

# Secondhand smoke

## Introduction

This fact sheet summarises the health impact of secondhand smoke on adults and children. For more detailed information download: ASH Research Report: [Secondhand Smoke](#) and ASH Research Report: [Secondhand Smoke - the impact on children](#).

Breathing in other people's cigarette smoke is called passive, involuntary or secondhand smoking (SHS). Secondhand smoke, also called "environmental tobacco smoke", comprises "sidestream" smoke from the burning tip of the cigarette and "mainstream" smoke which is smoke that has been inhaled and then exhaled by the smoker.

The United States Environmental Protection Agency (EPA) classifies environmental tobacco smoke as a Class A (known human) carcinogen alongside asbestos, arsenic, benzene and radon gas.<sup>1</sup> There is no safe level of exposure to SHS.<sup>2</sup>

Worldwide, an estimated 33% of male non-smokers, 35% of female non-smokers and 40% of children are exposed to SHS.<sup>3</sup>

## What's in the smoke?

Tobacco smoke contains over 4000 chemicals in the form of particles and gases.<sup>1</sup> Many potentially toxic gases are present in higher concentrations in sidestream smoke than in mainstream smoke and nearly 85% of the smoke in a room results from sidestream smoke.<sup>4</sup> The particulate phase includes tar (itself composed of many chemicals), nicotine, benzene and benzo(a)pyrene. The gas phase includes carbon monoxide, ammonia, dimethylnitrosamine, formaldehyde, hydrogen cyanide and acrolein. Some of these have marked irritant properties and there are more than 50 cancer-causing chemicals in secondhand smoke.<sup>5</sup>

For further information on tobacco smoke download: ASH Fact Sheet: [What's in a Cigarette](#)

## The health effects of breathing in secondhand smoke

Immediate effects of exposure to SHS include eye irritation, headache, cough, sore throat, dizziness and nausea. Adults with asthma can experience a significant decline in lung function when exposed, while new cases of asthma may be induced in children whose parents smoke. Short term exposure to tobacco smoke also has a measurable effect on the heart in non-smokers.<sup>6</sup>

In the longer term, passive smokers suffer an increased risk of a range of smoking-related diseases. The International Agency for Research on Cancer (IARC), convened by the World Health Organization, conducted a review of evidence on SHS and cancer in 2002 and found that "*the evidence is sufficient to conclude that involuntary smoking is a cause of lung cancer in never smokers*". The report concludes that exposure to other people's smoke increases the risk of lung cancer in non-smokers by 20-30% and coronary heart disease by 25-35%.<sup>7</sup>

These findings were confirmed in the UK by the Government-appointed Scientific Committee on Tobacco and Health (SCOTH) whose 2004 report found that passive smoking is a cause of lung cancer and ischaemic heart disease in adult non-smokers, and a cause of respiratory disease, cot death, middle ear infections and asthma attacks in children.<sup>8</sup> The Committee reported a “causal effect of exposure to secondhand smoke on the risks of lung cancer, ischaemic heart disease and a strong link to adverse effects in children”, and found that SHS “represents a substantial public health hazard.”

The 2006 US Surgeon General report concurs with the British Medical Association that there is no safe level of exposure to SHS and furthermore concludes that “*the scientific evidence is now indisputable: secondhand smoke is not a mere annoyance. It is a serious health hazard that leads to disease and premature death in children and nonsmoking adults.*”<sup>9</sup>

