Prevalence of asthma and allergies in children

The prevalence rates of symptoms of asthma and allergic rhinoconjunctivitis in children aged 6–7 years and 13–14 years

The summary gives an overview on the prevalence of asthma and allergic rhinoconjunctivitis symptoms in children as found in the International Study of Asthma and Allergies in Childhood (ISAAC) (1).

**KEY MESSAGE**

ISAAC found that asthma and rhinoconjunctivitis symptoms cause a significant burden of disease and that the prevalence of both is rising in European children. Allergic and asthmatic symptoms are associated with, among other things, indoor and outdoor air quality.

In 1999–2004, asthma prevalence in children across the European study centres varied from less than 5% to over 20%. Policies that promote early identification of the disease, ensure adequate treatment and, in particular, improve air quality, help to reduce this burden.

**RATIONALE**

Prevalence of asthma and allergies among children has become an increasing problem in the last few decades. Asthma has become the most common chronic disease among children and is one of the major causes of hospitalization among those younger than 15 years of age (2). As more people are sensitized to allergens, allergic diseases may increase in Europe in the coming years.

**Fig. 1. Prevalence of asthma symptoms in children aged 6–7 years and 13–14 years, ISAAC Phase Three, 1999–2004**

**Fig. 2. Prevalence of allergic rhinoconjunctivitis symptoms in children aged 6–7 years and 13–14 years, ISAAC Phase Three, 1999–2004**

Note. As the data were collected from specific centres only, prevalence figures are not country-representative. When data were collected from more than one centre, the number of centres is given in brackets.
**Fig. 3. Annual change in prevalence of asthma in children between ISAAC Phase One (1992–1998) and Phase Three (1999–2004)**

![Graph showing annual change in prevalence of asthma in children between ISAAC Phase One (1992–1998) and Phase Three (1999–2004)](image)

Note. The numbers of centres in countries for children aged 6–7 years and 13–14 years are given in brackets. Where there is no number, the data were collected from one centre.

**Fig. 4. Annual change in prevalence of allergic rhinoconjunctivitis in children between ISAAC Phase One (1992–1998) and Phase Three (1999–2004)**

![Graph showing annual change in prevalence of allergic rhinoconjunctivitis in children between ISAAC Phase One (1992–1998) and Phase Three (1999–2004)](image)

Note. The numbers of centres in countries for children aged 6–7 years and 13–14 years are given in brackets. Where there is no number, the data were collected from one centre.

### PRESENTATION OF DATA

The data in Figures 1–4 are not indicative of prevalence in all European countries as only selected centres (represented by cities/regions) participated in the study. Thus, the intracountry comparison shows the differences between the centres. The highest prevalences of asthma symptoms in children aged 6–7 years (>20%) and 13–14 years (>25%) were found in Ireland and the United Kingdom. The lowest asthma rates for both age groups were found in Albania (<5%). Allergic rhinoconjunctivitis symptoms were reported by children aged 13–14 years most frequently in Malta (>20%).

Among children aged 13–14 years, the greatest increases in prevalence between ISAAC Phase One (1992–1998) and Phase Three (1999–2004) were found in Romania and Ukraine for asthma, and Poland, Romania and the Russian Federation for rhinoconjunctivitis. The prevalence of asthma and rhinoconjunctivitis fell in Malta, Portugal (1992–1998) and Phase Three (1999–2004) were found in Romania and Ukraine for asthma, and Poland, Romania and the Russian Federation for rhinoconjunctivitis. The prevalence of asthma and rhinoconjunctivitis fell in Ireland, Malta and the United Kingdom.

Where countries have multiple study centres, the average prevalence is given. Table 1 shows centre-specific prevalence and outcomes. Allergy can be progressive, and neglecting its symptoms may lead to a worsening of the disease. Medication is not the only way to control asthma and allergies. It is also important to avoid triggers that irritate and inflame the airways. Primary prevention to reduce the level of exposure to common risk factors, particularly tobacco smoke, frequent lower respiratory infections during childhood and air pollution (indoor and outdoor), is an important step.

