

THE LANCET

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Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC

**The International Study of Asthma and Allergies in Childhood (ISAAC)
Steering Committee**

**Reprinted from THE LANCET Saturday 25 April 1998
Vol. 351 No. 9111 Pages 1225-1232**

THE LANCET 42 BEDFORD SQUARE LONDON WC1B 3SL UK

Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC

International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee*

Summary

Objective Systematic international comparisons of the prevalences of asthma and other allergic disorders in different countries are needed for better understanding of their epidemiology, to generate new hypotheses, and to test existing hypotheses of possible causes. We determined worldwide prevalence of asthma, allergic rhinoconjunctivitis, and atopic eczema.

Design We studied 463 801 children aged 13–14 years from 100 collaborating centres in 56 countries. Children were interviewed, through one-page questionnaires, symptoms of the three atopic disorders. In 99 centres in 42 countries, a video asthma questionnaire was also used for 100 children.

Results We found differences of between 20-fold and 60-fold between centres in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema, and 10-fold to 12-fold variations between the 10th and 90th percentiles for the different disorders. For asthma symptoms, the highest 12-month prevalences were from centres in the UK, Australia, New Zealand, and Republic of South Africa, followed by most centres in North, Central, and South America; the lowest prevalences were from centres in Central and Eastern European countries, Indonesia, Greece, Taiwan, Uzbekistan, India, and Ethiopia. For allergic rhinoconjunctivitis, the centres with the highest prevalences were scattered across the world. The centres with the lowest prevalences were similar to those for asthma symptoms. For atopic eczema, the highest prevalences came from scattered centres, including some in Scandinavia and Africa that were not among centres with the highest asthma prevalences; the lowest prevalence rates of atopic eczema were similar in prevalence as for asthma symptoms.

Conclusion The variation in the prevalences of asthma, allergic rhinoconjunctivitis, and atopic-eczema symptoms varies between different centres throughout the world. These findings will form the basis of further studies to investigate factors that potentially lead to these regional patterns.

1998; **351**: 1225–32
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Introduction

There have been few studies of the population prevalence of allergic rhinitis and atopic eczema, and although hundreds of asthma-prevalence studies have been done in various parts of the world, they have seldom used standard approaches. An exception is the European Community Respiratory Health Survey (ECRHS),¹ which involved surveys of asthma and allergic-rhinitis prevalence in adults aged 20–44 years in 48 centres in 22 countries, although only nine centres in six countries were outside of western Europe. The ECRHS suggested that there were regional risk factors for asthma and allergic rhinitis in western Europe, but it did not comprehensively assess the global patterns. For children, the largest standard studies of the prevalences of asthma, allergic rhinitis, or atopic eczema have involved at most four countries.^{4–6}

Thus, in some respects, the epidemiology of asthma and other allergic disorders is currently similar to that of cancer epidemiology in the 1950s and 1960s, when the international patterns of the incidence of cancer were studied.⁷ These studies revealed striking international differences that gave rise to many new hypotheses, tested in further epidemiological studies that identified previously unknown risk factors for cancer. These risk factors may not have been in the hypotheses investigated if the initial international comparisons had been confined to few western countries. More specifically, Rose^{8,9} has noted that whole populations may be exposed to risk factors for disease (eg, high exposure to house-dust-mite allergen) and the patterns may be apparent only when comparisons are made between, rather than within, populations.

Therefore, we carried out systematic, standardised, international comparisons of the prevalence of asthma and allergies to generate new hypotheses and to investigate existing hypotheses in the International Study of Asthma and Allergies in Childhood (ISAAC). The detailed findings for the prevalence and severity of the symptoms of asthma, allergic rhinoconjunctivitis, and atopic eczema in children aged 6–7 years and 13–14 years will be reported elsewhere. Here, we give an overview of the findings for children aged 13–14 years (the age-group that was studied by all participating centres), assess the relationship between the findings for the three disorders, and discuss the potential for future ecological and case-control studies.

Methods

Phase one of the ISAAC programme¹⁰ used a simple standard approach at minimum cost in as wide a range of centres and