Breaking the cycle of children’s exposure to tobacco smoke

April 2007
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**Glossary**

**Asthma** is a chronic inflammatory disease of the airways, characterised by recurrent breathlessness and wheezing.

**Atherosclerosis** describes fatty deposits which are laid down on the artery walls reducing bloodflow to the heart and other organs.

**Bronchiolitis** is an inflammatory infection of the bronchioles (small airways).

**Bronchitis** is inflammation of the bronchi (airways leading to the lungs).

**Bupropion** (Zyban) is an antidepressant used as an aid for smoking cessation.

**Cardiovascular disease** describes all conditions that affect the heart and blood vessels.

**Chronic obstructive pulmonary disease (COPD)** is a group of progressive respiratory tract diseases that are characterised by airflow obstruction or limitation.

**Cotinine** is a major metabolite of nicotine found in blood and urine.

**Cot death or Sudden Infant Death Syndrome (SIDS)** is the sudden and unexpected death of an infant aged less than one year during sleep.

**Croup** is a disease in young children, characterised by harsh coughing, fever and difficulty breathing.

**Cystic fibrosis** is an inherited and life-shortening illness which affects many organs in the body, particularly the lungs and digestive system.

**Deoxyribonucleic acid (DNA)** is a nucleic acid that makes up the genetic material in living organisms. It is made up of simple units called nucleotides and its major function is to encode the sequence of amino acid residues in proteins.

**Ectopic pregnancy** is pregnancy in which the fertilized egg grows outside the uterus, usually in one of the fallopian tubes.

**Emphysema** is a disease of the lungs which progressively reduces the effectiveness of the alveoli (air sacs) in providing oxygen to the blood.

**Endothelial cells** are the cells which line the vascular system acting as a barrier between the bloodstream and the blood vessel wall.

**Gastro-intestinal illnesses** are illnesses of the stomach and intestines.

**In utero** is a Latin term meaning inside the womb, and is used with reference to the fetus during pregnancy.

**Lymphoma** is a tumor of the lymphatic system.

**Meningitis** is an infection of the membranes of the brain or spinal cord.

**Miscarriage** is the spontaneous termination of a pregnancy before 24 weeks of gestation.

**Myeloid leukaemia** is a cancer of the blood-forming tissue, primarily the bone marrow and lymph nodes.

**Nicotine Replacement Therapy (NRT)** is the use of various forms of nicotine delivery methods intended to replace nicotine obtained from smoking or other tobacco usage.
Pharmacotherapy is the practice of treating disease with medication.

Placenta praevia is the abnormal development of the placenta, over or near the top of the cervix, placing the mother and baby at risk of severe blood loss and often rendering a vaginal delivery impossible.

Pneumonia is an infection causing inflammation of the bronchioles and alveoli, characterised by cough, fever and breathlessness.

Second-hand smoke is smoke exhaled by smokers and smoke that comes from the burning end of a cigarette, pipe or cigar, also referred to as passive or involuntary smoke.

Please note – the terms ‘smoking cessation’ and ‘stop smoking’ are used interchangeably throughout this report. Smoking cessation can be defined as the process of stopping or quitting smoking. Services provided to assist people in stopping smoking can be referred to as either ‘Stop smoking services’ or ‘Smoking cessation services’.

Abbreviations

<table>
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<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>ADHD</td>
<td>Attention deficit/hyperactivity disorder</td>
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<td>BAT</td>
<td>British American Tobacco</td>
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<td>COPD</td>
<td>Chronic obstructive pulmonary disease</td>
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<td>CSM</td>
<td>Committee on Safety of Medicines</td>
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<td>DNA</td>
<td>Deoxyribonucleic acid</td>
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<td>DH</td>
<td>Department of Health</td>
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<td>DTI</td>
<td>Department of Trade and Industry</td>
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<td>ECJ</td>
<td>European Court of Justice</td>
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<td>EU</td>
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<td>FCTC</td>
<td>Framework Convention on Tobacco Control</td>
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<td>GP</td>
<td>General practitioner</td>
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<td>IARC</td>
<td>International Agency for Research on Cancer</td>
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<td>MHRA</td>
<td>Medicines and Healthcare Regulatory Authority</td>
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<td>NHS</td>
<td>National Health Service</td>
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<td>NICE</td>
<td>National Institute for Healthcare and Clinical Excellence</td>
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<td>NRT</td>
<td>Nicotine replacement therapy</td>
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<td>SHS</td>
<td>Second-hand smoke</td>
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<td>SIDS</td>
<td>Sudden infant death syndrome</td>
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<td>USA</td>
<td>United States of America</td>
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<td>QOF</td>
<td>Quality and Outcomes Framework</td>
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<td>World Health Organisation</td>
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Foreword

The World Health Organisation (WHO) estimates that half of children worldwide live with at least one smoker. That has a profound effect on children’s health – from the direct health effects of inhaling second-hand smoke (SHS), to the risks of house fires. Addiction to tobacco also perpetuates poverty, and leaves a lethal legacy to a new generation of smokers who have learned from their parents to use tobacco.

In the United Kingdom (UK), more than five million children under 16 are exposed to SHS in their homes. By July 2007, all enclosed public places in the UK will be smoke-free. As the ban on smoking in public places comes into law, we will see a reduction in the current level of tobacco related disease that still blights the UK and kills an estimated 109,000 people each year. The evidence from other countries shows that smoke-free public places will protect workers from SHS, and will help smokers to quit. Furthermore, smoke-free places will reduce the numbers of our children who are exposed to SHS in their homes, and may prevent many from starting to smoke.

There is no doubt that the smoke-free laws will benefit the UK’s children, protecting their future health, and that of their families. The law, however, will not protect those children who remain exposed to tobacco smoke in utero, and to SHS in their own homes. The overwhelming majority of the world’s children, however, live in countries where there is no legislative protection from SHS at all.

This report describes the damage that adult smoking causes children. It explores effective ways of protecting some of the most vulnerable people in society from short and long-term harm, and recommends evidence-based policies that need to be adopted to break the cycle of children’s exposure to tobacco smoke. As with other publications by the BMA Board of Science this report is aimed at a wide audience, including health professionals, policy makers and members of the public. The approach of the BMA’s Board of Science is to provide a clear synthesis of the available research, and to develop evidence-based recommendations for policy.

Professor Sir Charles George
Chair, Board of Science

The Board of Science, a standing committee of the BMA, provides an interface between the medical profession, the government and the public. The board produces numerous reports containing policies for national action by government and other organisations, with specific recommendations affecting the medical and allied professions.
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Introduction

This report is about the intergenerational impacts of smoking. It focuses on the many consequences that parental smoking has on children; including the direct effects of SHS\(^a\) on children’s health, the damage that tobacco use can cause to family finances and wellbeing, and the influence of parents’ smoking on their children’s likelihood to smoke. It also summarises the evidence on interventions to support parents and protect children.

Children’s exposure to tobacco smoke in the environment can occur through three main routes: via the mother (from smoking or exposure to SHS) during pregnancy; through exposure of the child to SHS after birth; and through the child him/herself smoking. This report looks at all these routes of exposure. Epidemiological evidence shows that the health effects of children’s exposure to tobacco smoke \(\textit{in utero}\), and to SHS after they are born are significant. Living with adults who smoke also presents other risks to children’s wellbeing.

Maternal smoking in pregnancy, and maternal exposure to SHS while pregnant, have important effects on fetal, infant and child health. It can be difficult to distinguish the effects of smoking in pregnancy from maternal smoking after the baby is born because most children who are exposed to maternal smoking \(\textit{in utero}\) are also exposed to SHS after birth.

Most of children’s exposure to SHS comes from parents, and occurs in the home. In the United States of America (USA), it is estimated that 90 per cent of all childhood exposure to SHS comes from parents.\(^1\) No similar statistics are available for the UK. Although most studies have concentrated on maternal smoking, the effects of paternal smoking are also significant.\(^2,3,4\) Children may also be exposed to SHS from other adults in the home, in other people’s homes or in other settings where smoking is permitted.

Infants and children are particularly vulnerable to the health effects of SHS. They have more rapid respiratory rates, which means that they take proportionately more SHS into their lungs than adults. Their developing organs and immature immune systems are also at greater risk from exposure to toxins. A number of expert scientific reports have reviewed the available evidence, and have concluded that exposure to tobacco smoke is a major risk to child health. For key conclusions see appendix A.

In addition to the risks of SHS, many children and adolescents suffer health damage from smoking themselves. Children who live with smokers are more likely to start to smoke than those who live with non-smokers. Most adult smokers began to smoke in childhood or adolescence. Childhood smokers are at high risk of immediate health problems, including respiratory illness. They are also at very substantial risk of developing life-shortening conditions. Smokers who begin to smoke at younger ages have higher rates of tobacco-related mortality and morbidity, and suffer tobacco-related diseases earlier. The latest research shows that two thirds of young smokers die prematurely if they do not quit.\(^5\) Long-term smoking is closely correlated with inequality and social exclusion, with children from low income backgrounds most likely to be smokers in adulthood. The evidence shows that children who are looked after by the state, in foster care or in institutional settings, have disproportionately high smoking rates. These inequalities must be tackled. The smoke-free law provides an opportunity to harness people’s energy, and support smokers – especially those of childbearing age – to quit.

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\(^a\) Second-hand smoke (SHS) is also known as environmental tobacco smoke (ETS), tobacco smoke pollution and passive smoke.
In 2002, the BMA Tobacco Control Resource Centre and Board of Science published *Towards smoke-free public places* which called for legislation to make all enclosed public places smoke-free. This was followed in 2004 by the first focused overview of the impact of smoking on sexual, reproductive and child health in the UK; *Smoking and reproductive life: the impact of smoking on sexual, reproductive and child health*. In keeping with these, this new report draws on existing systematic reviews and expert evaluations, including the influential reports of the US Surgeon General, the UK Scientific Committee on Tobacco and Health, the World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC). Information about the main health effects of exposure to SHS and the constituents of SHS can be found in appendix B and C.

**Smoking and reproductive life: the impact of smoking on sexual, reproductive and child health**

The BMA’s report, *Smoking and reproductive life* (2004), presents the first focused overview of the impact of smoking on sexual, reproductive and neonate health in the UK. It considers active and passive smoking by men and women, and summarises the impact on sexual health, conception and pregnancy, as well as effects on the reproductive system. The impact of smoking on infant and child health is also considered.

The full report can be downloaded from the BMA’s website at www.bma.org.uk

For an explanation of the criteria used to assess causality in the report see appendix D.
Smoking trends

Smoking prevalence has declined steadily in the UK over the last two decades with the proportion of adults aged 16 and over who smoke cigarettes falling from 45 per cent in 1974 to 24 per cent in 2005. Despite this overall decline, smoking prevalence varies significantly with age, socioeconomic status, geographical location and gender. Within the UK, historically, smoking rates have been higher in Scotland than England and Wales, but in 2004, the prevalence was similar in all three countries, at about one in four adults. These figures mask considerable regional variation between different areas. In England, for example, prevalence ranges from 29 per cent in the North to 22 per cent in the South East.

Age and smoking rates

The decline in smoking prevalence since the 1970’s has not occurred equally across all age groups. In Britain, the highest smoking rates are consistently found in adults of childbearing age – between 20 and 34. Nearly one in three adults in this age range are smokers, compared with one in seven adults over 60 (see figure 1). Young adults are a major target of the tobacco companies, whose internal documents show that the industry views the process of becoming an addicted pack-a-day smoker as a series of stages. These stages begin with experimentation, often in teenagers, but can be consolidated up to age 25.

Figure 1: Smoking rates by age group, Great Britain 2005

Socioeconomic factors and smoking rates

Smoking is highly correlated with social deprivation. Those who live on low incomes are more likely to smoke. In 2004, one in four (25%) adults in the UK were smokers. Nearly one in three (31%) of people in manual groups were smokers, compared with fewer than one in five (18%) in professional and managerial groups (see figure 2).

The highest smoking rates were found among those who were economically inactive, but had last worked in manual jobs – nearly half (45%) of people in this category were smokers.

Figure 2: Smoking rates by occupation, Great Britain 2005

In the 1970s and 1980s, smoking rates fell more quickly among those in non-manual groups compared to those in manual groups, leaving a large gap in smoking rates between the different income groups. This gap has not broadened or narrowed in recent years, so smoking remains a major cause of health and economic inequalities. Smoking is responsible for more than half of the difference in premature death rates between individuals from high income backgrounds and individuals from low income backgrounds. Smokers living in deprived areas are about 40 per cent more likely to be classified as ‘hardcore smokers’ (ie those who are very resistant to quitting) than those in the most affluent areas. People who live in deprived areas are at greater risk of starting to smoke, likely to be more heavily addicted, and have lower chances of quitting successfully, compared with more affluent smokers.