- The SCOTH report estimates that non-smokers exposed to SHS have a 25% increased risk of heart disease.<sup>8</sup> The Institute of Medicine in the United States confirms that exposure to SHS is a cause of heart disease in non-smokers.<sup>10</sup> Other estimates have found an increased risk of heart disease between 25-35%.<sup>11</sup>
- A study published in the British Medical Journal suggests that previous studies of the effects of passive smoking on the risk of heart disease may have underestimated the risk. Researchers found that non-smokers exposed to SHS had a 50-60% increased risk of heart disease.<sup>12</sup> Furthermore, a review published in 2005 reported that the risks of heart disease caused by passive smoking were 80-90% as large as those caused by active smoking.<sup>13</sup>
- As well as longer-term increased risks to heart disease, exposure to SHS has been reported to have immediate adverse effects on cardiovascular functioning.<sup>9</sup>
- The SCOTH report’s review of the evidence concluded that exposure to SHS increased the risks of lung cancer in non-smokers by 24%.<sup>8</sup> Similarly, the US Surgeon General’s report and review of the evidence concluded a causal link between SHS exposure and lung cancer, with the risks of developing lung cancer increasing by between 20-30% for non-smokers who live with a smoker.<sup>9</sup>
- There is some evidence of a link between SHS exposure and other types of cancer. For example, passive smoking has been associated with a 40% increased risk of developing cervical tumours (cervical neoplasia).<sup>14</sup> The 2010 IARC update on the link between exposure to SHS and cancer reports limited evidence showing an association with cancers of the larynx and pharynx.<sup>15</sup>
- An expert panel’s review reported a causal link between passive smoking and breast cancer in non-smoking premenopausal women.<sup>16</sup> A recent meta-analysis found that the risk of breast cancer was increased by 67% in those exposed to SHS.<sup>17</sup>
- The US Surgeon General report found the evidence was suggestive of a link between SHS exposure and acute respiratory symptoms, poor lung function, acute lung function decline, asthma and chronic obstructive pulmonary disease (COPD).<sup>9</sup>
- A review and meta-analysis of 20 studies published in 2011 found a strong, dose dependent association between exposure to SHS and risk of stroke.<sup>18</sup> The authors argued that even at very low levels of passive smoking, the risk of stroke was disproportionately high suggesting that there is no safe level of exposure to tobacco smoke.<sup>18</sup>
- Evidence of a link between exposure to SHS and dementia and cognitive impairment is beginning to emerge. Whilst a link between passive smoking and dementia has been reported by some studies,<sup>19,20</sup> other research suggests that exposure to SHS may increase the risk of dementia only in those with cardiovascular disease.<sup>21</sup> A recent review reported that exposure to passive smoking may increase the risk of cognitive impairment in later life by between 30-90%.<sup>22</sup>
- Further evidence of a link between exposure to SHS and other diseases have also been

found, including diabetes<sup>23,24</sup> and tuberculosis,<sup>25</sup> however further research is required to confirm these findings.

- Research has highlighted significant risks to babies associated with SHS exposure in pregnant women. These include low birth weight,<sup>26,27</sup> congenital anomalies,<sup>27</sup> smaller head circumferences,<sup>27</sup> increased risk of still birth and congenital malformation.<sup>28</sup>

## Deaths from secondhand smoke

Whilst the relative health risks from passive smoking are small in comparison to risks from active smoking, the overall health impact is large because the diseases are common.<sup>29</sup>

Research has reported that worldwide an estimated 603,000 deaths were attributed to SHS in 2004, which was approximately 1.0% of worldwide mortality.<sup>3</sup> These deaths were from ischaemic heart disease (379,000 deaths), lower respiratory tract infections (165,000 deaths), asthma (36,900 deaths) and lung cancer (214,000 deaths).<sup>3</sup>

It has been estimated that domestic exposure to SHS in the UK causes around 2,700 deaths in people aged 20-63 and a further 8,000 deaths a year among people aged 65 years and older.<sup>30</sup>

In 2005, the California Environmental Protection Agency used population estimates in the US to show the number of annual estimated deaths from SHS exposure. For non-smokers the Agency estimated that:

- around 3,400 Americans died from lung cancer (ranging from 3,423 to 8,866)
- 46,000 died from cardiac-related illness (range of 22,700 to 69,600)
- 430 children died from sudden infant death syndrome (SIDS).<sup>31</sup>

## The risks to children

In 2010 The Royal College of Physicians (RCP) published a landmark report entitled “Passive Smoking and Children”. The report acknowledges the importance of smoke free legislation in reducing exposure to SHS 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.

The authors state 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*” (preface IX). They conclude that “*passive smoking is a significant cause of morbidity and mortality in babies and children.*” (p197)<sup>32</sup>

The RCP report concurs with the findings of a review published by the World Health Organization in 1999,<sup>33</sup> with both reports identifying that SHS is linked to increased risks of a wide range of poor health outcomes for children.

