

ASTHMA AND SMOKING

Action on Smoking and Health, Updated June 2002

[Summary](#)

[What is Asthma?](#)

[How many people have it?](#)

[A disease on the increase](#)

[Effects of tobacco smoke on asthmatics](#)

[Passive smoking and asthmatic children](#)

[Smoking during pregnancy](#)

[Asthmatic children who smoke](#)

[Major studies linking passive smoking and asthma](#)

[UK Scientific Committee Report](#)

[The World Health Organisation 1999](#)

[Evidence from the United States](#)

[Conclusion](#)

Summary

Research has shown that the relationship between tobacco smoke and asthma is a complex one. Given the nature of asthma it may often be difficult for scientists to provide conclusive evidence on why an individual develops the disease and the exact cause of an attack. However, there is sufficient evidence to conclude that exposure to tobacco smoke increases asthma symptoms and attacks both for smokers and for non-smokers.

Major governmental studies undertaken in the UK and the US have concluded that parental smoking is associated with increased prevalence of asthma in children, and among those with established asthma, parental smoking is associated with more severe disease.

Furthermore, there is substantial data confirming that infants whose mothers smoke during pregnancy have a higher risk of developing asthma and other respiratory illnesses including wheezing and coughing.

What is Asthma?

Asthma is a common condition that causes irritation and inflammation of the airways within the lungs. Most people with asthma are allergic to certain things in the environment – these are known as allergic triggers. Common triggers are dust, pollen, air pollution, animal skin and cigarette smoke. However, asthma can also be non-allergic.

People with asthma feel short of breath, tight-chested and often cough and wheeze. It is still unclear why some people develop asthma, but it is thought to be a combination of what is inherited and exposures to allergic triggers in early childhood.¹

The disease varies in severity from one person to another and for each individual over time. In some, the disease is mild and intermittent and may enter into long periods of remission or disappear completely. In others, the disease becomes severe.

How many people have it?

Asthma is one of the most common chronic conditions in the western world^[1] The National Asthma Campaign estimates that 3.4 million people in the UK currently have asthma, with 640,000 having severe or very severe asthma.

Asthma is at its most visible when someone is experiencing bad symptoms or an asthma attack. Up to 100,000 people are admitted to hospital every year for asthma and almost half of these are children.^[2]

A disease on the increase

Most studies that have compared the number of people with asthma, or asthma-like symptoms, at two different points in time have concluded that asthma has increased significantly over the last 2-3 decades.^[3] ^[4] Research indicates the rise is genuine and not simply due to better recognition of the problem.^[5] The rise in asthma has been most noticeable in children.⁵

Possible reasons for the increase have been identified as:⁵

- An increase in smoking by women during pregnancy
- Children's exposure to passive smoking
- Increased exposure to indoor allergens
- Outdoor air pollution e.g. smog
- Changes in diet, particularly a diet deficient in fruit and vegetables

Although there is evidence for all of the above, it is likely that no one single factor is the sole cause and that the increase in prevalence is due to a combination of these and other as yet unidentified factors.⁵

Effects of tobacco smoke on asthmatics

The link between tobacco smoke and asthma has been the subject of many epidemiological studies and research programmes, in the UK and overseas. Active smokers and non-smokers exposed to passive smoking, (also known as environmental tobacco smoking or ETS) have been found to be adversely affected.

Recent research from Finland has shown that passive smoking plays a role in the development of adult asthma. Researchers found that subjects exposed to tobacco smoke in the workplace were twice as likely to develop asthma as those who were not exposed.^[6] Health effects for adult asthmatics include: asthma attacks; increased sensitivity and reduced lung function; irritation of the eyes, nose and throat.^[7]

Most asthmatics develop a narrowing of the airways in response to small amounts of a stimuli (e.g. dust, pollen, animal skin) that triggers their condition – the more severe the asthma, the more the airways will react.^[8] Research carried out by the National Asthma Campaign showed that tobacco smoke is a trigger of asthma attacks in almost 80 per cent of people with asthma.^[9]

One study has shown how exposure to cigarette smoke for just one hour caused a 20 per cent deterioration in the short-term lung function of adults with asthma.^[10]

Up to a fifth of asthmatics continue to smoke⁸, and those who do have worse symptoms and lung function than non-smoking asthmatics.^[11]

“Among teenagers, smoking increases problems from asthma and the respiratory function abnormalities associated with smoking are more marked in asthmatics”

11

Passive smoking and asthmatic children

Researchers have identified factors that might determine why a child is prone to wheezing and develops asthma, including:

- Maternal age
- Birthweight
- Prematurity

- Breastfeeding
- Family size
- Socio-economic status
- Atopy
- Lung function
- Diet

“Asthma is the commonest chronic illness of childhood, affecting between 10-15% of children. There is considerable evidence that passive smoking increases the frequency and severity of symptoms in children with asthma”. 11

The bronchial tubes of children are smaller and their immune systems are less developed, making them more likely to develop respiratory illness when exposed to environmental tobacco smoke. Because they have smaller airways, children breathe faster than adults and consequently breathe in more harmful chemicals per pound of their weight than an adult would in the same amount of time.