Recent studies have explored the intersection between the life circumstances of smokers in disadvantaged areas and their smoking. These studies have found that smoking is used as a coping mechanism to mitigate the stresses of smokers’ lives – such as debt, unemployment, parenting (for women with childcare responsibilities) and work (frequently reported by men). Stressful events would often spark relapse after an attempt to quit. For the smokers interviewed, smoking is a cultural norm in both work and social contexts. It was easier to be a smoker than a non-smoker.
Parental smoking and the perpetuation of poverty

Children are disproportionately affected by poverty in the UK, and worldwide. Smoking deepens the effects of poverty on families and children. In low income families, parents’ addiction to tobacco can divert scarce funds away from meeting basic needs. The UK government’s independent inquiry on inequalities in health reported that in more than 70 per cent of two-parent households on income support, parents smoked, spending about 15 per cent of their disposable income on cigarettes. Children in these families were more likely to lack basic amenities such as food, shoes and coats. Interviews with smokers who are in low socioeconomic groups support the idea that the majority will find the money for tobacco, or use other strategies to obtain cigarettes, even when circumstances are difficult.

The consequences of parental smoking can also deepen poverty. Smoking is the UK’s biggest single cause of premature death and disability. Smokers are more likely to suffer from chronic illness, or to die prematurely than non-smokers. Children of parents who are unable to work are more likely to be from low income backgrounds, and dependence on benefits increases poverty. It has been argued that young smoking parents and children are vulnerable to creating a cycle of deprivation. Parental smoking harms the health of children, is associated with educational underachievement, and makes it more likely that these children will smoke. This makes them more vulnerable to becoming adult smokers, and young parents themselves, thus perpetuating the cycle.

Tobacco and poverty – the international picture

By 2020, the annual global death toll from tobacco is expected to double to 10 million. Seventy per cent of these deaths will be in developing countries. The burden of tobacco-related illness is borne by those from low income backgrounds.

In 2004, the WHO highlighted the links between tobacco and poverty when it devoted its annual World No Tobacco Day to the topic. For people from low income backgrounds, maintaining an addiction to tobacco can make the difference between sufficient food and malnutrition, and can literally cost children their education. In developing countries, the costs of ill health caused by smoking; such as lost wages and healthcare can be devastating.

Key facts

- The low income households in Bangladesh spend almost 10 times as much on tobacco as on education.
- More than 10.5m currently malnourished Bangladeshis could have an adequate diet if money spent on tobacco were spent on food instead.
- Some street children and other homeless people in India spend more on tobacco than on food, education or savings.
- Some Vietnamese smokers spend 3.6 times more on tobacco than on education; 2.5 times more on tobacco than on clothes; and 1.9 times more on tobacco than on healthcare.
- In Egypt, more than 10 per cent of household expenditure is on tobacco.
- In Morocco, households spend nearly as much on tobacco as they do on education.

UK-based tobacco companies are building share value on ‘emerging markets’, where tobacco control legislation is often much less stringent than it is in the UK. It is likely that expansion of tobacco company interests can only result in increasing poverty, disease and death for some of the world’s poorest people.
Smoking rates during pregnancy
In 2005, one in three (33%) women in the UK had smoked in the 12 months before they became pregnant, and one in six (17%) smoked throughout their pregnancy. Nearly half (48%) of women who smoked reported giving up before they became pregnant or while they were pregnant (see figure 3).

Figure 3: Women smoking in pregnancy, UK 2005


There are a number of risk factors for smoking during pregnancy including:
- low income
- low socioeconomic status
- unemployment
- young age
- lower educational attainment
- no partner or with a partner who smokes
- having an unplanned pregnancy.

The youngest parents are more likely to smoke. Nearly seven in 10 (68%) of teenage mothers report smoking in the year before pregnancy, compared with 21 per cent of those aged over 35 (see figure 4).
There is a general downward trend in rates of women smoking in pregnancy, but there are increasing health inequalities. Mothers who smoked throughout pregnancy are over four times more likely to work in routine and manual occupations than in managerial and professional occupations. While the proportion of mothers in managerial and professional occupations who smoked before or during pregnancy decreased from 22 per cent to 20 per cent between 2000 and 2005, the proportion of mothers in routine and manual occupations who smoked before or during pregnancy increased from 46 per cent to 48 per cent. Teenage mothers were the only age group where smoking rates in pregnancy increased between 2000 and 2005. In 2005, 45 per cent of teenage mothers smoked throughout their pregnancy, a five percentage point increase since 2000.

Lone parenthood, income and smoking rates during pregnancy

Lone parenthood, poor education, young age and low socioeconomic status all increase the risk of maternal smoking. The 2004 Families and Children study showed that half of lone mothers smoked, compared with a fifth of mothers in couple families. Half of lone mothers in the lowest income category were smokers.

Nearly three in five (58%) of mothers in the lowest income group had smoked during their last pregnancy (see figure 5) with lone mothers more likely to smoke. The highest smoking rates in pregnancy were among women with partners where neither partner worked – nearly four out of five (77%) of these mothers smoked during their last pregnancy.

Figure 5: Smoking in pregnancy and income, Great Britain 2004

A research study from 2005 has warned that policies aiming to reduce children’s exposure to SHS may not be sufficient without parallel action to improve maternal education and reduce material hardship. Reductions in smoking rates among low income women can only take place if the differences in life opportunities are addressed.
Smoking in pregnancy and the impact on neonatal health

Maternal smoking during pregnancy is the largest preventable cause of neonatal and infant ill health and death in the UK.\(^\text{27}\) It places the mother at risk of life-threatening complications. There is evidence to show that exposure to SHS in pregnancy causes harm that extends through infancy and childhood into adulthood (see appendix E).

Smoking is associated with an increased risk of ectopic pregnancy and miscarriage. Women who smoke are between 50 and 150 per cent more likely to experience an ectopic pregnancy,\(^\text{28}\) and 25 per cent more likely to miscarry.\(^\text{29}\) Smoking in pregnancy has been established as a cause of placental abnormalities and premature rupture of the fetal membranes.\(^\text{30}\) Smoking increases the risk of placental abruption by between 1.4 and 2.4 times. Smoking also increases the risk of placenta praevia by between 1.5 and 3.0 times. In both cases, the risk increases with cigarette consumption.\(^\text{31}\) Smokers have a two to three-fold increased risk of rupture of the chorion and amnion membranes that surround the fetus in the womb before 37 weeks of pregnancy.

Babies born with low birth-weight\(^\text{3}\) are at increased risk of illness and death in infancy.\(^\text{32}\) Babies born to mothers who smoke are around 40 per cent more likely to be stillborn\(^\text{33}\) or to die within the first four weeks of life.\(^\text{34}\) The more cigarettes that are smoked during pregnancy, the greater the risk. One study found that first-time mothers who smoked up to a pack a day were 25 per cent more likely to experience a stillbirth or neonatal death than non-smoking mothers, while those smoking more than a pack a day had a 56 per cent increase in risk.\(^\text{35}\) Smoking in pregnancy is also a cause of cot death, or sudden infant death syndrome (SIDS) (see page 18).

Maternal smoking in pregnancy is a cause of low birth-weight, via both interuterine growth retardation and premature delivery, although the impact of smoking on fetal growth is greater.\(^\text{36}\) In developed countries, cigarette smoking is the most important factor affecting birth-weight.\(^\text{37}\) SHS exposure is also associated with low birth-weight. On average, babies of mothers who smoke during pregnancy are 200 to 250g lighter than those of non-smokers.\(^\text{38}\) A review in 2004 found that the risk of premature birth was between 20 and 30 per cent higher for smoking mothers than for non-smokers.\(^\text{39}\)

There is conflicting evidence about whether reducing tobacco consumption during pregnancy reduces risks such as low birth-weight.\(^\text{40-42}\) No safe level of exposure to tobacco smoke during pregnancy has been identified.

Smoking in pregnancy has been associated with a modest increase in risk for specific fetal malformations, although the evidence is complex and difficult to interpret. The strongest evidence is for oral clefts (cleft lip and cleft palate).\(^\text{43}\) There is more limited evidence that smoking may be associated with absent or shortened limbs,\(^\text{44}\) and urogenital abnormalities.\(^\text{45}\) A 2004 review has resolved that there is insufficient evidence to conclude that smoking in pregnancy increases the risk of fetal abnormalities in general.\(^\text{46}\)

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b Low birth weight is defined by the WHO as a birth weight below 2,500g.

c Number of cigarettes in a pack not specified by author.
Mothers who smoke are less likely to start breastfeeding their babies than non-smoking mothers, and tend to breastfeed for a shorter time. The more cigarettes smoked, the sooner the baby is weaned. In breastfeeding mothers who smoke, milk output is reduced by more than 250 ml/day compared with non-smoking mothers.

There is substantial research linking maternal smoking in pregnancy to the development of attention deficit/hyperactivity disorder (ADHD). A review in 2005 concluded that children exposed to maternal smoking in utero were more than twice as likely to develop ADHD. Another study has found that women who smoke during pregnancy can cause permanent cardiovascular damage to their children, putting them at higher risk of cardiovascular disease later in life. The study found that pregnancy was a critical period for harm from exposure to tobacco smoke and that the effect was independent from exposure to SHS after birth (see page 20).

Some research suggests that maternal smoking in pregnancy may predispose those exposed to tobacco smoke in utero to become addicted smokers later in life. In one study, children of mothers who smoked more than 10 cigarettes a day while pregnant were five and a half times more likely to start smoking than the children of non-smoking mothers. It is possible that smoking in pregnancy may affect the development of nicotine receptors in the brain, increasing the risk of addiction if smoking is taken up later in life.

**Smoking in pregnancy – women’s experiences**

More women give up smoking while planning to conceive or while pregnant than at any other point in their lives, but approximately half of the women who smoke in the year before they become pregnant continue to smoke throughout their pregnancy.

Women smokers who are pregnant are more likely to give up smoking if it is their first pregnancy compared to women who have smoked during their previous pregnancies. Single mothers are more likely to smoke while pregnant than those with partners, and women with partners are more likely to smoke while they are pregnant if their partners are smokers. Women who continue to smoke while they are pregnant report strong feelings of guilt, which can prevent them from admitting how much they smoke. Women who contributed to a 2004 review identified that guilt, anxiety and stress resulting from continuing to smoke could damage relationships with their families and antenatal care staff. Most women are aware that smoking in pregnancy is harmful to the baby, but many downplay the impact that it will have on their baby as a process of rationalising this knowledge. In 1999, four out of five pregnant smokers surveyed agreed with the statement that “there are things which are far worse for an unborn baby than smoking”.

Survey data show that more women report cutting down on smoking while they are pregnant than quitting. A study which analysed cotinine levels in urine suggests that women may not actually reduce consumption during pregnancy.

It has been reported that some women mistakenly believe that low birth-weight babies are desirable or that they result in easier labours. One study that modelled the impact of a 100g increase in birth weight found that the overall risk of caesarean section was greatly reduced. While there was a slightly increased risk of caesarean section due to obstruction, there was a reduced risk of caesarean section due to fetal distress.
**Smoking in pregnancy – the role of partners**

A number of studies have shown that partners have a strong influence on whether women continue to smoke while they are pregnant. One study has shown that women with partners who smoke are four times more likely to smoke while pregnant than those with non-smoking partners. 51

Some research has shown that expectant fathers did not believe that their SHS would have an effect on the fetus. 56 One recent Northern Ireland study showed that the majority of male partners wanted their partners to quit or cut down smoking, while making no real changes to their own smoking behaviour. 57 Other studies have suggested that fathers can undermine women’s quit attempts by giving ‘negative support’ in response to smoking cues and lapses. 58

In addition to the potential to support mothers to quit, the impact of continuing paternal smoking on maternal and fetal health, as well as on children is a strong argument for encouraging fathers to quit.
Impacts of parental smoking on child health and well-being

The impacts of exposure to tobacco smoke on children's health are far reaching; they start in the womb and continue into adult life. The overwhelming majority of children in the UK are exposed to SHS. Over 80 per cent of children under the age of 10 from the most affluent backgrounds display biological markers of exposure, and this rises to more than 95 per cent of children from the least affluent backgrounds. The Scottish health survey showed similar levels of exposure among older children; overall more than 80 per cent (83 to 86%) of children aged eight to 15 reported being exposed to other people’s smoke, with more than 60 per cent (61 to 64%) exposed in their own home or someone else’s home.

With the implementation of the legislation banning smoking in public places, many settings where children are currently exposed to SHS (such as cafes, restaurants and public transport) will become smoke-free. Two major sites of exposure for children however, are not included under the legislation: homes and cars.

**Smoking in the home**

Studies have repeatedly demonstrated that the home is the most significant environment of children’s exposure to SHS. The Scottish health survey reports that four out of every 10 children (40%) live in homes where at least one person regularly smokes inside, which is in line with previous estimates for England. This represents more than 5 million children in the UK.

