



## Scientific Facts on **Respiratory Diseases** in Children

**Source document:**  
EC (2003)

**Summary & Details:**  
GreenFacts

**Context** - Respiratory diseases are a leading cause of mortality in developing countries, and one of the most common causes of illness in children of developed countries.

Asthma and allergies are increasing in a number of European countries.

How can genetic and environmental factors affect a child's likelihood to develop such diseases?

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This Digest is a faithful summary of the leading scientific consensus report produced in 2003 by European Commission (EC):  
*"Baseline Report on Respiratory Health in the framework of the European Environment and Health Strategy"*

The full Digest is available at: <https://www.greenfacts.org/en/respiratory-diseases/>

**i** This PDF Document is the Level 1 of a GreenFacts Digest. GreenFacts Digests are published in several languages as questions and answers, in a copyrighted user-friendly Three-Level Structure of increasing detail:

- Each question is answered in Level 1 with a short summary.
- These answers are developed in more detail in Level 2.
- Level 3 consists of the Source document, the internationally recognised scientific consensus report which is faithfully summarised in Level 2 and further in Level 1.

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## 1. To what extent do respiratory diseases affect children?

1.1 Diseases of the lung and airways are the most common cause of illness in children in developed countries and a leading cause of death in children in developing areas.

1.2 In developed countries the frequency of life threatening acute respiratory infections has dropped over the last 50 years. This is probably due to improved living conditions and health care.

1.3 Within Europe, there tends to be more asthma and allergy in the West and more infectious diseases in the East.

## 2. Which factors cause respiratory diseases in children?

2.1 Respiratory diseases, such as asthma and allergies, are caused by combinations of different factors. These factors are linked to the genetic background and the lifestyle of a person as well as the environment they live in. For instance, those who have a genetic predisposition and who are exposed to environmental factors are more likely to develop a disease such as asthma.



2.2 While underlying causes are responsible for a disease, triggers are factors that bring on or worsen symptoms. For instance, air pollution may not be responsible for causing asthma, but it is clearly a trigger that precipitates asthma attacks in children who already have the disease.

## 3. Which circumstances can affect children's sensitivity to respiratory diseases?

3.1 Some people have a genetic predisposition to develop respiratory diseases. Environmental factors such as tobacco smoke and air pollution also contribute to the onset of allergic disease, asthma, and other respiratory diseases. Once the disease is established, these factors may also trigger symptoms. These observations show the importance of the interplay between genetic background and environmental factors.



3.2 Asthma affects about twice as many boys than girls in early childhood, but later in life, a larger number of girls are affected. This suggests a certain role of sex hormones in asthma.

3.3 Many diseases that appear during childhood or adult life may have their origins during development in the womb or in very early infancy. If a mother smokes during pregnancy, this exposes her baby to tobacco smoke, which has adverse effects on lung development. Furthermore, respiratory infections during early childhood may have consequences for adult lung function.

3.4 Poverty is linked to an increased risk of respiratory infections both in developed and developing countries.

3.5 Living conditions can have an effect on how both environmental and genetic factors lead to respiratory diseases. In Europe, there has been a steep decrease in severe infectious diseases such as tuberculosis. However, asthma and allergies have become more and more

frequent in Western Europe. One explanation for this increase might be that infections in early childhood may prevent the development of allergic diseases. This trend may also be explained by changes in the diet.

In addition, factors affecting the development of the fetus may lead to greater risk of asthma later in life. For instance, children born with a low birth weight to older or smoking mothers may be particularly affected.

#### **4. Can outdoor air pollution contribute to respiratory diseases in children?**

There is clear evidence that air pollution is associated with troublesome respiratory symptoms in children, but it is less clear whether specific pollutants are directly responsible.

4.1 Key air pollutants that can affect children's health are particulate matter, ozone, nitrogen dioxide, and sulphur dioxide. This pollution is mainly linked to road traffic or industrial processes.

4.2 Air pollution, especially particulate matter and ozone, can trigger asthma attacks and can also worsen other respiratory symptoms such as wheezing. Whether specific pollutants may actually cause asthma is less clear.

4.3 In Europe, pollens from different plant species are responsible for 10-20% of allergies. Studies disagree on whether air pollution may affect pollen-related allergies. Global climate change might cause some plant species to spread to new areas and to extend their pollen season, but it is not clear to what extent this would affect allergic diseases.

#### **5. Can indoor air pollution contribute to respiratory diseases in children?**

Indoor air pollution can be much worse than air pollution outdoors. In Europe, most children spend 90% of their time indoors.

5.1 Indoor air quality may be affected by outdoor pollution, but also by indoor pollutants such as those produced by smoking and indoor heating and cooking and those released from building materials and cleaning products. It may be worsened by insufficient air exchange with the outside.

5.2 Poor indoor air quality can cause or contribute to the development of chronic respiratory diseases such as asthma. The most important source of indoor pollutants is environmental tobacco smoke. Other factors which can contribute to indoor pollution are damp housing, the presence of pets, the use of fuels for cooking and heating, and chemicals released from building materials.

5.3 When children spend time indoors at places other than home, such as day care or school, they are exposed to air pollutants similar to those found in the home environment: tobacco smoke, moulds, combustion gases, cleaning products, building materials, and outdoor air pollution. Moreover, specific exposures might occur during professional training or recreational activities such as swimming.

## 6. Which aspects of respiratory diseases require further research?

In order to better assess respiratory health risks for children, further knowledge is needed about the effects of:

- new building materials,
- products used in the home, and
- exposure to various environmental factors at different stages of development, before birth up to childhood.

Moreover, genetic factors which make children more sensitive to respiratory diseases need to be studied and children should be followed over many years in order to understand disease development.

Finally, there is a need for uniform definitions of respiratory symptoms, so that data from different countries can be more easily compared.

## 7. Conclusions

Environmental factors, such as tobacco smoke and nutrition, greatly affect a child's resistance to respiratory diseases. In prosperous countries, a reduction in severe infectious disease and an increase in asthma and allergies has been reported. Many environmental factors thought to influence children's respiratory health remain unclear and sometimes controversial, particularly in the case of asthma and allergies.