

Secondhand Smoke: the impact on children

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Key Findings of this Report

- Children have the right to be protected from exposure to secondhand smoke.
- Being exposed to secondhand smoke has a significant impact on the health of a child before birth, in childhood, and can continue to have an impact on their health into adulthood.
- Prenatal exposure to tobacco smoke has adverse impacts on the health of the foetus including low birth weight, premature birth, spontaneous abortion and still birth. Smoking during pregnancy should be avoided.
- About 2 million children in the UK currently live in a household where they are exposed to tobacco smoke and many more are exposed outside the home.¹
- The proportion of children living in a smokefree home in England has risen from 21% in 1996 to 37% in 2007.²
- There is a high level of awareness about the impact of secondhand smoke: 92% of adults are aware that exposure to SHS increases a child's risk of chest infections and 86% are aware of an increased risk of asthma. People are less likely to be aware of the risks associated with cot deaths (58%) and ear infections (35%).³
- Smokefree legislation does not lead to a rise in smoking in the home.
- Parents must recognise that passive smoking causes ill-health in children and that they have a responsibility not to harm their children.
- Governments have a duty to continue raising awareness about the dangers of exposure to secondhand smoke and adults should act on that advice to protect the health of children.

What is passive smoking?

Breathing other people's smoke is known as passive, involuntary or secondhand smoking. Secondhand smoke (SHS) is also called 'environmental tobacco smoke'. Inhaling SHS is an unavoidable consequence of being in a smoke-filled environment.⁴

Secondhand Smoke is a mixture of air-diluted 'sidestream' smoke from the burning tip of a cigarette, and the exhaled 'mainstream' smoke exhaled by the smoker. While the proportions of sidestream and exhaled mainstream smoke can differ, sidestream smoke is usually the larger constituent of SHS.⁵

Mainstream smoke inhaled by a smoker contains over 4000 chemicals (both particles and gases), including chemical irritants and almost 70 carcinogens (cancer causing substances).⁶ Sidestream smoke has a similar composition but the relative quantities of chemicals can differ.

Mainstream and sidestream smoke contain fine particles and thousands of gases made up from the combustion of tobacco, paper and additives in a cigarette. The concentration of these chemicals and particles changes over time and in different environmental conditions. The concentration is dependent on the number of smokers, the rate at which they are smoking and the volume of air into which the smoke is distributed.

Extent of exposure to tobacco smoke

The World Health Organization has estimated that nearly 700 million, or almost half of the world's children, are exposed to tobacco smoke by the 1.2 billion adults who smoke.⁷

In the UK, surveys in the 1980s and 1990s found that about half of all children in lived in a house where at least one person smokes.⁸ By early 2007 this figure had dropped to 40%.⁹ Since the introduction of smokefree legislation in the United Kingdom, this figure has continued to fall.¹⁰ At the same time, the proportion of children living in smokefree homes has risen from 21% in 1996 to 37% in 2007.¹¹ However, for many children who live in smoking households, there has been little reduction in smoke exposure.

For young children, the major source of tobacco smoke is smoking by parents and other household members. Maternal smoking is usually the largest source of SHS because of the cumulative effect of exposure during pregnancy and close proximity to the mother during early life.

Secondhand smoke in the home is a major source of exposure because children spend most of their time at home and indoors. Unlike adults who can choose whether or not to be in a smoky environment, children have little choice. They are far less likely to be able to leave a smoke-filled room if they want to: babies cannot

ask; some children may not feel confident about raising the subject; and others may not be allowed to leave even if they do ask.

Health effects of exposure to secondhand smoke

Children are especially vulnerable to SHS as they breathe more rapidly and they inhale more pollutants per pound of body weight (a higher relative ventilation rate) than adults.¹²

In 2010 The Royal College of Physicians (RCP) published a landmark report entitled “Passive Smoking and Children”. The report acknowledges the importance of smokefree legislation in reducing exposure to secondhand smoke in the workplace but points out that the principle source of exposure for non-smokers is in the home and that children are especially at risk.¹³

The authors note that *“passive smoking in the home is a major hazard to the health of the millions of children in the UK who live with smokers, and the extent of this health problem has not, to date, been accurately quantified.”*¹⁴ They conclude that *“passive smoking is a significant cause of morbidity and mortality in babies and children.”*¹⁵