In 2005, the Royal College of Physicians reported that household exposure to SHS in England declined by more than half between 1996 and 2003. Up to 1998, this decline was accounted for mostly by reductions in exposure among children of non-smoking parents. Data to 2003 however show that there have also been substantial declines among the children of parents who smoke. See section on promoting smoke-free environments (page 31) for further information on smoking parents and the introduction of smoke-free homes.

**Children’s exposure to SHS – the international perspective**

The Global Youth Tobacco Study, a WHO survey of students aged between 13 and 15 in 76 countries, found that overall more than four in 10 (43.6%) of young people are exposed to SHS in their homes. More than half (55.8%) reported exposure in public places. This reflects the fact that a relatively small number of countries have introduced legislation on smoking in public places. Legislation is needed to protect young people from SHS.

Levels of SHS in homes can reach very high levels. A 2004 study demonstrated that just three cigarettes lit and left to smoulder in a small garage produced levels of particulate matter up to 10 times higher than a diesel car left to run for half an hour.

The evidence shows that only a completely smoke-free home offers effective protection from the health effects of SHS. Some studies have suggested that ‘harm reduction’ measures such as opening windows, smoking fewer cigarettes or avoiding smoking in the same room as children reduce levels of exposure to SHS. These studies also demonstrate that such measures still leave children exposed to levels of SHS that are far higher than those found in children who live in smoke-free homes, and in some cases are as high as those where there are no restrictions on smoking at all.
Ineffective harm reduction methods

- opening windows or doors
- smoking less
- not smoking in front of children
- smoking in different rooms
- smoking 'out of the window'
- smoking outside in front of an open door or window into the home
- smoking under the kitchen extractor fan
- air purifiers.

Recent evidence shows that pollution from SHS can linger for months in building interiors, including dust, carpets, furnishings and walls. These materials absorb the toxins in SHS and gradually release them back into the air, posing an additional risk of exposure. The evidence that SHS can contaminate house dust and surfaces is of particular concern in relation to young children. Infants have been estimated to ingest twice as much dust as adults. This is because they have more rapid respiratory rates, spend more time at ground level and have very high rates of hand-to-mouth behaviour.

Even when children have a condition such as asthma that makes them particularly vulnerable to SHS, they are no more likely to live in smoke-free homes than children without asthma. In one study from the USA, only half (51%) of children with asthma whose parents smoked lived in smoke-free homes. Smoking parents were 10 times more likely to permit people to smoke in their homes compared to non-smoking parents.

In England, parents who are smokers and have a smoke-free policy at home tend to smoke less, and to be from a more affluent background. Data from the Health Survey for England suggest that it is more common to have a smoke-free home if only the father smokes (32%) than if only the mother smokes (16%) or if both parents smoke (9%).

Benefits of smoke-free legislation for smoke-free homes

It has been claimed that smoke-free legislation will increase smoking in the home and place children at risk of increased exposure to SHS. There is no evidence to support this. The available evidence suggests that smoke-free laws reduce smoking in the home, particularly smoking around children. Smoke-free laws encourage smokers to quit. When fewer adults smoke, children’s exposure to SHS is reduced. Former and continuing smokers are more likely to adopt smoke-free homes after smoke-free laws are introduced.
In Australia, the proportion of family homes with smoking restrictions more than doubled from 25 per cent to 59 per cent after smoke-free workplaces were introduced. In households where one adult smoked, the proportion with smoking restrictions rose from 17 per cent to 53 per cent; among those where all adults smoked, it increased from two per cent to 32 per cent. In California, the proportion of children and adolescents living in smoke-free homes increased from 38 per cent in 1992, to 82.2 per cent in 1999, one year after all enclosed public places and workplaces became smoke-free state-wide.

Survey data from the Republic of Ireland show that the number of smokers who have smoke-free homes has increased by five percentage points (to 20%) since the law came into force. In New Zealand, reported exposure to SHS in the home nearly halved in the three years after smoke-free legislation was introduced, falling from 22 per cent to 12 per cent.

Smoke-free legislation may also reduce health inequalities. In New Zealand, there are large disparities in deprivation levels and health indicators between the (indigenous) Maori population and the non-Maori population. Maori people have a life expectancy of about eight years less than non-Maori. Maori people are more likely to smoke, and prior to the introduction of the smoke-free law they were more likely to be exposed to SHS. Evidence shows that SHS exposure has reduced for both Maori and non-Maori and is now similar for both populations (see figure 6).

**Figure 6: Effect of New Zealand smokefree law**

What do the world’s young people think about SHS?

International survey data from 132 countries between 1999 and 2005\(^{(1)}\) show that the majority of young people worldwide support smoke-free legislation. Overall, more than three quarters of students aged between 13 and 15 supported smoke-free laws (see figure 7). Support was highest in the European, Eastern Mediterranean and American regions (more than 80%) and lowest in Africa (60%).

Figure 7: Young people’s support for smokefree laws by WHO region

Smoking in cars

Much of the research has concentrated on risks arising from children’s exposure to SHS in homes. Two recent studies have confirmed that smoking in cars exposes non-smokers to very high levels of SHS. In England an estimated 30 per cent of smokers smoke in their cars,\(^{(74)}\) and over half of all journeys made by children aged 16 and under are by car.\(^{(77)}\) It is likely that cars are a significant source of exposure to SHS for children. Cars are confined spaces, so there is little potential for SHS to dissipate. In one USA study, the mean level of particles produced by a single smoker in a car with the windows wound up was higher than those measured in smoky bars, and the peak levels were higher still.\(^{(78)}\) A further study in New Zealand showed that even with car windows partially or wholly open, the air quality inside the car after three cigarettes had been smoked was similar to that found in a typical smoky pub. With the windows closed, levels of particulate matter were at least twice as high as the smokiest bar.\(^{(79)}\)

Unlike in homes, there is no clear evidence that smoke-free legislation increases the numbers of smoke-free cars. There is some international evidence that smokers are less likely to have smoke-free cars than smoke-free homes.\(^{(80,81,82)}\) In the Republic of Ireland, smoke-free legislation was followed by a small increase in smoking in cars, from 42 per cent to 45 per cent.\(^{(74)}\) In New Zealand,
qualitative research has suggested that smokers may perceive cars as ‘sanctuaries’ where smoking restrictions do not apply.\textsuperscript{[83]} Research evidence from California\textsuperscript{[80]} and New Zealand\textsuperscript{[84]} indicates that smoking in cars is more prevalent in areas of social deprivation.

Legislation banning smoking in cars with young children has been passed in the States of Arkansas and Louisiana in the USA, and in Puerto Rico. It is being actively considered in a number of other USA jurisdictions and in New South Wales, Australia.

There is some evidence that drivers who smoke are at greater risk of accidents than those who do not, with smokers about 50 per cent more likely to die in a crash. This risk is independent of other risk factors.\textsuperscript{[85,86,87]} Passengers, including children, are at greater risk of being involved in an accident if driven by a smoker. The evidence is complicated, and more research has been called for in this area.

**People’s perceptions of the risks of second-hand smoke to children’s health**

National survey data\textsuperscript{[85]} show that over time adult smokers have become significantly less likely to smoke in the same room as children. In 2005, 74 per cent of smokers said they would not smoke in the same room as a child, an increase of some 20 percentage points since 1997 (see figure 8). Among heavy smokers however, only 62 per cent said that they would not smoke in the same room as a child. Some researchers have argued that self-reporting of smoking habits among parents is unreliable, however, because of the perceived pressure to give the ‘correct’ response.\textsuperscript{[4]}

**Figure 8: Changing attitudes to smoking in front of children, Great Britain**

![Figure 8](image_url)

While this evidence suggests that the majority of people are aware that SHS harms children’s health, some health risks are better known than others. In 2005, approximately nine out of 10 people were aware that SHS increased the risk of chest infections and asthma. In contrast, fewer than six in 10 knew that it increased the risk of cot death, and fewer than four in 10 knew that SHS caused ear infections (see figure 9). Awareness of health risks was lowest among continuing smokers when compared with those who had given up smoking, or had never smoked.

Figure 9: Parental knowledge of health effects of second-hand smoke on children


One study of families who smoke found that 85 per cent of parents believed that SHS affected children a great deal or quite a lot, but that awareness of effective measures to protect babies from SHS was much lower.\(^\text{16}\)
Health impacts caused by exposure to second-hand smoke

Postnatal exposure to SHS causes health risks in infancy and childhood, which may extend into adulthood. Damage to the fetus caused by smoking in pregnancy may have important consequences after birth. It is difficult to identify the degree to which maternal smoking in pregnancy causes disease in childhood, because much of the research cannot separate the consequences of maternal smoking during pregnancy and smoking after birth. Children who are exposed to SHS have an increased risk of respiratory symptoms including breathlessness, phlegm, coughing and wheezing. Similarly, exposure to parental smoking has been shown to exacerbate the symptoms of cystic fibrosis, increasing the hospitalisation rate.

Major health effects of SHS on child health

<table>
<thead>
<tr>
<th>There is <strong>conclusive</strong> evidence that exposure to SHS causes:</th>
<th>There is <strong>substantial</strong> evidence that exposure to SHS causes:</th>
<th>There is <strong>suggestive</strong> evidence that exposure to SHS causes:</th>
</tr>
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<tbody>
<tr>
<td>• Cot death*</td>
<td>• Development of asthma* in those previously unaffected</td>
<td>• Overall childhood cancers (maternal smoking)</td>
</tr>
<tr>
<td>• Asthma attacks in those already affected</td>
<td>• Worse symptoms in cystic fibrosis</td>
<td>• Brain cancer and lymphoma (paternal smoking)</td>
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<td>• Respiratory illnesses</td>
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<td>• Meningitis</td>
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<td>• Respiratory symptoms</td>
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<td>• Cancer in adulthood</td>
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<tr>
<td>• Impaired lung function* in childhood and adulthood</td>
<td></td>
<td>• Initiation and progression of cardiovascular disease</td>
</tr>
<tr>
<td>• Middle-ear disease (glue ear)</td>
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* These conditions are also associated with maternal smoking in pregnancy.


Cot death

It has been established that smoking in pregnancy is an independent risk factor for cot death. A review in 2001 found that the risk of cot death is approximately trebled by maternal smoking. Paternal smoking also increases the risk of cot death. One study has shown that in homes where both parents smoke, the risk of cot death is nearly four times as high as in homes where neither parent smokes (odds ratio: 3.79). The greater the number of cigarettes smoked in a household, the greater the risk (see figure 10). In one study, the risk of SIDS was almost double among mothers who smoked up to nine cigarettes a day (odds ratio: 1.87), compared with mothers who did not smoke. The risk was more than two and a half times greater for those smoking 10-19 cigarettes a day (odds ratio: 2.64), and more than five times higher for those smoking more than a pack daily (odds ratio: 5.06).

A recent study has shown that the epidemiology of cot death in the UK has changed because of the success of the ‘back to sleep’ campaign. While numbers of cot deaths have fallen, maternal smoking in pregnancy is increasingly becoming a risk factor. Twenty years ago, 57 per cent of cot deaths occurred in families where the mother smoked. The figure is now 86 per cent.

d The odds ratio is a statistical measure of the size of an effect. It represents the ratio of the odds of an event occurring in one group of subjects to the odds of it occurring in another group.
Asthma
Asthma is a major cause of chronic disease in children. Rates are increasing. SHS exacerbates symptoms of asthma, and there is strong evidence that it is causally associated with the onset of asthma.

The 2006 report of the US Surgeon General has recently clarified the evidence base surrounding childhood asthma and SHS exposure. A number of reviews have classified exposure to SHS as a cause of childhood asthma. The US Surgeon General concluded that although the evidence is clear that SHS exposure increases the prevalence of asthma in populations, the currently available studies are insufficiently powerful to conclude that SHS causes asthma in individuals. Limitations in the scientific data make it difficult to ascertain whether smoking during pregnancy is an independent risk factor for asthma, although the evidence suggests strongly that it is.

Impaired lung function
Impaired lung function has been identified as a major risk factor for chronic obstructive pulmonary disease (COPD) in adult life. Smoking in pregnancy impairs lung function in infancy. Exposure to SHS, including paternal smoking, also reduces lung function by reducing the growth rate of the lung. Children both with and without asthma are affected. Reduced lung function in early life persists into childhood. There is some evidence that deficits developed in early life may extend into adulthood, where they would increase the risk of severe asthma and COPD, although more studies are needed to confirm this association. One international study conducted in 2004 demonstrated that children of smokers had poorer lung function and more respiratory symptoms than those of non-smoking parents in adulthood.
Lower respiratory tract illnesses
Acute respiratory illness is the most common cause of childhood morbidity worldwide, affecting a third of all infants in the first year of life, and a quarter of all children aged one to two. Maternal smoking and SHS exposure are important causes of lower respiratory tract illnesses including croup, bronchitis, bronchiolitis, and pneumonia in children and infants. Young children whose parents smoke are nearly twice as likely to be admitted to hospital with serious lower respiratory tract infections than children who are not exposed. The risks are highest in infants aged under two.