Reviews of the research around poor health outcomes for children exposed to SHS have found:

- SHS exposure in the home increases young infants’ risks of lower respiratory tract infections (including flu, bronchitis and pneumonia) by around 50%.<sup>34</sup>
- Exposure to pre or post-natal SHS is associated with between 30-70% increased risk of wheeze, and 21-85% increased risk in asthma in children.<sup>35</sup> A further review reported exposure to SHS was associated with a 30% increased risk of physician-diagnosed asthma in childhood.<sup>36</sup>
- Exposure to maternal smoking increases a child’s risk of middle ear infection by over 60%, and when exposed to both parents smoking children are significantly more at risk of needing surgery for middle ear infections.<sup>37</sup>
- Maternal smoking after birth is associated with a three-fold increased risk of sudden

unexpected death in infancy. Having one or more smokers living in the household more than doubles the risk of sudden unexpected death in infancy.<sup>32</sup>

- Exposure to SHS in the home more than doubles a child's risk of invasive meningococcal disease, with the greatest risks found for children under five years of age and those whose mothers smoked in the postnatal period.<sup>38</sup>
- Further studies have suggested exposure to SHS may be linked to increased risks of some types of childhood cancer,<sup>39</sup> some types of cancer in adulthood,<sup>2</sup> emphysema in adulthood,<sup>40</sup> impaired olfactory (sense of smell) function,<sup>41</sup> and may exacerbate chronic conditions such as sickle cell disease.<sup>42</sup>
- These disorders generate over 300,000 UK GP consultations and about 9,500 hospital admissions every year, costing the NHS about £23.3 million.<sup>32</sup>

Forty percent of children globally are reported to be exposed to SHS.<sup>3</sup> In the UK around 2 million children are estimated to be regularly exposed to SHS in the home and many more are exposed outside the home.<sup>32</sup>

In the UK, surveys in the 1980s and 1990s found that about half of all children lived in a house where at least one person smoked.<sup>43</sup> By early 2007 this figure had dropped to 40%.<sup>2</sup> Despite these improvements, passive smoking remains a major hazard to the health of millions of children both worldwide and in the UK.

The full Royal College of Physicians report "[Children and Passive Smoking](#)" is available for purchase or download.

For related information download:

ASH Fact Sheet on [Secondhand Smoke in the Home](#)

ASH Fact Sheet on [Smoking, Sex and Reproduction](#)

ASH Fact Sheet on [Smoking in Cars](#)

### **Legal protection from exposure to secondhand smoke**

Since the implementation of the smokefree provisions of the Health Act in 2007, smoking in all enclosed public places and workplaces is prohibited across the United Kingdom.

For further information download:

ASH Fact Sheet on [Smokefree Legislation](#)

[Smokefree England](#)

[Clearing the Air Scotland](#)

[Smoking Ban Wales](#)

[Space to Breathe for Northern Ireland](#)

[Smokefree England Regulations](#)

[The Smoke-free \(Premises and Enforcement\) Regulations 2006](#)

In February 2014, the House of Commons passed an amendment to the Children and Families Bill allowing the Government to introduce regulations making it an offence to smoke in a private vehicle carrying children. This will apply to England and Wales.

### **The health impact of smokefree laws**

There is consistent evidence to show that in countries where comprehensive smokefree legislation has been implemented, reductions in secondhand smoke exposure of between 80% and 90% have been recorded.<sup>44</sup>

- There is a growing body of evidence to show that incidences of myocardial infarction (heart attack) have fallen following the introduction of smokefree legislation, both in the

UK and internationally.<sup>45,46,47,48,49</sup>

- In England, there was a 2.4% reduction, equivalent to an estimated 1200 fewer emergency admissions to hospital for heart attack in the 12 months following implementation of the smokefree law.<sup>45</sup>
- One review of studies found an overall decrease in acute myocardial infarction of 17%.<sup>50</sup>
- A further meta-analysis of 17 studies across six countries found a reduction of 10% in the incidence of acute coronary events following the implementation of smokefree laws.<sup>51</sup>
- Research has shown reductions in hospital admissions for childhood asthma following the introduction of the smokefree laws.<sup>52,53</sup>
- A recent study in the Republic of Ireland reported an immediate 13% decrease in all-cause mortality following the smoking ban, with an estimated 3,726 deaths prevented.<sup>54</sup>



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