

- Introduction
- What's in the smoke?
- The health effects of secondhand smoke.
- Deaths from SHS
- The risks to children
- Legal protection
- Public opinion about secondhand Smoke
- HPublicH opinion about smokefree legislation
- Health impact of smokefree laws

# Secondhand smoke

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## Introduction

This fact sheet summarises the health impact of secondhand smoke on adults and children. For more detailed information see:

[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. 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> According to the British Medical Association there is no safe level of exposure to secondhand smoke.<sup>2</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>3</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 some 60 are known or suspected carcinogens (cancer causing substances).

For further information on tobacco smoke see:

[ASH Fact Sheet: What's in a Cigarette](#)

## The health effects of breathing in secondhand smoke

Immediate effects of exposure to secondhand smoke 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>4</sup>








In the longer term, passive smokers suffer an increased risk of a range of

## The health effects of breathing in secondhand smoke (continued)






smoking-related diseases. The International Agency for Research on Cancer (IARC), convened by the World Health Organization, conducted a review of evidence on second-hand smoke 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 per cent and coronary heart disease by 25-35 per cent.<sup>5</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>6</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 secondhand smoke *“represents a substantial public health hazard.”*

The 2006 US Surgeon General report concurs with the BMA that there is no safe level of exposure to secondhand smoke 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>7</sup>

-  The SCOTH report estimates that non-smokers exposed to secondhand smoke have a 24% increased risk of lung cancer and a 25% increased risk of heart disease.<sup>8</sup> The Institute of Medicine in the United States confirms that exposure to secondhand smoke is a cause of heart disease in non-smokers.<sup>9</sup> Other estimates have found an increased risk of heart disease between 25-35%.<sup>10</sup>
-  The effects of passive smoke exposure on the heart can be rapid.<sup>11</sup> A Japanese study has shown that just 30 minutes of exposure to environmental tobacco smoke by healthy non-smokers can have a measurable impact on coronary blood flow.<sup>12</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 secondhand smoke and with detectable cotinine levels had a 50-60% increased risk of heart disease.<sup>13</sup>
-  A 2009 study on the impact of secondhand smoke exposure on obstructive lung disease concluded that *“SHS has a substantive role in causing chronic respiratory disease. Exposure to as little as 1 hour of SHS can cause an acute decline in lung function; longer-term exposure can induce asthma, excessive decline in lung function, and possibly COPD.”*<sup>14</sup>
-  SHS exposure has been associated with a 40% increased risk of developing cervical tumours (cervical neoplasia).<sup>15</sup>
-  A 2010 IARC update on the link between exposure to SHS and cancer reports limited evidence showing an association between exposure and cancers of the larynx and pharynx.<sup>16</sup> Exposure to secondhand smoke has also been linked with bladder,<sup>17</sup> leukaemia, nasal and breast cancer.<sup>18 19</sup> However, the epidemiological studies of these cancers and SHS exposure are currently limited.
-  There is some evidence to suggest an association between passive

smoking and the risk of acute stroke<sup>20 21</sup> while a recent systematic review concluded that there is evidence of a “strong, consistent and dose-dependent association between exposure to secondhand smoke and risk of stroke”.<sup>22</sup>

-  Some research has suggested a link between exposure to secondhand smoke and breast cancer.<sup>23</sup> However, a large UK prospective study (the Million Women study) found no association between breast cancer and passive exposure to tobacco smoke among nonsmoking women either in childhood or in later life.<sup>24</sup>
-  A 2010 study found an association between exposure to SHS and tuberculosis.<sup>25</sup> In addition to this, non-smokers exposed to secondhand smoke were reported to be significantly more susceptible to infectious diseases in general including community acquired pneumonia and invasive pneumococcal disease.<sup>26</sup>
-  The first study to identify an association between exposure to secondhand smoke and the development of peripheral arterial occlusive disease (PAOD) has been published. PAOD is a surrogate marker for coronary artery disease.<sup>27</sup>
-  There is some new evidence to suggest that exposure to secondhand smoke may be associated with depression in never-smokers.<sup>28</sup> These are new findings and further research is needed.
-  A study published in Diabetes Care in February 2011 suggests an independent association between exposure to secondhand smoke and the development of Type 2 Diabetes in women.<sup>29</sup> Again, this is a new study with further research necessary to determine whether there is a causal link.

For further information regarding the health risks of exposure to secondhand smoke for adults see the [‘Going smoke-free’](#) report by the Royal College of Physicians.<sup>30</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>31</sup>

It has been estimated that domestic exposure to secondhand smoke 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>32</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>33</sup>

## The risks to children


In 2010 The Royal College of Physicians 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.<sup>34</sup>

The authors conclude 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*”<sup>35</sup> and that “*passive smoking is a significant cause of morbidity and mortality in babies and children.*”<sup>36</sup>

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, as well as general reduced respiratory function (cough, wheezes).<sup>37</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>38</sup>