Middle ear disease
Exposure to tobacco smoke in childhood causes acute and chronic middle ear disease, which are major sources of childhood morbidity. Ear infections can cause temporary hearing impairment. In chronic cases of ‘glue ear’, hearing may be permanently compromised. Children who live with one parent who smokes are nearly 50 per cent more likely to suffer from glue ear (odds ratio: 1.48).

Meningitis
A number of studies have associated exposure to SHS with the development of bacterial meningitis in children. More research is needed to confirm this association and the magnitude of the increased risk.

Cognitive development and behavioural problems
Some studies have suggested that exposure to parental smoking causes problems with cognitive and behavioural development, and that children of smokers tend to do less well at school than children of non-smokers. It is acknowledged that these studies were difficult to interpret. The US Surgeon General has described the difficulty of designing appropriate studies in this area, and concluded that there is currently insufficient evidence to establish whether or not parental smoking is a cause of cognitive delay or behavioural problems. A further study has raised questions about the methodology of some of the previous research on the relationship between parental smoking and cognitive problems.

Cardiovascular risks
Coronary heart disease is extremely rare in children and no study has yet shown that exposure to tobacco smoke in utero, or to SHS in childhood, causes cardiovascular disease in adulthood. There is strong evidence that low birth-weight – which can be caused by maternal smoking in pregnancy – is an independent risk factor for cardiovascular disease in later life. The Barker hypothesis (also known as fetal programming) suggests that low birth-weight caused by interuterine growth retardation followed by disproportionate growth triggers metabolic abnormalities and thus “programmes” adult coronary heart disease.

SHS exposure has been reported to alter lipid profiles in both children and adolescents, increasing the risk of coronary heart disease. There is also evidence that SHS exposure reduces oxygen transport in children, and that maternal smoking and SHS cause damage to infants’ endothelial cells.

Exposure to SHS has been established as a cause of coronary heart disease in adults; as exposure increases the risk of coronary heart disease by 25 to 30 per cent. Recent evidence from the British Regional Heart Study suggests that the effects of exposure to SHS may have been underestimated in previous research, and that heavily exposed individuals may be 50 to 60 per cent more likely to die from heart disease than those with no exposure.
**Childhood cancers**

A 2004 review has concluded that, children’s exposure to parental smoking may be associated with the development of some childhood cancers. Paternal smoking has been associated with an increased risk of lymphoma (odds ratio: 2.10) and brain tumours (odds ratio: 1.22). Maternal smoking is associated with a slightly increased risk for all childhood cancers (odds ratio: 1.10), but there is insufficient evidence to conclude that maternal smoking is associated with specific cancers such as leukaemia.

**Cancer in adulthood**

There is conclusive evidence that exposure to SHS causes lung cancer in adults. Adult exposure to SHS increases the risk of lung cancer by 20 to 30 per cent. The literature relating to childhood exposure has been limited and inconclusive. A review in 2000 concluded that there was currently insufficient evidence to infer an increased risk. A subsequent large-scale case-control study has concluded that children who are exposed to SHS for several hours each day are more than 3.5 times more likely to develop lung cancer as adults.

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**The tobacco industry and the health risks of SHS**

Despite the fact that private research conducted by some tobacco companies supports the conclusion that SHS harms health, they have attempted to discredit this evidence in public.

A number of published reports, claiming to be based on an examination of internal tobacco industry documents, allege that while private research conducted by some tobacco companies supported the conclusion that SHS harms health, some have attempted to discredit this evidence in public by:

- commissioning scientists to discredit the scientific evidence that SHS harms health
- funding independent organisations to promulgate research that supported tobacco company interests
- suppressing research that did not accord with its interests
- placing media articles to attack the science on SHS and health, using think tanks with links to the tobacco industry to recruit sympathetic journalists
- funding other interest groups, such as hospitality trade groups, to promote alternatives to smoke-free.

A study in 2005 identifies papers relating to maternal and child health. The papers show that Philip Morris was concerned that the evidence that SHS was harmful to maternal and child health would trigger increased regulation. One memo read:

*The issues of maternal, spousal and work-place smoking all come together when considering pregnancy. In addition, women of childbearing age constitute a significant part of our market, not to mention a powerful political force. Directly mobilising such a significant segment of the adult population around such an emotional issue has the potential for providing tremendous impetus to all sorts of restrictive legislation in the home, in public areas as well as in the workplace. There is perhaps no other issue as powerful facing the industry.*

The papers indicate that Philip Morris commissioned a review article about SHS and cot death. The original draft of the review concluded that exposure to SHS is a cause of cot death. Following input from Philip Morris executives, this conclusion was changed to read that the role of SHS in cot death is ‘less well established’ than that of maternal smoking during pregnancy. This was one of a number of amendments suggested by Philip Morris staff, who were not acknowledged as authors. The review’s conclusions have now been cited in several other publications.
Other impacts of parental smoking on health and wellbeing

Educational impacts
Children who live with smokers are more likely to be absent from school through respiratory illness or gastro-intestinal illness. Children with asthma who are exposed to SHS are at particularly high risk of absenteeism. A study of Scottish secondary school pupils with asthma showed that those exposed to SHS were between 44 and 77 per cent more likely to be absent from school because of asthmatic symptoms than those who were not exposed. Absence from school is a cause of stress and anxiety to young people. It can lead to children falling behind their peers, and may also lead to social isolation.

House fires
More than 1,500 children under 16 years of age are injured in house fires annually in the UK, and approximately 40 die each year. There is a very strong link between child house fire deaths and socioeconomic deprivation. A 2006 study in England and Wales has shown that children of parents who do not work are nearly 38 times more likely to die in a house fire than those whose parents are employed in professional and managerial jobs.

According to UK government figures, households including smokers are 35 per cent more likely to have a house fire than non-smoking homes. Globally, it has been estimated that one in every 10 deaths in house fires are caused by smoking materials. Cigarettes and smoking materials such as lighters and matches are a leading cause of house fires. Most manufactured cigarettes continue to smoulder unless they are extinguished. This means that discarded cigarettes can be a major fire risk. In the UK, fires ignited by tobacco products, matches and lighters are the biggest cause of fire death and account for over a third of all fatal house fires. In 2004, fires ignited by these materials caused 145 deaths and more than 4,300 injuries.

In 2002, it was revealed that a number of tobacco companies had been working on reducing the fire risk from discarded cigarettes since the 1970’s, and that the mass manufacture of self-extinguishing cigarettes has been possible since the mid 1980’s. Despite this, fire safe cigarettes were not introduced onto the market in any numbers. Both Canada and the State of New York have legislated to ban sales of conventional cigarettes, and replace them with reduced ignition propensity versions. Evaluations of the New York legislation have shown that these products have been accepted by smokers.

A study of fire safe cigarettes conducted for the UK government showed that these products reduce, but do not eliminate, the risk of discarded cigarettes igniting upholstery. Up to 78 deaths and 886 injuries could be avoided each year if the safer products were introduced. It has been reported that the UK government plans to lobby the European Union (EU) to make fire-safe cigarettes compulsory across Europe. This process may take years. The risk demands that fire safe cigarettes are introduced in the UK.

Poisoning
Tobacco products are among the top causes of poisoning in children each year in the UK. In 2002, there were an estimated 164 cases of nicotine poisoning caused by ingestion of tobacco in children under the age of 15. Although nicotine poisoning is rarely fatal, it can cause vomiting and other unpleasant symptoms. These figures do not include the more serious poisoning risks caused by accidental ingestion of lighter fuel or solvent abuse.
Children as smokers

Prevalence of smoking in children
In UK surveys, the following definitions of smoking prevalence in children are used:
• regular smokers – usually smoke at least one cigarette a week
• occasional smokers – usually smoke less than one cigarette a week
• current smokers – all regular and occasional smokers.
There is some evidence that young people who smoke may under report their usual smoking behaviour. 

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<tr>
<th>Risk factors associated with youth smoking:</th>
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<tr>
<td>• parental smoking</td>
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<tr>
<td>• peer influence from older siblings and friends</td>
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<tr>
<td>• low socioeconomic status</td>
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<tr>
<td>• female sex</td>
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<td>• low parental education</td>
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<tr>
<td>• living in a single parent household</td>
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<tr>
<td>• poor academic performance</td>
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<tr>
<td>• participation in risk taking activities</td>
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<tr>
<td>• exposure to tobacco marketing activities</td>
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<tr>
<td>• television and films</td>
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<tr>
<td>• mental illness</td>
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In the UK, youth smoking rates have declined since 1996. In 2004, the number of children who had ever smoked fell to its lowest level – fewer than four in 10 (39%) had ever smoked. In England, 17 per cent of girls and 11 per cent of boys aged between 11 and 15 were current smokers in 2005. Scottish data show similar trends. The highest prevalence is found in 15 year olds, wherein 25 per cent of girls and 16 percent of boys smoke regularly (see figure 11).
There is evidence that youth smoking rates are highest among those from low income backgrounds. In England and Wales, 13 per cent of pupils receiving free school meals are regular smokers, compared with eight per cent of pupils who do not receive free school meals. Pupils from homes with fewer than 10 books are more than twice as likely to become regular smokers compared to those from homes with more than 10 books. Scottish research suggests that adolescents from the lowest income backgrounds are also more likely to be regular smokers than those from the most affluent families. The inequalities gap appears to be widening among boys. Among the most affluent boys, smoking rates declined by two percentage points for 13 year olds and six percentage points for 15 year olds, between 2002 and 2004. Smoking rates among the least affluent boys, and girls in all income categories remained the same.

Children who are looked after by local authorities are among the most vulnerable groups in society. In any year, about 90,000 children pass through the care system in England and Wales alone. These young people have very high rates of smoking. Data from England in 2003 show that one in three (32%) looked after young people, aged 11 to 17 were current smokers. Seven in every 10 (69%) children in residential care were smokers, compared with just over one in five of those in foster care (22%). The study reported that these children began to smoke very young – nearly one in three (32%) had started smoking at age 10 or younger.

There is some evidence that young people with a range of mental health conditions, including schizophrenia, depression and ADHD are more likely to smoke. UK data showed that young people with a diagnosis of depression were over five times more likely to be smokers than those without depression.
In England and Wales there is some variation in smoking rates between ethnic groups. The highest rates of regular smoking are found among white and mixed ethnicity pupils – around one in 10 is a regular smoker. This compares with about one in 20 black pupils, and one in 29 Asian pupils.

**Children as smokers – the international perspective**

International data from the Global Youth Tobacco survey found that there was considerable variation in youth smoking patterns in different regions. Overall, 15 per cent of boys and 6.6 per cent of girls classed themselves as smokers, and 10.9 and 7.4 per cent respectively used other types of tobacco. The highest youth smoking rates were found in Europe, where 33.9 per cent of boys and 29 per cent of girls were smokers.

A major international study of child health in the European Region found that 15 per cent of all 11 year olds, 40 per cent of all 13 year olds and 62 per cent of all 15 year olds had tried smoking. The average age of starting to smoke was 12.5 years. In most countries, daily smoking prevalence ranges from below three per cent of 11 year olds, to less than 10 per cent of 13 year olds and less than 30 per cent of 15 year olds.

**Effect of parental attitude on smoking initiation in children**

Parental attitudes to smoking have been established as a major risk factor for smoking initiation, with permissive attitudes towards smoking increasing the risk. In England, 10 per cent of children who smoke regularly report that they are given cigarettes by their parents. Children of parents who smoke are between two and three times more likely to smoke than those who come from non-smoking homes. Young people who smoke will become tomorrow's parents who smoke, perpetuating the cycle of smoking-related ill-health in families.

Parental smoking cessation is the most effective way to reduce the risk of smoking initiation in children. A three year study has shown that even parents who continue to smoke can discourage their children from starting to smoke. Children whose parents actively socialised them against smoking were half as likely to initiate smoking. Living in a smoke-free home reduces the likelihood of children smoking; one study has shown that children from smoke-free homes are 74 per cent less likely to start smoking. Smoke-free homes also almost double the chances that children who begin to smoke will quit.

**Cigarette addiction in children**

While conventional wisdom might see experimentation with tobacco as an inevitable ‘rite of passage’, a number of studies demonstrate that any smoking can have serious repercussions. Recent research has suggested that experimental smoking in childhood, even if this amounts to a single cigarette, is highly predictive of regular smoking in adolescence. One study of London school children suggests that smoking a single cigarette is a risk indicator for children to become regular smokers up to three years later. Young people can show signs of addiction within four weeks of starting to smoke, and before they commence daily smoking.

