

## What is Environmental Tobacco Smoke?

Tobacco smoke contains over 3,000 different chemicals, including irritant gases, carcinogens and fine particles. The smoke given off from the burning end of the cigarette is known as “sidestream” smoke - “mainstream” smoke is that inhaled by the smoker. Environmental tobacco smoke (ETS) consists mainly of sidestream smoke, with a small amount of exhaled mainstream smoke.

## Who is exposed?

Non-smokers who live or work with a smoker generally have the greatest exposure to ETS. Although ETS in public places is important as a nuisance, it usually contributes only a small amount to personal ETS exposure. The Health Survey for England provides estimates of the proportions of adults and children in Britain who are passively exposed to smoking in the home (figure 1). For children, maternal smoking generally contributes more to exposure than paternal smoking.

## The risks to health

In theory passive smoking could cause any of the health effects associated with active smoking, but at a level of risk normally assumed to be significantly less than that for active smoking. Substantial evidence exists for a causal link between parental smoking and several respiratory illnesses in childhood, and for an increased risk of lung cancer in non-smoking women whose husbands smoke (figure 2). The evidence relating ETS exposure in the home or the workplace to non-malignant respiratory disease in adults is sparse and inconclusive. The mortality risks associated with passive smoking are influenced mainly by non-respiratory causes: sudden infant death syndrome and coronary heart disease. These are not discussed further here (see the references below for details).

Acute irritant symptoms from the inhalation of ETS are common, the most frequent being eye irritation. Headaches, throat and nasal symptoms are also reported. ETS may also contribute to “sick building syndrome” but is unlikely to be the primary cause. A number of studies have shown a small decrease in measures of lung function among children and adult non-smokers passively exposed to ETS, but the clinical relevance of this is uncertain.

**Figure 1: Percentage of persons in Great Britain exposed to smoking in the home.**

	Children (aged 2-15)	Adults (16+)	
		males	females
Current active smokers	2% #	30% #	27% #
Current non-smokers living with a smoker	39% #	18%*	23%*



Source: # Health Survey for England 1996. Department of Health  
\* Health and Lifestyle Survey 1991. The Health Promotion Research Trust

**Figure 2: Respiratory diseases associated with passive smoking**

### Children:

- Acute chest illnesses in infancy (including early wheezing)
- Chronic cough, phlegm and breathlessness
- Asthma and wheezing: particularly more severe disease
- Middle ear infections and effusion (“glue ear”)

### Adult non-smokers:

- Lung cancer
- Asthma (adult-onset, and more severe disease) #
- Chronic obstructive pulmonary disease #



# Evidence relatively sparse and less consistent than for the other diseases

## The magnitude of the risks

A number of recent reviews have systematically collated and pooled the results of published studies in an attempt to estimate more precisely the magnitude of the risks associated with ETS exposure. Some results of these meta-analyses are summarised in figure 3, which shows the risk of certain respiratory illnesses in children exposed to one or more parents who smoke, relative to children of non-smoking parents. A relative risk of 1.0 represents no difference between the two groups.

The increased risks of respiratory disease in the children of smokers are most likely to be due to the adverse effects of parental smoking, rather than other confounding factors. The risks are greatest when both parents smoke, but are detectable even in families where only the father smokes (figure 4). This suggests that postnatal (environmental) exposure is important. The independent effects of prenatal (intrauterine) and postnatal exposure to maternal smoking are difficult to disentangle.

A similar meta-analysis of lung cancer among adult non-smokers passively exposed to ETS at home estimated the relative risk to be 1.24 (95% confidence interval 1.13 to 1.36) compared to non-smokers not exposed at home. This increase cannot be readily explained other than by a causal link between ETS and lung cancer. The increases in lung cancer risk resulting from exposure outside the home (including at work) and exposure to parental smoking in childhood are less certain.

## References

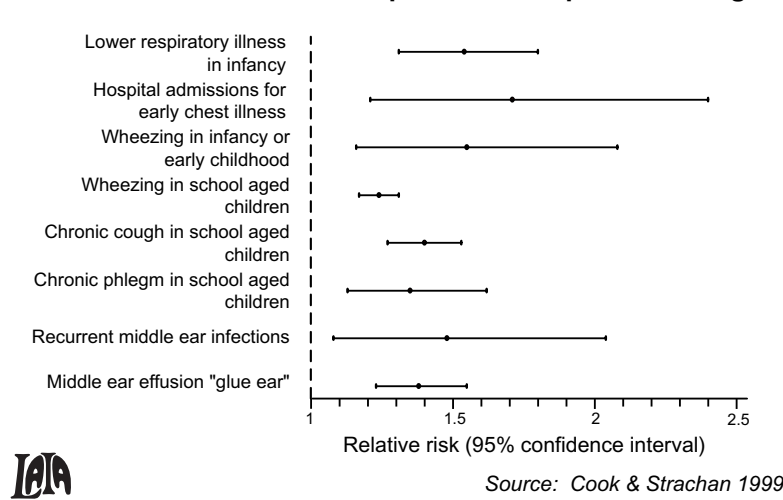
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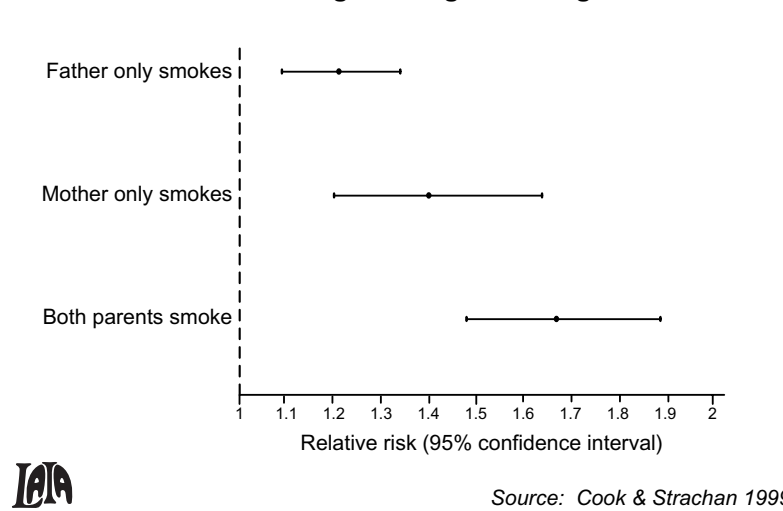
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**Figure 3: Pooled relative risks of selected respiratory diseases in children exposed to either parent smoking.**



**Figure 4: Pooled effects of maternal and paternal smoking on chronic cough among school aged children.**



## Summary

- **Environmental tobacco smoke (ETS) contains irritant gases, carcinogens and fine particles which are potentially toxic to the respiratory system.**
- **Recent systematic reviews and meta-analyses of published studies have been able to quantify more precisely than previously the low levels of risk associated with smoking.**
- **In children of parents who smoke, the risks of respiratory illness are increased by between one-quarter and three-quarters among the children of parents who smoke. This is thought to reflect a causal relationship, at least in part with postnatal ETS exposure.**
- **The risk of lung cancer is increased by about one-quarter among non-smoking adults who live with a smoker. This association is judged to be causal.**

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