The report affirms that a child exposed to SHS has an increased risk of asthma, lower respiratory infections, bronchitis, middle ear disease, bacterial meningitis and sudden infant death syndrome (SIDS) as well as general reduced respiratory function (cough, wheezes).¹⁶ These disorders generate over 300,000 UK GP consultations and about 9,500 hospital admissions every year, costing the NHS about £23.3 million.¹⁷

The RCP report concurs with the findings of a review published by the World Health Organization in 1999 which also found that passive smoking is a cause of bronchitis, pneumonia, coughing and wheezing, asthma attacks, middle ear infection, cot death, and possibly cardiovascular and neurobiological impairment in children.¹⁸ These findings were confirmed in the SCOTH Report in 2004.¹⁹

In addition to the above, a study published by the American Academy of Pediatrics in 2009 found that secondhand tobacco smoke exposure of children has also been associated with the exacerbation of many chronic illnesses such as sickle cell disease.²⁰

Exposure to tobacco smoke may impair olfactory function in children. A Canadian study found that passive smoking reduced children’s ability to detect a wide variety of odours compared with children raised in non-smoking households.²¹

Passive smoking may also affect children’s mental development. A US study found deficits in reading and reasoning skills among children even at low levels of smoke exposure.²² There is also some evidence to suggest that exposure to secondhand smoke can lead to increased school absenteeism.^{23 24}

Children are more likely to commence smoking if they grow up in households where those around them smoke.¹ Conversely, young adults who lived in smokefree homes as children are much more likely to prefer to live in smokefree accommodation once they leave home.²⁵

Asthma

Asthma is the most common chronic disease of childhood. Tobacco smoke exposure can trigger the development of asthma and exacerbate symptoms.²⁶

Three potential modifiable causes of asthma have been identified by researchers, these include: exposure to SHS, lack of dietary fruit intake (fruit intake is related to increased lung function) and the proximity of the home to a main road. A UK study found no association between living close to a main road and asthma, a moderate increased risk for children who consume no fruit, and an exposure-response relation between smoking and asthma. Parental smoking was a causal factor of asthma in children and the prevalence of asthma increased when the number of smokers in the home increased. The authors found that of the three preventable risk factors, SHS exposure was the independent determinant of the disease.²⁷

Children who suffer from asthma and whose parents smoke are at least twice as likely to suffer asthma symptoms all year round compared to the children of non-smokers. Wheeze and physician-diagnosed asthma is more common in children who live with a smoker.²⁶

An effective means of preventing asthma is to reduce exposure to SHS.^{26 27}

Cancer

A report by the British Medical Association found evidence that exposure to SHS causes childhood cancer (in particular brain cancer and lymphoma) and meningitis. It can also lead to cancer in adulthood and the initiation and progression of cardiovascular disease.²⁸

A study in Sweden found that that parents who smoke are greatly increasing their child's risk of developing several types of cancer. Similar risks for exposure by mothers' and fathers' smoking were found for lung cancer (71%), and upper aerodigestive cancer (45%). (Aerodigestive tract includes the lips, mouth, tongue, nose, throat, vocal cords, and part of the esophagus and windpipe). There was an 8-fold increased risk of developing nasal cancer (nasal adenoid cystic carcinoma) by exposure to SHS from either parent during childhood.²⁹

Children who are exposed to SHS on a daily basis grow up with more than triple the risk of lung cancer later in life compared to those who grow up in smokefree environments.⁹

Emphysema in adulthood

There is some evidence of an association between childhood exposure to SHS and the development of emphysema in adulthood. The findings suggest that the lungs may not recover completely from the effects of early-life exposure.³⁰

Health effects of prenatal exposure to SHS

Prenatal exposure to tobacco smoke has significant adverse impacts on the health of the foetus including low birth weight, premature birth, spontaneous abortion and still birth.