Smokers who begin to smoke at a young age are less likely to give up than those who start smoking in later life. One study has shown that those who start to smoke before the age of 16 are more than twice as likely to continue smoking than those who begin later in life (odds ratio: 2.1). They are also likely to smoke more heavily than those who begin to smoke later. Research shows that
young people's perception of their smoking does not reflect this. Many young people identify themselves as 'social smokers' who are not addicted to tobacco. In one Scottish study, these accounted for one fifth of smokers in their mid to late teens. Others did not recognise that they were addicted until they tried to quit.66

Long-term smoking is commonly measured in ‘pack years’. This is calculated by multiplying the number of packs of 20 cigarettes smoked per day by the number of years the person has smoked. Those who begin to smoke in childhood and adolescence typically have more ‘pack years’ of exposure than smokers who start during adulthood, both because they have smoked for longer and because they tend to smoke more heavily. This increases the risk of developing life-shortening illnesses at younger ages. Recent research records that in the UK, the average age of smoking initiation got younger as the 20th century progressed.16 As many as two thirds of life-long smokers may die prematurely as a result of smoking.

The health effects of smoking in children and adolescents
Childhood smoking initiation has serious short and long-term health impacts. In the short-term, young smokers are more prone to respiratory illness. There are also significant issues with co-morbidity; young smokers are more likely to use alcohol or drugs than non-smokers167 and to be absent from school through truancy or exclusion, than non-smokers.153,168 Smoking may be overlooked as a possible cause of illness even in young children.

Respiratory disease
Child and adolescent smoking causes serious risks to respiratory health in both the short and long term. Young people who smoke experience more respiratory symptoms, such as coughing, phlegm, and wheezing than those who do not smoke.30 They also have poorer lung function than their non-smoking peers.169 Smoking is a cause of asthma-related symptoms in childhood and adolescence, and it also causes poor control of asthmatic symptoms. There is substantial evidence that smoking may worsen the prognosis in those who have asthma.7

Smoking is established as a cause of impaired lung growth in children and adolescents. It also initiates the premature onset of lung function decline.30 It has been indicated that this reduced lung function leads to an elevated risk of developing COPD in later life, but more research is needed. One recent study has shown that starting to smoke at the age of 15 years or below is an independent risk factor for the development of COPD and other forms of obstructive airways disease in women. Female smokers who had started to smoke as children were 79 per cent more likely to develop bronchitis or emphysema than those who had begun to smoke as adults.169

Cancer
Smoking is a cause of several types of cancer, including cancer of the lung, mouth, throat, oesophagus, pancreas, kidney, liver, and cervix, and myeloid leukaemia. Overall, one in every three cancer deaths is caused by smoking.

Individuals who start to smoke at a young age have higher age-specific cancer rates for all types of tobacco-related cancers. A review in 2004 concluded that much of the effect is because young smokers have more ‘pack years’, and therefore a greater exposure to tobacco carcinogens.127 There is also some biological evidence that childhood smoking may constitute an independent risk factor for lung cancer, because younger smokers are more susceptible to deoxyribonucleic acid (DNA) damage from carcinogens in tobacco.110
Cardiovascular disease
A number of studies have shown that young people’s smoking is associated with the development of sub-clinical atherosclerosis, a precursor of cardiovascular disease. In one study, smokers aged as young as 15 displayed greater degrees of atherosclerosis than those who had never smoked. If young smokers continue to smoke, their cardiovascular health will deteriorate further.
UK policies to reduce exposure to second-hand smoke

The current UK government has made a number of policy commitments on tobacco since it came into power in 1997. Its white paper *Smoking kills*\(^{171}\) (1998) identified reducing smoking rates as a priority in order to improve health.

Policies introduced as a result of the white paper include:
- increases in tobacco taxation and enforcement against tobacco smuggling
- legislation to ban tobacco advertising and sponsorship
- funding specialist smoking cessation services to help smokers quit
- media health promotion campaigns.

*Smoking kills* did not advocate legislation on smoking in public places or workplaces. Instead, the government proposed voluntary action in partnership with employers and the hospitality industry. The tobacco-industry funded *Public Places Charter* focussed on signage and ventilation strategies. The use of ventilation systems and non-smoking areas have, however, been shown to be ineffective at protecting people from exposure to SHS,\(^{172,173,174}\) and an evaluation of the *Public Places Charter* showed that it had failed to increase smoke-free provision.\(^{175}\)

The *Choosing health*\(^{176}\) white paper was published in 2004. It proposed some new policies on smoking, including a partial ban on smoking in public places, negative licensing to help enforce the law on underage sales, and pictorial health warnings on packs.

In England, the Department of Health (DH) is currently pursuing a six-strand strategy to reduce tobacco use:\(^{177}\)
- reducing exposure to SHS
- reducing tobacco advertising and promotion
- funding National Health Service (NHS) Stop Smoking Services\(^*\) and wider availability of Nicotine Replacement Therapy (NRT)
- developing national smoking communication campaigns and education
- regulating tobacco products
- reducing availability and supply of tobacco.

In Scotland, the Smoking Prevention Working Group’s report *Towards a future without tobacco* was published on 22 November 2006. The consultation process on the recommendations of the report closed on 28 February 2007. Responses are now being considered before publishing a full response.

**Targets**

In the *Smoking kills*\(^{171}\) white paper the government set targets on reducing smoking rates in England:
- to reduce overall smoking prevalence to 24 per cent by 2010
- to reduce smoking prevalence among 11 to 15 year olds to nine per cent by 2010
- to reduce smoking among pregnant women from 23 per cent in 1995 to 18 per cent by 2005 and 15 per cent by 2010.

Please refer to the glossary for an explanation for the use of the terms ‘stop smoking’ and ‘smoking cessation’.
A further commitment was made in the *National Cancer Plan (2001)*\(^{178}\) to reduce smoking prevalence among manual groups to 26 per cent by 2010. In July 2004, a series of new targets were agreed with the Treasury,\(^{179}\) including the reduction of overall adult smoking prevalence to 21 per cent by 2010.

<table>
<thead>
<tr>
<th>Current UK smoking rate targets for England</th>
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<tr>
<td>Adults 16+</td>
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<tr>
<td>Young smokers</td>
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<td>Pregnant women</td>
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<td>Manual groups</td>
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<tr>
<td>to 21 per cent by 2010</td>
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<tr>
<td>to nine per cent by 2010</td>
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<td>to 18 per cent by 2005 and 15 per cent by 2010</td>
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<td>to 26 per cent by 2010</td>
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The Scottish and Northern Irish administrations have set their own targets for smoking rates. They are as follows:

<table>
<thead>
<tr>
<th>Scotland</th>
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<tr>
<td>Adults 16+</td>
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<tr>
<td>Young smokers</td>
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<td>Pregnant women</td>
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<td>Deprived communities</td>
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<tr>
<td>to 22 per cent by 2010</td>
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<tr>
<td>to 12 per cent by 2005 and 11 per cent by 2010</td>
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<tr>
<td>to 23 per cent by 2005 and to 20 per cent by 2010</td>
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<td>to 32 per cent by 2008</td>
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<table>
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<th>Northern Ireland</th>
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<tr>
<td>Adults 16+</td>
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<td>Young smokers</td>
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<td>Pregnant women</td>
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<td>Manual groups</td>
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<td>to 25 per cent by 2006/7</td>
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<td>to 11 per cent by 2006</td>
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<tr>
<td>to 18 per cent by 2005</td>
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<td>to 31 per cent by 2006/7</td>
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The countries of the UK will all have introduced smoke-free public places by July 2007. Scotland and Wales went completely smoke-free on 26 March 2006 and 2 April 2007 respectively. Northern Ireland will become smoke-free from 30 April 2007, with England following on 1 July 2007.

Ministers in Scotland, England and Wales have announced that they will legislate to raise the age for tobacco sales from 16 to 18. At the time of writing, the DH has yet to publish the results of a consultation into introducing pictorial health warnings throughout the UK.

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\(^{178}\) No targets have been set for Wales as the Welsh Assembly Government is currently developing new determinants of health indicators.
Effective interventions to reduce children’s exposure to tobacco smoke

Reducing children's exposure to tobacco smoke requires a coordinated approach focused on reducing smoking rates among parents, reducing children’s exposure to SHS and reducing smoking rates among children and young people.

Evidence from Massachusetts and the Republic of Ireland shows that comprehensive tobacco control programmes reduced smoking prevalence across the population, and in target groups, including young smokers, pregnant women and those from low income backgrounds. New research from California demonstrates that a comprehensive tobacco control programme dramatically reduces youth smoking prevalence, including youth experimentation with cigarettes. Between 1996 and 2002, the number of youths who had ever smoked a cigarette by the age of 16 and 17 fell by a third (34%).

A study from 2006 found that individualised interventions designed to reduce exposure to SHS are likely to have limited effectiveness, and may risk leaving the most disadvantaged at greatest risk of exposure. Population-wide measures to reduce smoking – including tobacco price policies, smoke-free public places, population level stop smoking support and tobacco education – have a central role in reducing children's exposure to SHS. As the prevalence of smoking in a population falls, so does exposure to SHS. Measures are needed to reduce smoking prevalence among adults of childbearing age. If fewer parents smoke, fewer children would suffer detrimental effects to their health and wellbeing. Population-wide approaches to reducing smoking rates can reduce child and adolescent smoking, because smoking initiation and regular smoking can mirror wider trends in the population. Some measures, such as making tobacco less affordable, have disproportionate benefits for young smokers.

Health promotion and advice – the role of healthcare professionals

Healthcare professionals have a vital role in providing information to parents about the risks that exposure to SHS and parental smoking can cause to their children's health. Where children are smokers, healthcare professionals are in a position to advise them of the health risks, and encourage them to quit.

There is strong evidence that brief advice from a doctor increases quit rates in the general population. A review from 2004 concluded that advice from nurses could also have a positive impact on quit rates. If doctors offer stop smoking advice to parents as part of their healthcare, it will increase quit rates and therefore reduce exposure to SHS. There is currently little evidence that interventions from health professionals that are designed specifically to reduce children’s exposure to SHS are effective. This is an important area for future research.

Much of the research has focussed on general practitioners (GPs). Guidelines published in Thorax and by National Institute for Health and Clinical Excellence (NICE) stipulate that smokers should be asked about their smoking status and offered brief advice at least once a year. Research suggests, however, that smoking cessation advice is not provided in the majority of GP consultations with smokers. In one UK study, up to eight in every ten GP consultations with smokers did not include stop smoking advice. A large UK study found that in a two year period, fewer than seven per cent of smokers were prescribed NRT by their doctor, while another suggests that only about five per cent of smokers receive advice about NRT from their GP. The inclusion of smoking cessation within the Quality and Outcomes Framework (QOF) of GP contract should increase the rate of GP intervention.

There is limited research on doctors’ behaviour in relation to young people and smoking. Although American studies suggest that the majority of paediatricians and GPs ask young people about
whether they smoke, a sizeable minority do not, and of those that ask, many do not offer stop
smoking advice or support. In one study of American child psychiatrists, fewer than a third
(30%) consistently offered advice to their smoking patients to help them quit.

**Encouraging parents to reduce children’s exposure to second-hand smoke**

A review from 2002 found that there was insufficient evidence about which interventions aimed
at parents would reduce children’s exposure to SHS. The authors noted that, while interventions
appeared to change participants’ knowledge of the effects of SHS, they did not necessarily result
in changes in smoking behaviour or reductions in children’s exposure to SHS. Some of the more
successful interventions were aimed at changing parents’ attitudes and behaviours rather than
trying to increase their knowledge. There is no evidence that parents of children who are ill are
more likely to respond to interventions than the parents of healthy children. Another review
reported similar results and concluded that brief interventions, such as physician advice and one-
off counselling had – at best – a marginal impact on parent’s behaviour. It noted that more
intensive counselling yielded better results, without reducing exposure levels to zero.

**Promoting smoke-free environments**

Increases in the numbers of smoke-free homes are a response to reduced prevalence of smoke-free
environments in the population at large, and to the wider policy context and increasing information
about the health risks of SHS.

Two recent qualitative studies in Liverpool and Australia have identified the following factors
that might prevent parents from adopting smoke-free homes:

- inability to leave children unsupervised in order to smoke
- lack of appropriate outside space for smoking
- lack of comfort or privacy outside home
- addiction to tobacco
- difficulties in requesting visitors not to smoke in the home
- lack of support from friends and family
- lack of knowledge about health risks of SHS for children.

These factors should be considered when developing interventions to promote smoke-free homes.

The introduction of smoke-free laws are a major opportunity to increase awareness of the health
risks of SHS, and to run information campaigns to encourage smokers to adopt smoke-free
home. In New Zealand, reported exposure to SHS nearly halved in the three years after smoke-
free legislation was introduced. A hard-hitting media campaign was launched alongside the legal
change, and is likely to have contributed to this decline in exposure.