### HEALTH – ENVIRONMENT CONTEXT

It is estimated that 20% of the world population suffer from allergic diseases (3). Recent reviews suggest that the prevalence of allergic diseases is increasing throughout Europe and is no longer restricted to specific seasons or environments (2,4). Asthma is an inflammatory disorder of the bronchial Airways produced by allergies, viral respiratory infections and airborne irritants, while genetic factors predispose to develop asthma (2). Allergic rhinoconjunctivitis is characterized by sneezing, nasal congestion and itching of the nose, eyes or throat. As with other allergic disorders, this is due to an exaggerated response of the body’s immune system when exposed to specific non-infectious particles.

In the development of both asthma and allergic rhinoconjunctivitis, there is a complex interaction of genetic and environmental factors. A possible explanation is the “hygiene hypothesis”. This suggests that increased hygiene and the resulting lack of exposure to various microorganisms in early life affect the immune system so that individuals’ ability to fight off certain diseases is weakened and they are more susceptible to autoimmune diseases (5).

Good management of asthma can control the disorder and enable people to enjoy a high quality of life. Early diagnosis and appropriate treatment lead to much better disease control and outcomes. Allergy can be progressive, and neglecting its symptoms may lead to a worsening of the disease. Medication is not the only way to control asthma and allergies. It is also important to avoid triggers that irritate and inflame the airways. Primary prevention to reduce the level of exposure to common risk factors, particularly tobacco smoke, frequent lower respiratory infections during childhood and air pollution (indoor and outdoor), is an important step.

Poor outdoor air quality, exposure to indoor allergens and a stressful lifestyle have been connected with the prevalence of asthma and allergic rhinoconjunctivitis (6). An increasing trend in the prevalence of asthma and allergies is particularly apparent in urban areas, where children have been found to have more allergic reactions to outdoor and indoor allergens (7). The use of fossil fuels as well as higher volumes of road traffic in cities are thought to contribute to this (8,9). Recent evidence supports a causal relationship between exposure to air pollution and exacerbation of asthma, mainly due to exposure to particulate matter (PM) and ozone (9). There is little evidence, however, to support a causal association between the prevalence or incidence of asthma and air pollution in general. The incidence of allergic symptoms in children is associated with exposure to allergens in indoor environments with poor air quality (10). This includes biomass combustion products, high humidity...
and moulds, dust mites, pets and environmental
tobacco smoke (ETS) (1). Children who are more
frequently exposed to poor indoor air
may be at greater risk of being affected by out-
door pollutants. Exposure to ETS can cause
new cases of asthma in children who have not
previously shown symptoms. Additionally, in
asthmatic individuals it can trigger asthma
attacks and make asthma symptoms more
severe (11).

Additionally, there seems to be a parallel
development between climate change and the
increasing prevalence of asthma and allergies
in children. As warmer temperatures and early
spring are related to increased airborne pollen,
sensitization to pollen allergens is likely to
have doubled during the last three decades,
particularly in young people in many areas in
Europe (12).

### POLICY RELEVANCE

**AND CONTEXT**

The failure to diagnosis asthma and allergic
diseases leads to inadequate disease control
and, consequently, higher treatment costs. In
the management of asthma and allergies it is,
therefore, important to raise the population’s
awareness of the disease, the best management
strategies and the importance of risk factors
and behaviour in the prognosis. Many studies
have shown that asthma is under-diagnosed,
which often leads to delayed treatment (2).
As environmental conditions contribute to asth-
ma and allergies, the use of medication is not
the only way to reduce the burden: policies
that improve indoor and outdoor air quality
are likely to have positive effects. Many countries
also have web pages informing the public
about proper preventive behaviour, such as
avoiding house-dust allergens by using mat-
tress covers or not keeping pets.

The Global Alliance against Chronic Respira-
tory Diseases (GARD), a voluntary alliance of
internationally recognized organizations and
institutions, is part of WHO’s activities to pre-
vent and control asthma and allergic condi-
tions. GARD includes the Global Initiative for
Asthma (GINA), which was formed in 1992
by WHO and the National Heart, Lung and
Blood Institute in the United States. It also
includes the Global Initiative on Allergic
Rhinitis and its impact on Asthma (ARIA), in
which WHO is a participant. The WHO Prac-
tical Approach to Lung Health (PAL), a strat-
egy designed to help primary health care
workers improve their management of respira-
tory symptoms, is used in GARD’s implementa-
tion strategy (2). World Asthma Day is an
annual event organized by GINA to improve
asthma awareness and care around the world.
The Prevention of Allergy and Allergic Asthma
Project is an outcome of the joint meeting
between WHO and the World Allergy Organiza-
tion (3). This approach focuses mainly on
different preventive measures for allergy and
allergic asthma.