Babies born to women who smoke weigh around 200 grams less than non-smokers. There is a small adverse effect on the baby's weight of non-smoking mothers who themselves have been exposed to SHS during their pregnancy.³¹ Smoking also impacts on IVF and fertility rates. It has been found that exposure to SHS is as damaging as active smoking in terms of successful pregnancy outcomes for people using IVF.³²

Prenatal exposure can have adverse impacts on the learning and behavioural development of a child. Maternal prenatal smoking is associated with both antisocial behaviour and attention deficit hyperactivity disorder (ADHD) in children and adolescents. This association remains after controlling for confounders such as socio-economic status, maternal age, birth weight and maternal psychopathology.³³

Health effects of exposure to SHS in pregnant women

Research published in the journal *Pediatrics* in 2011 combined data from 19 studies investigating the impact of exposure to secondhand smoke on pregnant women. The authors note that when the studies were viewed in isolation, there was no significant impact, but when the data from all nineteen studies were combined and analysed together, they found that women exposed to secondhand smoke were 23% more likely to have a stillbirth and 13% more likely to give birth to a child with congenital heart defects.^{34 35}

A 2010 review of studies examining the impact of secondhand smoke exposure on non-smoking pregnant women found that there was a small risk of them having lighter weight babies and of the babies having congenital abnormalities. The authors concluded that for most women the risks were small but that for active smokers or those in poor health the added risk of exposure to SHS may be more significant.³⁶

However, earlier studies found babies born to non-smoking women whose partners smoked weighed less than babies born to non-smoking couples.³⁷ Moreover, women exposed to secondhand smoke in the workplace were also affected.³⁸ A review of the evidence concluded that on average, infants born to women exposed to secondhand smoke during pregnancy are 40-50g lighter than those born to

women who are not exposed.³⁹ Other research suggests that non-smoking women who are exposed to SHS during their pregnancy are at increased risk of giving birth prematurely⁴⁰ and may be at increased risk of spontaneous abortion (miscarriage).⁴¹

There is also some evidence which suggests that female fertility can be damaged in utero if the woman's mother was exposed to secondhand smoke while pregnant.⁴²

Awareness of the health risks of exposure to secondhand smoke

There is widespread recognition that passive smoking is harmful and the majority of smokers report that they try not to smoke in the presence of children.

According to the 2009 Smoking-related Behaviour and Attitudes survey, 77% of smokers report that they would not smoke at all when they are in a room with children, with a further 14% saying they would limit their smoking in the presence of children. The same survey found a high level of knowledge about the impact of secondhand smoke: 92% of adults were aware that exposure to SHS increases a child's risk of chest infections and 86% were aware of an increased risk of asthma. Fewer respondents (58%) were aware of the risks associated with cot deaths while only 35% were aware of the association between SHS and ear infections.⁴³

Smokefree Legislation

Prior to the introduction of smokefree legislation in 2007, which prohibited smoking in enclosed public and workplaces across the United Kingdom, some people expressed concern that the legislation would lead to a rise in people smoking in the home, thus putting children at greater risk of ill-health through passive smoking. However, there is no published, peer-reviewed evidence to show that smokefree legislation leads to an increase in smoking in the home. In fact there is a growing body of evidence to show that the reverse is more likely to occur, that is, that legislation banning smoking in work and public places leads to a reduction in smoking in the home.

The 2009 Smoking-related Behaviour and Attitudes survey found that 69% of respondents no longer allow smoking inside their home - an increase from 61% in 2006. A further 20% only allow smoking in certain rooms or at certain times. Only 10% allow smoking to take place anywhere in their homes.³

A study in Scotland found that the Scottish smoke-free legislation has reduced exposure to secondhand smoke among young people in Scotland and the authors found no evidence of increased secondhand smoke exposure in young people caused by parental smoking in the home.¹⁰

Other countries with smokefree legislation also report no displacement of smoking to the home. Studies suggest that where smokefree work and public places are the

norm, parents are more likely to make their own home a tobacco-free zone.^{44 45 46}
⁴⁷ Furthermore, smokefree workplaces encourage smokers to quit. The corresponding reduction in smoking among adults means that fewer children are likely to be exposed to smoke at home.

Government action to protect children from secondhand smoke

In March 2011, the Department of Health published a Tobacco Control Plan for England as part of its Public Health White Paper: 'Healthy Lives, Healthy People.'⁴⁸ Among the measures proposed, the Government pledged to:

- work with national media to raise awareness of the risks of exposing children to secondhand smoke
- support local areas to encourage smokers to change their behaviour so that they do not smoke in their homes or family cars

There is strong recognition by Government that children are entitled to be protected from exposure to secondhand smoke.