In 2003, the DH ran a high impact television campaign about children’s exposure to SHS, with the
strap-line ‘when you smoke, they smoke’. Infants and children were shown with smoke coming
out of their noses and mouths, as though they were smoking. The evaluation of the campaign
showed that unprompted awareness that SHS harmed children’s health rose from less than a third
(28%) of respondents to half (50%). Three per cent of smokers said that these ads had prompted
them to quit, while one fifth (19%) said that it had stopped them from smoking around children.
**International examples: Campaigns for smoke-free homes and cars in New Zealand and New South Wales, Australia**

**New Zealand**

New Zealand’s ‘take the smoke outside’ mass media campaign was developed to accompany the smoke-free legislation and has been running since April 2004. It uses television adverts supported by print and radio advertising and other resources.

The first phase concentrated on smoking in the home. Television adverts showed the toxins in SHS, and encouraged parents to protect their children by ‘taking the smoke outside’. A third commercial publicised the New Zealand ‘quit-line’ to help parents to stop smoking.

Source: Second-hand smoke in New Zealand; Smokefree community, New Zealand.

In 2006, a further campaign ‘make your car smoke-free’ was launched, using television and radio adverts and other sources including key fobs, number plate surrounds and stickers. The ‘smoke-free cars’ campaign encourages smokers to protect their children from the harms of SHS by not smoking in their car, even when they are alone.

The key messages are:
- SHS is dangerous to the health of children
- winding down a window does not rid a car of the poisons contained in SHS
- poisons linger long after the smoke has disappeared

All resources featured the tagline ‘make your car smoke-free / kia auahi kore o tatou waka’.

**Australia**

In New South Wales, Australia, the ‘car and home smoke-free zone’ project was directed at a community level. It achieved a 56 per cent increase in the number of smoke-free homes (from 47% to 73% of homes surveyed), and a 42 per cent increase in smoke-free cars (from 23% to 61%) between 2002 and 2005. This project was aimed at households including children under 7 years of age living with smokers.
The project used multi-media campaigns to influence parents directly, as well as building capacity within the health professions and communities through targeted resources and grants awarded to support associated projects.

Both of these examples show the importance of tailoring messages to target different cultural contexts. In the UK, similar campaigns have operated at local level. For these community campaigns, including those in Liverpool and Lincolnshire, interventions have included specific measures, such as signage and stickers, to help parents to overcome some of the barriers to enforcing smoke-free homes.
**Smoking cessation**

The single most effective intervention to reduce children’s exposure to SHS is for parents and carers to stop smoking. Effective stop smoking interventions for young smokers would also improve their individual health outcomes, and break the intergenerational cycle of tobacco use.

Support to stop smoking is highly cost effective. Throughout England and Wales a reduction in smoking rates has been the biggest single factor in reducing deaths from heart disease and was responsible for preventing nearly 30,000 deaths from heart disease alone between 1981 and 2000. The provision of smoking cessation support is also one of the most effective ways to reduce health inequalities.

Support to stop smoking is an important component of a comprehensive tobacco control strategy. Helpful support will maximise the effectiveness of population-wide policies to reduce tobacco use.

Specialist smoking cessation services have been established throughout the UK with NHS funding. The UK is the leading country in the world in offering support for smokers to quit. The services offer practical support and pharmaceutical treatments (NRT and/or bupropion) on prescription to help smokers give up. A new treatment, varenicline was licensed for prescription in the UK in 2006. At the time of writing, it had not been evaluated by NICE.

**Tobacco addiction and stopping smoking**

Tobacco is a highly addictive substance, and even extremely motivated smokers can find it very difficult to give up. In the UK, more than seven out of ten smokers (72%) say they want to quit, and more than half (53%) want to do so within the next year. Eight out of ten have already made a quit attempt. Of those who try to quit without help, about 5 per cent will succeed at any attempt. Support from a health professional increases quit rates. Intensive behavioural support makes the most difference. Evidence shows that around one in five (21-22%) of those who receive medication as well as behavioural support succeed.

Smoking cessation services are highly cost effective. A recent study of the cessation services in England has confirmed that the cost comes in at £684 per life year saved, or £438 when savings in future health-care costs are counted. To put this cost into perspective, NICE recommends that interventions that cost less than £20,000 per ‘quality adjusted life year’ should be implemented by the NHS.

A recent study has confirmed that the smoking cessation services in England have encouraged GPs to offer smokers help to quit. Cessation services in England have also successfully targeted smokers in hard to reach areas. A greater proportion of smokers in deprived areas were treated than in affluent areas. Almost a third (32%) of all those treated were from the most deprived groups. Smokers in low income groups are less likely to succeed in quitting. This difference in treatment outcomes must be addressed if the services are to reduce health inequalities.

**Cessation in pregnancy**

A Cochrane review of smoking cessation interventions for pregnant women shows that they can make a difference. Overall, this amounts to an additional six women quitting in every 100. The most successful strategies involve social support and a rewards system. In these groups an additional 23 women in every 100 quit. The review also shows that cessation can make a difference to neonatal health outcomes. The interventions lead to a mean increase in birth-weight of 33g, a reduction in low birth-weight rates by 19 per cent and reduced premature births by 16 per cent. One study has demonstrated that many women who do quit smoking during pregnancy also have partners who give up, and suggests that expectant parents who smoke may be encouraged to quit together. More research to identify appropriate interventions is required.
Use of pharmacotherapies to help pregnant women stop smoking

In 2005, the UK Committee on Safety of Medicines (CSM) and Medicines and Healthcare Regulatory Authority (MHRA) licensed NRT for use in pregnant women. Research in Wales suggests that three quarters of women want to stop smoking when pregnant, and that more than two thirds (68%) would find it acceptable to be prescribed NRT. The recent Cochrane review showed that interventions using NRT were similar in effectiveness to other interventions (ie that they led to an additional six women in every hundred quitting). The data were very limited however, and more research is needed. The MHRA guidance notes that, although there is little clinical research about the use of NRT in pregnancy, the known dangers of smoking are likely to outweigh the potential risks of using nicotine in pregnancy. It is recommended that pregnant women should stop smoking without using NRT if possible, but that NRT may be prescribed if it is needed to help pregnant women to stop smoking.

Important factors for supporting pregnant smokers to quit

A 2006 English study identified three beacon services for smoking cessation in pregnancy. Their success rates ranged from 35 per cent to 48 per cent of smokers setting a quit date being abstinent at four weeks. The authors identified the following factors as being important:

- local midwives make most of the referrals. Training for midwives centres on how to refer smokers, rather than how to treat them
- NRT is offered to almost all pregnant smokers, and an efficient prescription system is in place
- flexible home visits
- intensive multi-session treatment by a small number of key staff.

Avoiding relapse during or after pregnancy

Women who quit smoking while pregnant have very high rates of relapse after giving birth. Between 70 per cent and 85 per cent of women who quit while they are pregnant begin smoking again after their baby is born. There is very little evidence about how to prevent smokers who have quit successfully from beginning to smoke again. A Cochrane review of stop smoking interventions in pregnancy found none that reduced relapse rates. A review in 2004 of smoking cessation programmes aimed at pregnant women smokers concluded that the risk of relapse may be reduced if the following considerations are incorporated into interventions:

- smoking habits of partners, others living in the home, and close friends
- support, positive encouragement
- understanding that successful interventions take time and financial commitment
- support from women’s social networks
- interventions should take place throughout pregnancy and early childhood care
- differentiation between those who have concrete plans for not relapsing and those who have not thought out possible challenges.

Cessation targeted at young people

Epidemiological evidence suggests that smokers can avoid the majority of smoking related mortality if they give up before they are 30 years old. Smoking prevalence is highest in young smokers aged from 16 to 34. The most effective way of eliminating children’s exposure to SHS and the influence of parental smoking is if parents do not smoke at all. Encouraging young adults to quit is therefore a priority to protect children from exposure to tobacco smoke. Despite this, evidence about how to promote cessation in this age group is scant. Smoking interventions for young people also need to address the fact that in this age group it is common to smoke cannabis as well as tobacco.

NRT is now licensed for use in young people over the age of 12 years. Recent research however raises questions about whether NRT will be effective in helping young smokers to quit. A study
of low income young smokers in Nottingham\textsuperscript{212} showed that participation in a programme involving counselling and NRT did not increase quit rates. The researchers identified problems with recruiting young smokers to participate, and retaining them. They concluded that young people found complying with the treatment programme difficult, perhaps because they underestimated how difficult it is to quit.

A review in 2006\textsuperscript{211} of adolescent cessation programmes, including 15 trials involving more than 3,500 smokers under the age of 20, concluded that more evidence is needed to elucidate effective measures to support young people to stop smoking. Eight cessation pilot projects aimed at young people aged between 12 and 24 were recently evaluated in Scotland. The projects had very low success rates, with fewer than three per cent of participants remaining abstinent after three and 12 months. There were also considerable difficulties with recruiting young smokers to the projects in the first place. Participation and quit rates appeared to increase with age, suggesting that young people have different perceptions of tobacco use and stopping smoking compared with older adults.\textsuperscript{211} It has also been suggested that young people are averse to using stop smoking support services, preferring to quit on their own or with friends’ advice.\textsuperscript{213}

Another study found that young people often express a desire to give up, but that their views are characterised by ambivalence. Many see quitting as a project for the future, rather than the short term.\textsuperscript{166} It has been argued that smokers aged 18 to 24 have been ignored by public health programmes. This is despite the fact that this is the point immediately before youth smokers make the transition into more addicted smokers with heavier consumption who are likely to find it harder to quit.\textsuperscript{8}

**Policies to reduce tobacco supply and demand**

**Marketing controls**

Tobacco marketing is central to recruiting young smokers, and also to retaining them, by providing smoking cues that make it harder for smokers to give up. Cigarette pack branding is a very powerful medium, which is used to convey brand image.\textsuperscript{214} The introduction of plain packaging would eradicate the marketing power associated with cigarette branding. It may also mean that health warnings are more easily recalled by consumers.\textsuperscript{215,216} The promotion of tobacco through product placement in TV and films is also of concern. There is a growing body of research that suggests that on-screen smoking can influence young people to take up smoking.\textsuperscript{217,218,219,220}

Some advertising is permitted at point of sale, such as gantries. The display of tobacco products can itself constitute tobacco advertising, in the form of ‘power walls’ where large quantities of cigarettes form a backdrop to the cash point. Displays at point of sale normalise tobacco use, especially because the packs are placed next to everyday items.\textsuperscript{221} In the USA, tobacco companies are known to pay retailers to achieve dominance of these power walls with their brands.\textsuperscript{222} One study\textsuperscript{221} has shown that adolescents become more aware of tobacco brands when cigarettes are on display, and that they are more likely to express an interest in trying named brands. School children shown a cigarettes display at point of sale were more likely to perceive that it would be easy for them to buy cigarettes than those who were shown a till point with no cigarette display. Norway and New Zealand are considering banning displays of cigarettes at point of sale and permitting tobacco products only to be stored under the counter.\textsuperscript{223} Scotland is also considering this as a part of the *Towards a future without tobacco* consultation.\textsuperscript{214} The UK introduced a comprehensive ban on tobacco advertising, sponsorship and promotion in 2003. A study\textsuperscript{225} conducted shortly after the ban was implemented showed that there was a dramatic reduction in
smokers’ awareness of tobacco advertising as a result of the law. The legislation left some loopholes in both traditional outlets and new media. Cross-border marketing of tobacco products is a significant loophole for countries like the UK that have already banned tobacco advertising. The growth of the internet and international access to television and radio mean that this is a fast moving technological area.

Tackling cross border advertising requires multinational cooperation. The WHO Framework Convention on Tobacco Control (FCTC) mandates parties to act against advertising efforts that span countries’ national borders (see appendix F). It also provides potential mechanisms for monitoring, reporting and prosecuting companies that breach the Treaty's provisions on cross-border advertising. A specific protocol on cross border advertising would help to ensure that countries maintain their obligations in this area, share information about the changing technology in this area and can reduce the risk from cross border advertising.

Advances in communications technology have opened new frontiers in tobacco marketing, which are often not captured by existing regulations and are difficult to monitor and block. The danger is that companies will be able to target young people in new ways, giving rise to the fear that young people with access to this technology could be unprotected.

In the UK, nearly six in ten (57%) households have access to the internet at home.\(^226\) A study conducted by academics from the London School of Economics has estimated that nearly all (98%) young people aged nine to 19 are internet users, and nearly three quarters (74%) have online access at home, although this drops to around six in ten (61%) for young people from lower socioeconomic backgrounds.\(^227\) The possibilities of using new media to reach this market are enormous. These include marketing techniques that are not covered under current legislation banning tobacco advertising, underage sales of tobacco products and easy access to cheaper tobacco, where duty is not paid. A number of studies\(^228,229,230\) have commented on the pro-smoking content of some websites aimed at young people. These can include tobacco branding and celebrities smoking, as well as misleading content. The anonymity of the internet means that it can be difficult to establish who is posting messages to websites.