-  A review published by the World Health Organization in 1999 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.<sup>39</sup>
-  A study published by the American Academy of Pediatrics in 2009 confirmed earlier findings that “secondhand tobacco smoke (SHS) exposure of children and their families causes significant morbidity and mortality,” citing strong evidence showing an association of SHS exposure in children with respiratory illnesses, middle-ear infections, tonsillectomy and adenoidectomy, cough, asthma and asthma exacerbations, hospitalizations and sudden infant death syndrome. According to the study, SHS has also been associated with the exacerbation of many chronic illnesses such as sickle cell disease.<sup>40</sup>
-  Passive smoking increases the risk of lower respiratory tract infections such as bronchitis, pneumonia and bronchiolitis in children. One study found that in households where both parents smoke, young children have a 72% increased risk of respiratory illnesses.<sup>41</sup> Passive smoking causes a reduction in lung function and increased severity in the symptoms of asthma in children, and is a risk factor for new cases of asthma in children.<sup>42 43</sup>
-  A study in Sweden revealed 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 throat cancer (45%). There was an 8-fold increased risk of developing nasal cancer (nasal adenoid cystic carcinoma) by exposure to SHS from either parent during childhood.<sup>44</sup>
-  Infants of parents who smoke are more likely to be admitted to hospital for bronchitis and pneumonia in the first year of life.<sup>45</sup> Passive smoking during childhood predisposes children to developing chronic obstructive airway disease and cancer as adults.<sup>45</sup>
-  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.<sup>46</sup>
-  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.<sup>47</sup> There is also some evidence to suggest that exposure to secondhand smoke can lead to increased school absenteeism.<sup>48 49</sup>
-  A report by the British Medical Association found that suggestive 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.<sup>52</sup>

-  A study published in 2009 found an association between childhood exposure to SHS and emphysema in adulthood. The findings suggest that the lungs may not recover completely from the effects of early-life exposure.<sup>50</sup>

In 2000, it was estimated that almost half of all children in the UK were exposed to tobacco smoke at home.<sup>51</sup> By early 2007 this figure had dropped to 40%<sup>52</sup> and a recent study in Scotland found that children's exposure to secondhand smoke has continued to fall since the introduction of smokefree legislation.<sup>53</sup> The proportion of children living in smokefree homes has risen from 21% in 1996 to 37% in 2007.<sup>54</sup> Nevertheless, secondhand smoke in the home remains the principal source of exposure for children.

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

For related information see:

[ASH Fact Sheet on Secondhand Smoke in the Home](#)  
[ASH Fact Sheet on Smoking, Sex and Reproduction](#)  
[ASH Fact Sheet Information 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 see:

[ASH Fact Sheet Information 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](#)

## Public opinion about secondhand smoke



There are high levels of awareness about the health risks of SHS. Around 80% of adults in the UK believe that a non-smoker's risk of lung cancer, bronchitis and asthma is increased by SHS exposure. Slightly fewer (76%) are aware that SHS increases the risk of heart disease.<sup>55</sup>

The most recent edition of the annual Government survey on public opinion about smoking, "Smoking-related behaviours and attitudes", found that:

-  Around 62% of non smokers dislike people smoking around them.
-  Women who did not smoke were more likely to mind others smoking near them than men who did not smoke (64% compared with 59%).
-  Those who have never smoked regularly were more likely to mind people smoking near them than ex-regular smokers (67% and 53% respectively).
-  People do not like the smell of cigarettes (65%); or the smell of smoke on clothes (53%). 51% also reported adverse health reactions due to SHS








including that: it affects their breathing; makes them cough; gets in their eyes and makes them feel sick.<sup>56</sup>

Awareness about the impact of secondhand smoke on children is variable:

-  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% thought there was an increased risk) but only 35% believed there was an increased risk of ear infections in children living with a smoker.<sup>57</sup>

## Public opinion about smokefree legislation

There is strong support for smokefree legislation which has been growing steadily in recent years:

-  In 2005, prior to the introduction of smokefree legislation, a YouGov poll commissioned by ASH and Cancer Research UK found that 71% of respondents would support a law to make workplaces smokefree.<sup>58</sup>
-  The Department of Health carried out a survey in 2008 which found that 76% of respondents supported smokefree legislation in England.<sup>59</sup>
-  The 2008/9 edition of the Office of National Statistics "Smoking-related behaviour and attitudes" found that 85% of respondents supported restrictions on smoking at work, 93% in restaurants, 91% for indoor shopping centres, 94% for indoor sport and leisure centres. 75% of those interviewed supported the ban on smoking in pubs.<sup>60</sup>
-  Monthly surveys conducted on behalf of the Government since the ban was implemented have revealed that 98% of businesses are compliant with the law and 81% believe the legislation is a "good idea".<sup>61</sup>
-  A MRUK survey carried out on behalf of the Scottish government in 2006 found that 91% of non-smokers supported smokefree legislation.<sup>62</sup>
-  Surveys suggest there is strong support for the introduction of a law banning smoking in cars with children.<sup>63</sup>
-  Research in the US has found that young adults who lived in smokefree homes as children are much more likely to prefer to live in smokefree accommodation once they leave home.<sup>64</sup>

## 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>65</sup>

In addition to improved respiratory function, there has been a notable decline in admissions to hospital for heart attack. There is a growing body of evidence to show that incidences of myocardial infarction (heart attack) fall following the introduction of smokefree legislation.<sup>66 67 68 69</sup> One review of recent studies found an overall decrease in acute myocardial infarction of 17%.<sup>70</sup>

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