Smoking in cars

Levels of secondhand smoke in cars can be extremely high because of the restricted area in which the smoke is circulated.⁴⁹ One study found significantly increased levels of blood carboxyhemoglobin (carbon monoxide in the blood) in individuals exposed to the smoke of as few as three cigarettes in an enclosed vehicle.⁵⁰

The California Environmental Protection Agency warns that:

- cigarette smoke particle exposure in a closed car is comparable to the exposure a firefighter might receive over four to eight hours fighting a California wildfire.
- one smoker emits five times more fine particles into a car than are emitted per-mile by the car's exhaust pipe.
- secondhand smoke in cars can be ten times more concentrated than the level considered "unhealthy" by the US Environmental Protection Agency.⁵¹

In 2005, the State of California's Air Resources Board (CARB) conducted a comprehensive review of studies which measured secondhand smoke particle concentrations in a variety of environments. The review found that in-car concentrations were up to 60 times greater than in a smoke-free home, and up to 27 times greater than in a smoker's home.⁵²

A study comparing secondhand smoke particle concentrations in a vehicle with those in a bar which allowed smoking found in-vehicle concentrations 20-times greater than inside the bar.⁵³ A Harvard University study which measured air

quality in passenger cars under actual driving conditions found unsafe levels of secondhand smoke, especially for children.⁵⁴

Why opening a window won't help

Opening a window does not reduce the levels of secondhand smoke in a car to a safe level as the smoke simply blows back into the vehicle, often lingering for hours. A US study examined 100 different air change rate measurements in four vehicles. Results showed that under all ventilation circumstances, even with windows open and the fan on high, SHS concentrations in a vehicle were greater than in any other small enclosed place.⁵⁵

In the Stanford Report discussing the study, one of the researchers noted that

“even with a car's windows open, smoke particle concentrations were higher than the levels measured in California bars during studies in the mid-1990s before the state banned smoking in taverns.”⁵⁶

Smoking in cars - impact on children

Given that children have significantly higher metabolic and respiratory rates than adults, exposure to secondhand smoke in vehicles is potentially a very serious problem.⁵⁷ An Australian study found that children exposed to secondhand smoke in their parents' car had double the risk of persistent wheeze compared to children who had not been exposed.⁵⁸

In addition to the physical risks faced by children exposed to secondhand smoke in cars, there are wider social issues to consider. Observational studies examining the prevalence of smoking in cars by socioeconomic area suggests that children in lower socio-economic groups are likely to receive more frequent exposure than other children, compounding the already unacceptable health inequalities faced by these children.⁵⁹

Some experts argue that it is ethically justifiable to ban smoking in cars carrying children because children are not fully autonomous and are therefore unable to act to protect their own interests.⁶⁰

Public opinion on smoking in cars

Since the introduction of smokefree legislation in 2007, public support for a ban on smoking in cars has been growing, especially when children are present.

- A YouGov poll in 2009 found majority support among adults in England for a ban on smoking in cars.⁶¹
- A YouGov poll published by the Faculty of Public Health in August 2010 found 74% support for a ban on smoking in cars with children.⁶²

- A survey conducted by GEM Motoring Assist (formerly The Guild of Experienced Motorists) found a considerable majority (72%) in favour of a complete ban on smoking while driving in the UK.⁶³
- Polls publicised by Road Safety GB and Channel 4 in 2007 showed that 70% of respondents supported a complete ban on smoking in cars in the UK.^{64 65}
- In Australia, a public opinion survey in 2005 showed that 90% of Australians supported the banning of smoking in cars carrying children.⁶⁶
- An international review of surveys from North America, the UK and Australasia found a majority (76%) of the public supported the introduction of smokefree car laws. In four of the jurisdictions examined (Victoria, California, New Zealand, and South Australia) levels of public support were in excess of 90%.⁶⁷

International laws

Laws banning smoking in cars carrying children have been introduced in a number of jurisdictions in Canada, the United States and Australia with others expected to introduce similar laws in the near future. South Africa recently introduced a country-wide ban on smoking in cars with children.

There are also a growing number of countries which ban smoking in vehicles used for work purposes, including Chile and Germany while in Kuwait it is against the law to smoke while driving in any vehicle.⁶⁷

Legal Rights

Children are protected by law from exposure to secondhand smoke at school (inside school buildings, but not in the playground) and when under the care of registered childminders.⁶⁸ While there is no explicit protection against exposure to SHS in the home, the need to protect the health of children does have some legal recognition:

- The UN Convention on the Rights of the Child

The Convention was adopted by the UN General Assembly on 20 November 1989 and came into force in September 1990. The Convention consists of legally binding international obligations. Article 3 of the Convention states that:

“In all actions concerning children, whether undertaken by public or private social welfare institutions, courts of law, administrative authorities or legislative bodies, the best interests of the child shall be a primary consideration.”