In one American study from 2004,\(^231\) a direct marketing executive who has worked with tobacco companies explained the attractions of the internet for the tobacco industry: ‘You’ve got to realise that, number one, tobacco isn’t allowed to advertise and number two, the internet reduces the costs of communication to almost nil. The combination is absolutely irresistible to tobacco. And what else are they going to do, except head out of town literally to places overseas where concern about smoking is virtually non-existent … on the internet especially, it’s not hard to slide around the rules…’

Viral marketing uses the internet to create “word of mouth” awareness of marketing messages, commonly by encouraging consumers to pass on weblinks and downloads to their social networks. Although there is evidence that children are able to buy tobacco over the internet without age restrictions,\(^228,229,231\) surveys of young people in the UK show that, at present, the internet is very rarely used to purchase tobacco.\(^192,193\) This is likely to become a growth sector for youth tobacco sales in the future, especially if the availability of tobacco from shops and vending machines is reduced. The development of prepayment cards for children as young as 13 years of age could make it easier for children to access tobacco from the internet.

The internet also offers opportunities for tobacco control campaigns. Web-based campaigns can generate high impacts at lower costs than traditional broadcast media. More than a quarter (27%)
of UK adults report using the web specifically to seek health information within the last three months.\textsuperscript{226} Government tobacco control campaigns must incorporate a strong web presence.

**Increasing the minimum age**

From October 2007, it will be illegal to sell tobacco in England and Wales to young people under 18 years old. The Scottish Executive has also announced that it intends to raise the age to 18. The BMA has long called for the minimum age of tobacco sales to be raised from 16 to 18 years old, bringing tobacco into line with alcohol. This measure will convey the important social message that tobacco is harmful, and should be seen as part of a package of measures to reduce tobacco use. If the law is to be effective, it is vital that it is enforced. A number of countries have a minimum age of 18 years for purchasing tobacco, including Australia, Malta, Norway, Finland and the Republic of Ireland. Six out of eight Canadian provinces have set the cigarette purchase age at 19 years.

There is evidence that the UK’s existing legislation on sales of tobacco is not effectively implemented. Despite the fact that it is against the law to sell tobacco to children under 16, English data show that only under a quarter (24%) of underage smokers find it difficult to buy cigarettes from shops, and just over half (52%) were refused on one or more occasions in 2004.\textsuperscript{152} There are other important aspects of the law on tobacco sales which are not currently enforced, which also need to be implemented. It has been illegal to sell cigarettes singly or in units of less than ten since 1991 because buying cigarettes in small numbers makes them more affordable for adolescents. In 2005, three per cent of underage smokers in England reported that they had bought fewer than 10 cigarettes the last time they had obtained cigarettes from a shop.\textsuperscript{152} Despite widespread evidence that the law on underage sales is being broken, there have been very few prosecutions of retailers. A total of 73 cases were brought in 2004, of which 57 resulted in a guilty verdict.\textsuperscript{234} In four out of five cases, guilty retailers are not even fined.\textsuperscript{235}

A recent Cochrane review\textsuperscript{236} concluded that effective enforcement of laws to restrict tobacco sales to minors reduced young people’s access to tobacco, and improved retailers’ compliance with the law. Compliance rates by retailers may have to be higher than 80 per cent to reduce access sufficiently to reduce young people’s tobacco consumption or smoking prevalence.

**Licensing scheme for tobacco sales**

The government has suggested that it will introduce a ‘negative licensing’ scheme to provide meaningful sanctions against retailers that break the law, by taking away the assumed right to sell tobacco products.\textsuperscript{156} Radical action is needed, however, to ensure that the law on underage sales is enforced. A positive licensing scheme, already in place for shops that wish to sell alcohol, would bring tobacco sales into line with alcohol sales. It would be more likely to be taken seriously than a negative licensing scheme. In a recent survey of Scottish BMA members, 93 per cent of doctors said that they believed the introduction of a license to sell cigarettes would be an important measure to prevent shopkeepers selling cigarettes to under-age children.\textsuperscript{227}

**Ten packs and vending machines**

The latest English data show that most underage smokers buy their cigarettes in packs of ten cigarettes; over half (55%) of underage smokers last bought a ten pack.\textsuperscript{152} Internal tobacco documents confirm that packs of ten are mainly bought by young smokers, including ‘new entrants’, as a cheaper means of acquiring cigarettes.\textsuperscript{238} The Scottish Executive’s Smoking Prevention Working Group recently recommended that the UK government should investigate the case for banning the sale of packs of 10 cigarettes altogether, as has been done in other jurisdictions including Australia, New Zealand, Canada, France, and 14 states in the USA.\textsuperscript{223} Article 16 of the FCTC calls for bans on the sale of ‘small packs’ of cigarettes.\textsuperscript{239}
Vending machines are often used by young people to buy cigarettes because there are no age checks in place. A voluntary code agreed with the National Association of Cigarette Machine Operators is supposed to ensure that vending machines are only sited in supervised areas so that underage smokers cannot buy cigarettes. English data suggest that about a quarter of all underage regular smokers usually obtain their cigarettes from vending machines. Adolescents also report that it is easier to buy cigarettes from vending machines than from shops.\textsuperscript{242}

\textit{Tobacco tax policies}

Effective tobacco tax policies are successful evidence based measures to reduce tobacco consumption. A recent study has concluded that tobacco tax is also a highly cost-effective public health measure.\textsuperscript{207} The World Bank has estimated that, in high income countries like the UK, a 10 per cent increase in price leads to a four per cent reduction in demand.\textsuperscript{241} Young people and low income smokers are particularly sensitive to increases in price. It has been estimated that young smokers are two to three times more sensitive to price than older adults.\textsuperscript{242} Tobacco duty is an effective tool for reducing smoking in these groups.

It is important to examine the trends in affordability of cigarettes. Although cigarettes are less affordable than they were in 1980, the government’s recent failure to levy tobacco tax at levels greater than the rate of inflation means that duty paid tobacco has become steadily more affordable since 2000 (see figure 12).\textsuperscript{243} In addition, the decision to tax hand-rolling tobacco at a lower rate than manufactured cigarettes has provided an opportunity for smokers to ‘trade down’ to hand-rolling tobacco and maintain their consumption. The negative consequences of reducing taxation levels on tobacco products were seen in Canada in the 1990s. When tobacco taxes were reduced, youth smoking rate increased. An analysis in 2006 estimated that for each dollar reduction in price, there was a 15 per cent increase in smoking uptake in young people.\textsuperscript{244}
There are strong public health arguments for retaining high levels of tobacco taxation, despite concerns that tobacco taxes may be regressive, because they are disproportionately paid by the people with low income backgrounds. The evidence shows that, because the least affluent smokers are more likely to quit in response to price increases, the tax increase is borne more heavily by those who are most able to afford it. The World Bank has concluded that tobacco tax increases are not regressive. One recent study in New Zealand found that the health impacts arising from paying higher duty for low income smokers who continued to smoke were several orders of magnitude less than those caused by deprivation or smoking. The authors concluded that the benefits of high tobacco tax outweighed the harms, even for the most deprived communities. It has been suggested that hypothecating increases in tobacco duty and spending them on smoking cessation services aimed at low income communities makes tobacco tax increases more equitable.

The European Union and duty levels
A 2006 ruling by the European Court of Justice (ECJ) has clarified that internet sales of tobacco and alcohol will be subject to duty in the country where the purchaser is based. While this decision on cross-border sales is to be welcomed, it is extremely important that the UK government resists attempts to harmonise duty levels across the EU, unless this involves a levelling-up process. If duty levels were harmonised downwards, this would mean that tobacco prices in the UK would fall, and would drive an increase in tobacco consumption. This would be a disaster for public health and for the individuals and families that would have their lives blighted by tobacco-related death and disability.

Illicit trade in tobacco
The ready supply of smuggled tobacco helps to undermine the public health benefits of taxation. Smuggled cigarettes typically cost half of the price of duty paid products. A study in 2006 showed that heavy smokers in deprived communities were the most likely to buy smuggled
tobacco. In a random sample of smokers in North East England, nearly half (44%) of all smokers reported having bought smuggled tobacco. Research on low income smokers has shown that many perceive smugglers to be doing a service by giving people access to cheaper tobacco. Since 1996, the proportion of underage smokers reporting that they bought cigarettes from other people has risen from 26 per cent to 42 per cent. This may reflect increasing availability of bootlegged tobacco to young smokers.

The tobacco industry argues that the high levels of taxation in the UK create a demand for smuggled tobacco, and lobby for reductions in duty. The evidence shows that high rates of smuggling are often found in economies where prices are relatively low. Price is not the only – or the most important – driver of smuggling. Rather it should be seen as a criminal activity and enforced as such.

Illicit trade in tobacco falls into three categories:

- bootlegging – which is the illegal import of small quantities of tobacco for non-personal use. It accounts for a relatively small fraction of the overall total of the UK’s smuggled tobacco market. Reducing the amount of tobacco that people can legally bring into the UK would help to prevent this. Policy on these levels is decided at EU level. The indicative level for cigarettes for personal use when travelling between EU countries is currently 3,200. This should be reduced to 200 cigarettes.

- large scale smuggling – the UK tobacco companies have now signed memoranda of understanding with Customs to reduce large-scale smuggling. The 2000 Health Select Committee report, The tobacco industry and the health risks of smoking, examined evidence regarding alleged activities of British American Tobacco (BAT) in manipulating the market in smuggled tobacco goods. The allegations centred on the claim that BAT had not been directly involved in carrying out smuggling, but that it had condoned tax evasion and exploited the smuggling of billions of cigarettes in a global effort to boost sales and lure generations of new smokers. The report concluded that the allegations merited careful consideration and called upon the Department of Trade and Industry (DTI) to investigate further. The subsequent investigation by the DTI did not uncover material indicating a basis for launching a criminal investigation and no further action has been taken by the DTI. In 2002, the Parliament’s public accounts committee launched an inquiry into tobacco smuggling, which concluded that Imperial Tobacco had been complicit in large scale smuggling of its own brands into the UK.

- counterfeit cigarettes – which now account for more than half of all illegal cigarettes seized by HM Customs. In London, more than eight in every ten cheap cigarettes are counterfeit. Counterfeits may be even more harmful to health than authentic cigarettes. Analysis of 47 types of counterfeit cigarettes in the UK found that they had even higher levels of cadmium and other toxic heavy metals. Most smokers do not identify their cigarettes as counterfeits, and there is low awareness that fake cigarettes may pose additional risks to health.

Tobacco smuggling is a major international problem. In addition to enforcement by domestic governments, multilateral action is also required. Article 15 of the WHO FCTC contains general provisions against tobacco smuggling, but a detailed protocol which controls large scale smuggling, counterfeit trade and illegal manufacturing is urgently needed to stem the flow of illegal tobacco. Jurisdictions including Malaysia and Brazil require pack markings which allow enforcement officials to detect counterfeit cigarettes easily. These should be introduced in the UK.
Recommendations

Policy for UK governments

- The UK health departments should ensure that smoking cessation services are adequately funded and resourced. In addition to money already provided, two per cent of the revenues raised from tobacco tax should be ring-fenced for use in providing cessation services especially in areas of deprivation.

- Smoking cessation services should be targeted at high risk groups to include those in the lower socioeconomic groups, pregnant mothers, those with mental health problems and children who are looked after by the state, in foster care or in institutional settings.

- Taxation on all tobacco products should be standardised and increased at higher than inflation rates to reduce the affordability and therefore availability of cigarettes.

- Cigarettes should not be displayed at the point of sale and tobacco vending machines should be banned.

- Legislation to ban the sale of packs of 10 cigarettes should be introduced.

- Legislation raising the minimum age of sale of tobacco products to 18 should be introduced across the UK and strictly enforced.

- A positive licensing scheme, already in place for shops that wish to sell alcohol, should be introduced. This would bring tobacco sales into line with alcohol sales.

- Legislation to ban the sale of conventional cigarettes and have these replaced with Reduced Ignition Propensity (fire safe) cigarettes should be introduced. There should be campaigns for them to be adopted throughout the EU.

- The UK governments should continue with country-wide media campaigns to inform the public about the health effects of exposure to SHS at home and in cars.

Healthcare professionals

- Healthcare professionals should inform parents who smoke of the health risks that it poses to their children. This is particularly important for children who already have an illness that is caused or exacerbated by parental smoking. Parents who smoke should be encouraged and helped to quit smoking, and to adopt smoke-free homes if they continue to smoke.