In an analysis of data on 4,000 children aged 0-5 years, it was found that maternal smoking of more than 10 cigarettes a day was associated with higher rates of asthma, an increased likelihood of using asthma medication, and an earlier onset of asthma than was observed in children of non-smoking mothers. 11

A survey carried out by the children's TV programme, Blue Peter, in 1995 to which 10,000 children responded, showed that for 74 per cent of children with asthma, smoky places made their asthma worse.

Research has also shown that when children have been hospitalised for acute asthma and return to a home where there is a smoker, their recovery is impaired. 82 per cent of children that went home to non-smoking households had less than 1 symptomatic day per week compared with smokers with only 27 per cent of the children who went home to households with smokers. [12]

Exposure to passive smoking during childhood and *in utero* exposure (maternal smoking during pregnancy) are associated with adverse effects on lung growth and development. 11

Smoking during pregnancy

Recent research undertaken at Nottingham City Hospital has shown that babies born to mothers who smoked were more likely to develop asthma than those who did not. [13] The study used data from 15,000 children born during one week in 1970. Almost 40 per cent of those children exposed to tobacco smoke, either in the womb or soon afterwards displayed asthma symptoms by the age of 16, compared to 29 per cent who were not. This indicates that mothers who smoked during, or shortly after pregnancy, raised the chances of their children developing asthma by a third.

Research at Nottingham is continuing into which period of exposure to smoke (pre- or postnatal) is most harmful and exactly how smoke affects different causes of wheezing, such as infections or allergic asthma.

A further study assessed the effects of passive smoking on respiratory systems in a cohort of over 1,000 children born during 1980-84. [14] Maternal prenatal smoking was associated with wheezing independently of family history of asthma, socio-economic factors and birth weight. This effect was attributed to changes that affect the early stages of lung development.

Research carried out at the Institute of Child Health in Bristol has shown that babies whose mothers continue to smoke during pregnancy have almost a 50 per cent increased risk of being wheezy or having breathing problems. [15]

Asthmatic children who smoke

A study of 11-16 year olds showed that asthma was more common among children who smoked but that the onset of the asthma symptoms preceded the start of smoking. ¹¹ It is unlikely that asthmatics are more inclined to take up smoking; a more likely explanation is that smoking increases the chances that asthma symptoms will persist. ¹¹

-

Major studies linking passive smoking and asthma

UK Scientific Committee Report

The UK government appointed Scientific Committee on Tobacco and Health (SCOTH) concluded in its 1998 report:^[16]

“Smoking in the presence of infants and children is a cause of serious respiratory illness and asthma attacks”.

The Committee recommends:

“There is a need for public education about the risks of smoking in the home particularly in relation to respiratory diseases in children.”

The World Health Organisation 1999

The World Health Organisation (WHO) convened an International Consultation on Environmental Tobacco Smoke (ETS) and Child Health in 1999. The Consultation brought together experts from developed and developing countries to examine the health effects of ETS on child health and to recommend interventions to reduce these harmful effects and eliminate children’s exposure. The final conclusions of the Consultation state^[17]:

“Both asthma and respiratory systems (wheeze, cough, phlegm) are increased among children whose parents smoke, on the basis of over 60 studies of school-aged children. The pooled relative risks for either parent smoking range from 1.2 to 1.4.”

The Consultation also states that:

“ETS exposure causes the exacerbations of symptoms in children with asthma and in many countries this has led to the standard practice of recommending avoidance of tobacco smoke for children with asthma”.

A review of past and current studies on the association between parental smoking and respiratory diseases throughout childhood submitted to the WHO in 1998^[18] concluded that:

“There is convincing evidence that parental smoking is associated with increased prevalence of asthma and respiratory symptoms in school children. Among children with established asthma, parental smoking is associated with more severe disease.”

Evidence from the United States

In 1986 in the United States, a comprehensive review of the health effects of exposure to passive smoking was published by the US Surgeon General^[19]. The report concluded that ETS can be causally associated with respiratory illnesses, including lung cancer, childhood asthma and lower respiratory tract infections.

Following on from this study, in 1992 the US Environmental Protection Agency undertook a broad review of the major health effects associated with ETS [20]. The findings of the review state:

“ETS exposure is causally associated with additional episodes and increased severity of symptoms in children with asthma. This reports estimates that 200,000 to 1,000,000 asthmatic children have their condition worsened by exposure to ETS.”

Subsequently the California Environmental Protection Agency spent 5 years examining the role of ETS on public health [21]. It solicited input from all interested parties – including the tobacco industry and its consultants. It revealed that passive smoking could be a causal factor in as many as 2,600 new cases of asthma in the US annually.

It published the following results [22]:

“Effects Causally Associated with ETS Exposure”

Respiratory Effects

*Acute Lower respiratory tract infections in children e.g. bronchitis and pneumonia
Asthma induction and exacerbation in children
Chronic respiratory symptoms in children
Eye and nasal irritation in adults
Middle ear infection in children”*

A study commissioned by the US Environmental Protection Agency reviewed the relationship between asthma and indoor air quality, including the impact of environmental tobacco smoke. [23] The key conclusions with regard to passive smoking are as follows:

“There is sufficient evidence to conclude that complete avoidance of ETS would be associated with a lower likelihood of exacerbation of asthma in pre-school children with established asthma.”