Although the Convention does not include any explicit right to protection from the harm caused by tobacco, official interpretation of the articles of the

Convention demonstrates that tobacco is a human rights issue. According to the World Health Organization:

“Because of the enormous potential harm to children from tobacco use and exposure, States have a duty to take all necessary legislative and regulatory measures to protect children from tobacco and ensure that the interest of children take precedence over those of the tobacco industry.”⁶⁹

- The 1997 Declaration of the Environment Leaders of the Eight (G8)¹ on Children’s Environmental Health.

“We affirm that environmental tobacco smoke is a significant public health risk to young children and that parents need to know about the risks of smoking in the home around their young children. We agree to co-operate on education and public awareness efforts aimed at reducing children’s exposure to environmental tobacco smoke.”

- Every Child Matters

In the landmark Green Paper on Child Protection in the UK, “Every Child Matters” five key outcomes were identified by children and young people as being the most important to them. The first of these was:

Being healthy: enjoying good physical and mental health and living a healthy lifestyle⁷⁰

Educating parents and carers about passive smoking

Parents who smoke should be aware that their children may become ill as a result of breathing in secondhand smoke. Furthermore, children of smokers are more likely to take up the habit themselves because they copy the behaviour of adults and will perceive smoking as the norm if they grow up in a household where adults smoke. Making homes completely smokefree is the only effective means of protecting children; other measures such as opening windows or limiting smoking to certain areas do not provide sufficient protection.

There has been a marked shift towards making homes smokefree, even among households where one or more parents smoke. Using data from the Health Survey for England, researchers revealed that the proportion of homes where one parent was a smoker that were smokefree increased from 21% in 1996 to 37% in 2007, and where both parents were smokers from 6% to 21%.⁷¹ This suggests that the law prohibiting smoking in public places is having an impact in terms of changing

¹ Canada, France, Germany, Italy, Japan, Russian Federation, United Kingdom, United States of America

beliefs and norms about passive smoking. However, given that SHS exposure among children remains substantial, measures are still needed to persuade parents and carers not to smoke in the home.

In 2003, the Department of Health launched a mass media campaign to raise awareness about the hazards of passive smoking and to reduce the number of people smoking around children. An evaluation of the campaign revealed that the number of respondents reporting that secondhand smoke was a hazard to children's health increased from 28% before to 50% after the campaign.¹ Health warnings on cigarette packs can also help to reinforce the message about the harm from secondhand smoke.

Other approaches aimed at raising awareness include intervention strategies targeted at individuals or households. However a review of 36 studies concluded that there is insufficient evidence to recommend any particular approach.⁷²

Smoking around children in care

The British Association for Adoption and Fostering (BAAF) and the Fostering Network have produced policy papers giving guidance on reducing the risks from environmental tobacco smoke for fostered children.^{73 74} Both organisations recommend that children aged under five should not be placed with carers who smoke and that children with significant health problems should not be placed with carers who are ex-smokers until at least 12 months after cessation (because of the risk of relapse to smoking within one year). A number of local authorities in the UK have adopted these guidelines.^{75 76 77 78} In the United States and Canada, laws have been enacted to protect children in foster care from SHS.^{79 80 81}

Conclusions

Children's exposure to tobacco smoke occurs mainly in the home. Therefore the best way of preventing secondhand smoke exposure is by reducing the prevalence of smoking among parents and young adults. Making homes completely smokefree is the only effective means of protecting children; other measures such as opening windows or limiting smoking to certain areas do not provide sufficient protection.

The health impacts of passive smoking on children are now well documented and as public knowledge about the health consequences increases, so support for smoking restrictions in the home and in private cars is likely to rise. In countries with comprehensive smokefree legislation, there is a greater willingness to accept the need for smoking restrictions to be extended to the home environment. While legislation to regulate smoking in the home may currently be inappropriate, there is growing recognition of the rights of children to be protected from exposure to the secondhand smoke. There is strong support for legislation to prohibit smoking in cars where children are present and these laws have been successfully introduced in other countries. The Government should continue with its programme of hard hitting educational campaigns which remind adult smokers of their responsibility to protect children from exposure to secondhand smoke.

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