- Healthcare professionals have a responsibility to help their patients to stop smoking. This includes providing opportunistic interventions, support and advice on how to quit, prescribing appropriate treatment such as NRT, and referral to specialist smoking cessation services where necessary.
**International**

- The European Commission should:
  - introduce smoke-free legislation across all member states as proposed in the 2007 Green paper
  - introduce policies to reduce bootlegging without levelling duty levels downwards
  - reduce the indicative level for cigarettes for personal use when travelling between EU countries from the 3,200 to 200 cigarettes.

- Governments world-wide should introduce comprehensive tobacco control policies that are regularly monitored and strictly enforced. These policies should be in line with the WHO Framework Convention on Tobacco Control and include:
  - comprehensive bans on smoking in work places and public places
  - increased taxation on tobacco and tobacco products
  - comprehensive bans on the advertising and promotion of tobacco and tobacco products
  - the introduction of health warnings on all tobacco products
  - an increase in the age of purchase for tobacco and tobacco products
  - action on smuggling of tobacco and tobacco products
  - comprehensive provision of smoking cessation services.

- Detailed protocols on illicit trade in tobacco and cross border marketing should be developed, disseminated and implemented as part of the Framework Convention on Tobacco Control.

**Research**

There is already a strong research base on the effects of tobacco smoke on health. Further research is needed to:

- evaluate current cessation services and different models of delivery and support
- develop and evaluate new cessation approaches focussing on disadvantaged, pregnant women (and partners)
- develop and evaluate initiatives at national and local level of increasing smoke-free homes and cars, particularly where children are at risk. Could involve a range of agencies and settings eg NHS, education, social services
- continue to monitor trends in children's levels and sources of exposure to SHS in national surveys
- ascertain children's and young peoples' views and experiences of SHS (plus parents’, grandparents and other carers) to help inform health promotion initiatives and advocacy
- evaluate impact of national policy measures on key groups eg increase age of sale, smoke-free legislation on children and young people (exposure, attitudes, behaviour, home/school/college)
- further examine the association between the exposure to SHS with the development of bacterial meningitis in children and the magnitude of the increased risk
- further examine the indication that reduced lung function due to smoking in children and adolescents leads to an elevated risk of developing COPD in later life.
Appendix A: Key findings of the health impacts of second-hand smoke

- 1983 – UK Independent Scientific Committee on Smoking and Health concludes that smoking during pregnancy retards fetal growth.  
- 1984 – US Surgeon General concludes that children of smoking parents have an increased prevalence of respiratory symptoms and an increased frequency of bronchitis and pneumonia early in life.  
- 1986 – US Surgeon General concludes that the children of parents who smoke have an increased frequency of acute respiratory illnesses and related hospital admissions during infancy.  
- 1988 – UK Independent Scientific Committee on Smoking and Health concludes that exposure to other people's tobacco smoke is a risk for pregnant women.  
- 1992 – USA Environmental Protection Agency concludes that children who are exposed to passive smoking have an increased risk of developing asthma.  
- 1998 – The UK Scientific Committee on Tobacco and Health concludes that passive smoking causes childhood respiratory disease and is causally associated with cot death.  
- 1999 – WHO Expert Consultation concludes that passive smoking causes respiratory disease and middle-ear infection, and reduces lung function in children.  
- 2000 – UK Confidential Inquiry into Stillbirths and Death in Infancy identifies exposure to SHS in infancy as a cause of cot death.  
- 2004 – BMA publishes its report *Smoking and reproductive life*, which finds that smoking and passive smoking adversely affect many aspects of sexual, reproductive and child health.  
- 2004 – WHO International Agency for Research on Cancer concludes that SHS exposure is a cause of lung cancer in adults, and notes that exposure to SHS produces a number of harmful effects in children and adults.  
- 2004 – UK Scientific Committee on Tobacco and Health reiterates its earlier findings and states that SHS is a controllable and preventable form of indoor air pollution, and that no infant, child or adult should be exposed to it.  
- 2005 – California Environmental Protection Agency recommends that SHS be defined in law as a toxic air contaminant with a disproportionate impact on children.  
- 2006 – US Surgeon General concludes that there is no risk-free level of exposure to SHS.
Appendix B: Summary of the main health effects of exposure to second-hand smoke

<table>
<thead>
<tr>
<th>Adults (including pregnant women)</th>
<th>There is <strong>conclusive</strong> evidence that exposure to SHS causes:</th>
<th>There is <strong>substantial</strong> evidence that exposure to SHS causes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Lung cancer</td>
<td>% Coronary heart disease</td>
<td>% Stroke</td>
</tr>
<tr>
<td>% Asthma attacks in those already affected</td>
<td>% Onset of symptoms of heart disease</td>
<td>% Reduced fetal growth (low birth-weight baby)</td>
</tr>
<tr>
<td>% Worsening of symptoms of bronchitis</td>
<td>% Reduced lung function</td>
<td>% Premature birth</td>
</tr>
<tr>
<td>% Chronic obstructive pulmonary disease</td>
<td>% Onset of asthma</td>
<td>% Reduced lung function</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Children</th>
<th>% Stroke</th>
<th>% Development of asthma in those previously unaffected</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Cot death</td>
<td>% Middle-ear disease (ear infections)</td>
<td>% Development of asthma in those previously unaffected</td>
</tr>
<tr>
<td>% Respiratory infections</td>
<td>% Asthma attacks in those already affected</td>
<td>% Development of asthma in those previously unaffected</td>
</tr>
<tr>
<td>% Reduced lung function</td>
<td>% Onset of asthma</td>
<td>% Development of asthma in those previously unaffected</td>
</tr>
</tbody>
</table>

Source: Adapted from BMA (2004) *Smoking and reproductive life*
Appendix C: Constituents of second-hand smoke

SHS is produced when tobacco products are burned. Typically about 85 per cent of SHS is sidestream smoke, which comes from the lit end of a cigarette, cigar or pipe, and is not inhaled by the smoker. Most of the remaining 15 per cent is mainstream smoke, which the smoker has exhaled.¹²⁷

SHS consists of a gas phase and a particulate phase. The majority of SHS is in the form of undetectable gases, including carbon monoxide, nicotine, ammonia, dimethylnitrosamine, formaldehyde, hydrogen cyanide and acrolein. The particulate phase includes the components of tar, benzene and benzo[a]pyrene. It is made up of fine particles that can be inhaled deep into the lungs.

SHS has been classified as a known human carcinogen by the USA Environmental Protection Agency and the IARC. It is a cocktail of more than 4,000 chemicals, some of which remain to be identified. At least 69 of these are known to cause cancer, and many others are known to be poisonous.¹²⁷

Recent evidence shows that pollution from SHS can linger for months in building interiors, including dust, carpets, furnishings and walls. These materials absorb the toxins in SHS and gradually release them back into the air, posing an additional risk of exposure.¹²⁷

<table>
<thead>
<tr>
<th>Toxins and irritants</th>
<th>Carcinogens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia</td>
<td>Benzo[a]pyrene</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>N-Nitrosamines</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>2-Naphthylamine</td>
</tr>
<tr>
<td>Nicotine</td>
<td>4-Aminobiphenyl</td>
</tr>
<tr>
<td>Toluene</td>
<td>Benzene</td>
</tr>
<tr>
<td>Nitrogen dioxide</td>
<td>Arsenic</td>
</tr>
<tr>
<td>Hydrogen cyanide</td>
<td>Beryllium</td>
</tr>
<tr>
<td>Acrolein</td>
<td>Nickel compounds</td>
</tr>
<tr>
<td>Acetone</td>
<td>Chromium</td>
</tr>
<tr>
<td>Mercury</td>
<td>Cadmium</td>
</tr>
<tr>
<td></td>
<td>Ethylene oxide</td>
</tr>
<tr>
<td></td>
<td>Vinyl chloride</td>
</tr>
<tr>
<td></td>
<td>Polonium 210</td>
</tr>
</tbody>
</table>

Appendix D: Explanation of terms

**Assessment of causality**
Assessment of the relationship between exposure and a particular outcome is made on the balance of all the available evidence. Sir Austin Bradford-Hill proposed several considerations to be taken into account, which have been widely used and adapted. Some key considerations follow.

**Strength of the association**
Strong associations are more likely to be causal than weak ones. Weak associations are more likely to be explained by undetected biases. However, this does not rule out the possibility of a weak association being causal.

**Consistency of the association**
An association is more likely to be causal when a number of similar results emerge from different studies done in different populations. Lack of consistency, however, does not rule out a causal association.

**Temporality**
For an exposure to cause an outcome, it must precede the effect.

**Plausibility**
Is there a biologically plausible mechanism by which the exposure could cause the outcome? The existence of a plausible mechanism may strengthen the evidence for causality; however, lack of such a mechanism may simply reflect limitations in the current state of knowledge.

**Biological gradient**
The observation that an increasing dose of an exposure increases the risk of an outcome strengthens the evidence for causality. Again, however, absence of a dose-response, does not rule out a causal association.

**Coherence**
Coherence implies that the association does not conflict with current knowledge about the outcome.

**Experimental evidence**
Experimental studies in which changing the level of an exposure is found to change the risk of an outcome provide strong evidence for causality. Such studies may not, however, always be possible, for practical or ethical reasons.

Evaluation of an exposure as a cause is based not on any single test, but on the balance of all available evidence. No single criterion is essential, except that the exposure precedes the effect. Identifying an exposure as a cause does not mean that it is the sole cause of the disease or condition. Nor does it imply that the exposure is sufficient to cause the disease – it may act in combination with other factors.

The strength of evidence on the harmful effects of smoking on reproductive health varies. In this report, the evidence for each effect is described as conclusive, substantial or suggestive. These conclusions draw largely on existing expert evaluations – in particular those of the US Surgeon General, the UK Scientific Committee on Tobacco and Health, WHO and IARC.

For certain effects – for example, smoking during pregnancy as a cause of low birth-weight – the evidence is conclusive, or beyond reasonable doubt: extensive, well-conducted epidemiological
studies have shown a consistent association and there is a plausible mechanism by which the
effect could be mediated. The effect increases with the number of cigarettes smoked, and
stopping smoking reduces it. In this instance, smoking is said to be a cause of the outcome.

For other effects, the evidence is judged substantial. An example is the association between
smoking and ectopic pregnancy. Several well-designed studies have shown that smokers have an
increased risk of ectopic pregnancy, a risk which increases with the number of cigarettes smoked,
and declines when women stop smoking. Plausible biological mechanisms exist, but pathways
have not yet been elucidated. In this instance, there is said to be an association between smoking
and the outcome.

Finally, for certain outcomes, the evidence for an effect of smoking is suggestive. In these cases,
the evidence for an association may be limited, or the results of studies may not always be
consistent. However, at least one good-quality study has found an effect, a plausible mechanism
can be identified, and the association is judged to warrant further investigation. An example is the
link between smoking during pregnancy and certain fetal abnormalities, such as cleft lip and plate,
and limb reduction.
Appendix E: Major health effects of smoking in pregnancy

<table>
<thead>
<tr>
<th>There is <strong>conclusive</strong> evidence that smoking in pregnancy causes:</th>
<th>There is <strong>substantial</strong> evidence that smoking in pregnancy causes:</th>
<th>There is <strong>suggestive</strong> evidence that smoking in pregnancy causes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Placental complications</td>
<td>• Ectopic pregnancy</td>
<td>• Specific fetal malformations</td>
</tr>
<tr>
<td>• Premature rupture of the membranes</td>
<td>• Miscarriage</td>
<td>• Predisposition to smoke in later life</td>
</tr>
<tr>
<td>• Premature birth</td>
<td>• Reduced rates of breastfeeding</td>
<td>• ADHD</td>
</tr>
<tr>
<td>• Perinatal death</td>
<td>• Shorter duration of breastfeeding</td>
<td></td>
</tr>
<tr>
<td>• Reduced fetal growth (low birth-weight baby)</td>
<td>• Asthma*</td>
<td></td>
</tr>
<tr>
<td>• Cot death*</td>
<td>• Respiratory symptoms*</td>
<td></td>
</tr>
<tr>
<td>• Reduced lung function in infancy*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* These are also caused by exposure to SHS in childhood.

Source: Adapted from BMA (2004) Smoking and reproductive life
Appendix F: The Framework Convention on Tobacco Control

The UK government is a party to the world's first public health treaty: the Framework Convention on Tobacco Control. The FCTC became law on 27 February 2005.

The FCTC commits governments to take action to protect their citizens from the disability and death caused by tobacco. Its provisions are policies that have been proven to reduce tobacco consumption. They include protection from SHS, increases in tobacco taxes, advertising bans and clear labelling of tobacco products.

As a result of the FCTC, the world's governments are starting to introduce evidence-based laws and policies to reduce tobacco use, often for the first time. It has been calculated that if the policies included in the FCTC are adopted worldwide, 200 million lives could be saved by the year 2050.\textsuperscript{264}
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