“There is sufficient evidence to conclude that complete avoidance of ETS would reduce the probability of the development of wheezing with respiratory illness in younger children.”

“There is limited evidence suggesting that complete avoidance of ETS would be associated with a lower likelihood of exacerbations of asthma in older children and adults.”

“There is limited or suggestive evidence that complete avoidance of ETS would reduce the likelihood of the persistence of asthma or of new onset asthma in children and adults.”

Conclusion

Evidence of the health impacts of tobacco smoke on asthmatics has been building up over the past two decades. There is overwhelming scientific research to verify the fact that it increases asthma symptoms and attacks both for smokers and for non-smokers exposed to ETS.

There is also convincing evidence that parental smoking is associated with increased prevalence of asthma and respiratory systems in school children. Among children with established asthma, parental smoking is associated with more severe disease.

Children whose mothers smoke during pregnancy have a higher risk of developing asthma and other respiratory illnesses including wheezing and coughing.

Further studies are needed which allow a comparison of the effects of critical periods of exposure to cigarette smoke, in particular during pregnancy, early infancy and during childhood.

References

[1] Asthma Encyclomedica 2000

[2] *Asthma Agenda*, National Asthma Campaign September 1998

[3] Anderson HR, Butland BK, Strachan DP. Trends in the prevalence and severity of childhood asthma. *BMJ* 1994; 308: 1600-4. [[View abstract](#)]

[4] Burr ML, Butland BK, King S, Vaughan-Williams E *Changes in asthma prevalence: two surveys 15 years apart*, *Archives of Disease in Childhood* 1989; 64:1452-1456 in *Asthma Agenda*, National Asthma Campaign, September 1998 [[View abstract](#)]

[5] The Lung Report, *Lung Disease: A Shadow over the Nations Health*, March 1996
[British Lung Foundation](#)

[6] Jaakkola, MS et al. *Environmental tobacco smoke and adult-onset asthma: a population-based incident case-control study*. Paper presented at a meeting of the European Respiratory Society in Berlin, Sept. 2001.

[7] National Asthma Campaign, *No Smoke Without Asthma*, February 1998

[8] Rees J, Price J, *ABC of Asthma*, Third Edition, BMJ Publishing Group, 1995

[9] *The Impact of Asthma Survey, 1996*. The National Asthma Campaign and Allen and Hanburys Ltd.

[10] Dahms T E, Bohlin JF and Salvin RG, *Passive smoking effects on bronchial asthma*, 1981;80. [In *No Smoke Without Asthma?* National Asthma Campaign, February 1998]

[11] *Smoking and the Young* . Royal College of Physicians, London 1992

[12] Abulhosn RS et al. *Passive smoke exposure impairs recovery after hospitalization for acute asthma*. *Archives of Paediatrics and Adolescent Medicine*, 1997

[13] Lewis S, Richards D, Bynner J, Butler N, Britton J. *Prospective study of risk factors for early and persistent wheezing in childhood*. *Eur Resp J* 1995;8:349-56.

[14] Stein RT, Holberg CJ, Sherrill D, Wright AL, Morgan WJ, Taussig L, Martinez FD, *Influence of parental smoking on respiratory symptoms during the first decade of life: the Tucson Children's Respiratory Study*, *Am J Epidemiology* 1999; 149:1030-7 [[View abstract](#)]

[15] Professor Jean Golding, Institute of Child Health, Bristol University, 1996

[16] Report of the Scientific Committee on Tobacco and Health. 1998 London: The Stationery Office, 1998. [[View text](#)]

[17] *International Consultation on Environmental Tobacco Smoke (ETS) and Child Health* Consultation Report, Tobacco Free Initiative, World Health Organization 11-14 January 1999, Geneva.

[18] Cook D, Strachan D. *Effects of maternal and paternal smoking on children's respiratory health*. Report to the World Health Organization, 1998

[19] US Department of Health and Human Services, [The Health Consequences of Involuntary Smoking: A report of the Surgeon General](#) US DHHS Public Health Services, Centers for Disease Control. DHHS Publication No. (CDC) 87-8398, 1986

[20] US Environmental Protection Agency, [Respiratory health effects of passive smoking: lung cancers and other disorders](#) US EPA Office of Research and Development Publication No. EPA/600/6-90/0006F, 1992

[21] The Report of the California Environmental Protection Agency. [Health Effects of Exposure to Environmental Tobacco Smoke](#) National Institutes of Health, National Cancer Institute, 1999

[22] Abstract from Table ES 1 Health Effects Associated with Exposure to Environmental Tobacco Smoke in California EPA, [Health Effects of Exposure to Environmental Tobacco Smoke](#) 1999

[23] Clearing the Air: Asthma and Indoor Air Exposures. National Academy Press 2000 [\[View report\]](#)