In 2004, the Fourth M inisterial Conference
on Environment and Health adopted the Chil-
dren’s Health and Environment Action Plan
for Europe, which includes four regional pri-
ority goals to reduce the burden of environ-
ment-related diseases in children (13). One of
the goals (RPG III) aims to prevent and reduce
respiratory diseases due to outdoor and indoor
air pollution, thereby contributing to a reduc-
tion in the frequency of asthmatic attacks, and
to ensure that children can live in an environ-
ment with clean air.

As asthma is a reducible and preventable dis-
ease, the European Community action plan in
the field of Public Health (2003–2008) aims to
evaluate the impact of possible health policy
interventions on its prevalence (14).

### DATA UNDERLYING THE INDICATOR

**D ata source**

ISAAC Phase One (1992–1998) and Phase

**ASHER et al (15).**

### ASSESSMENT

Globally, the prevalence of asthma and allergies
has increased over the last few decades. How-
ever, the ISAAC study, which focused on chil-
dren, showed wide variations in the prevalence
of symptoms of asthma, allergic rhinoconjunc-
tivitis and eczema. In general, the study found
the highest asthma prevalence in English-speak-
ing developed countries (Australia, Ireland,
New Zealand, the United Kingdom and the
United States). Differences between countries
may be due to factors such as lifestyle, dietary
habits, socioeconomic differences and environ-
mental or climate factors (7,15). Additionally,
awareness of the disease can affect its preva-
cence and severity in a population (15).

In the European Region, the countries with the
highest prevalence of asthma and symptoms of
allergy include Finland, Germany, Ireland, the
United Kingdom and, recently, Romania. A
lower asthma prevalence was found in Alba-
nia, Belgium, Estonia, Georgia, Italy, Lithuania,
Spain and Sweden. In some countries with mul-
tiple study centres, variations in preva-
ience were seen in ISAAC Phase Three, particu-
larly in Italy. Poland reported a high rate of
allergic rhinoconjunctivitis symptoms but low
asthma rates. This suggests that the prevalence
rates of asthma may depend on awareness of
asthma in the population studied (16).

Overall, the correlation between the preva-
ience of the two symptoms was high (between
0.47 in the oldest children in Phase Three and
0.80 in the youngest in Phase One), as was the
relation correlation between the changes in those rates
(0.47–0.51).

The high prevalence of asthma symptoms is
not, however, necessarily connected with
increased rates of other allergic symptoms sur-
veyed. This may be due to the different risk
factors for these interrelated yet distinct disor-
ders or to a time shift in the onset of the symp-
toms.

The intercountry differences observed are also
likely to have been partly influenced by the
validity of the written questionnaires in a vari-
ety of cultures and languages (7).

The greatest year-on-year increase in asthma
symptoms was seen in 13–14-year-olds in
Romania and Ukraine, although considerable
increases were also evident in Finland and
Germany. In the countries with a high preva-
ience in 1992–1998 (Ireland, Sweden and the
United Kingdom), a decreased prevalence was
seen in 1999–2004 in 13–14-year-olds but not
in 6–7-year-olds.

### Table 1. Range of prevalence between centres in countries

with more than one ISAAC centre

<table>
<thead>
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<th>Allergic rhinoconjunctivitis symptoms: range between centres</th>
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<td>12.5 – 14.5</td>
<td>9.4 – 11.2</td>
</tr>
<tr>
<td>Portugal</td>
<td>-</td>
<td>9 – 14.6</td>
</tr>
<tr>
<td>Spain</td>
<td>7.1 – 12.4</td>
<td>7.1 – 13.7</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10.2 – 20.9</td>
<td>9.7 – 27.8</td>
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</tbody>
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| Country |-country | prevalence data are calculated as the centres’ average. ISAAC Phases One and Three are repeated multi-country cross-sectional surveys. Two age groups were investigated by standardized ques-

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References

Further information


A plea to abandon asthma as a disease concept. Lancet, 2006, 368:705.


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