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Global variation in the prevalence and severity of asthma symptoms: Phase Three of the International Study of Asthma and Allergies in Childhood (ISAAC)

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See the Appendix and Supplementary table S1 for a full list of the members of the ISAAC Phase Three Study Group.

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ABSTRACT

Background: Phase Three of the International Study of Asthma and Allergies in Childhood (ISAAC) measured the global prevalence and severity of asthma symptoms in children.

Methods: A cross-sectional questionnaire survey of 798 685 children aged 13–14 years from 233 centres in 97 countries, and 388 811 children aged 6–7 years from 144 centres in 61 countries, was conducted between 2000 and 2003 in >90% of the centres.

Results: The prevalence of wheeze in the past 12 months (current wheeze) ranged from 0.8% in Tibet (China) to 32.6% in Wellington (New Zealand) in the 13–14 year olds, and from 2.4% in Jodhpur (India) to 37.6% in Costa Rica in the 6–7 year olds. The prevalence of symptoms of severe asthma, defined as ≥ 4 attacks of wheeze or ≥ 1 night per week sleep disturbance from wheeze or wheeze affecting speech in the past 12 months, ranged from 0.1% in Pune (India) to 16% in Costa Rica in the 13–14 year olds and from 0% to 20.3% in the same two centres, respectively, in the 6–7 year olds. Ecological economic analyses revealed a significant trend towards a higher prevalence of current wheeze in centres in higher income countries in both age groups, but this trend was reversed for the prevalence of severe symptoms among current wheezers, especially in the older age group.

Conclusion: Wide variations exist in the symptom prevalence of childhood asthma worldwide. Although asthma symptoms tend to be more prevalent in more affluent countries, they appear to be more severe in less affluent countries.

Asthma is one of the most common non-communicable diseases in children. The increase in asthma prevalence in developed countries seen at the end of the last century has raised concern for the considerable burden of this disease on society as well as individuals. Until a decade ago, there were few data on asthma prevalence from developing countries. Recently, the International Study of Asthma and Allergies in Childhood (ISAAC), using a simple and inexpensive standardised methodology, has provided valuable data on the prevalence of the symptoms of childhood asthma, rhinoconjunctivitis and eczema for international comparison from countries with different socio-economic backgrounds.^{1–3}

Phase One of this global study was conducted over the early to mid 1990s and involved >700 000 schoolchildren aged 6–7 and 13–14 years from 156 centres in 56 countries. It revealed marked geographic variations in the prevalence of asthma

symptoms, even within genetically similar groups.^{2,3} These findings strongly suggested that environmental factors were likely to be responsible for the observed variations. Phase Three of ISAAC, using the same methodology as Phase One and conducted around the turn of the century, was undertaken to examine time trends in the prevalence of symptoms of asthma and related disorders and to provide more comprehensive information on how the prevalence of these symptoms varies across the world. These time trends data were derived from centres which participated in both phases and have been published elsewhere.^{4,5} This current paper gives a more comprehensive description of the worldwide prevalence of asthma symptoms, including those which indicate clinically more severe disease, by presenting data not only from centres included in the time trends analysis, but also data from 128 new centres which participated solely in Phase Three. The majority of these new centres were from developing countries in Latin America, Eastern Europe and Africa which have few, if any, epidemiological data on asthma (Supplementary table S1). With the diverse socio-economic backgrounds of the participating centres, these data are useful not only as a basis for studying the burden of childhood asthma worldwide, but also for exploring the impact of economic development on the prevalence and severity of asthma symptoms.

METHODS

Study design and questionnaires

Details of the Phase Three study protocol have been published elsewhere.⁶ This multicountry cross-sectional survey involved schoolchildren of two age groups, 6–7 years and 13–14 years. The study instruments were comprised of a standardised written questionnaire on symptoms of asthma, rhinoconjunctivitis and eczema, and a video questionnaire showing five different scenes of asthma symptoms.⁷ Both questionnaires were self-completed by adolescents in the 13–14 year age group whereas the written questionnaire only was completed by parents of children in the 6–7 year age group. The results for the symptoms of rhinoconjunctivitis and eczema will be reported in separate publications.

In this study, we estimated the prevalence of asthma symptoms based on the responses to (1) the written questionnaire on (a) wheeze in the past 12 months (current wheeze) and (b) frequent or

Table 1 Prevalence of asthma symptoms in the 13–14 year age group by region

Region (no of centres)	Year	No*	Current wheeze		Asthma ever		Current wheeze (video)		Symptoms of severe asthma (total participants denominator)		Symptoms of severe asthma† (current wheeze denominator)		Symptoms of severe asthma without asthma ever† (current wheeze denominator)	
			No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
Africa (22)	2002	66334	9275 (14.0)	7150 (10.8)	16627	1749 (10.5)	5937 (9.0)	4729 (51.0)	2639 (28.5)					
Asia-Pacific (27)	2000	99688	8737 (8.8)	10831 (10.9)	83917	4583 (5.5)	3837 (3.8)	3496 (40.0)	1747 (20.0)					
Eastern Mediterranean (16)	2001	51708	4801 (9.3)	3847 (7.4)	36331	1998 (5.5)	2721 (5.3)	2265 (47.2)	1381 (28.8)					
Indian subcontinent (19)	2002	55815	3894 (7.0)	3103 (5.6)	42960	2166 (5.0)	2231 (4.0)	1877 (48.2)	953 (24.5)					
Latin America (56)	2002	165917	26352 (15.9)	22612 (13.6)	84278	8643 (10.3)	11941 (7.2)	10080 (38.3)	4976 (18.9)					
North America (7)	2002	142437	30750 (21.6)	24693 (17.3)	139421	18163 (13.0)	16032 (11.3)	14956 (48.6)	5999 (19.5)					
Northern and Eastern Europe (28)	2002	72092	7012 (9.7)	3651 (5.1)	38091	1251 (3.3)	2704 (3.8)	2446 (34.9)	1643 (23.4)					
Oceania (14)	2002	36385	6306 (17.3)	8015 (22.0)	31258	3231 (10.3)	2757 (7.6)	2635 (41.8)	795 (12.6)					
Western Europe (44)	2002	108309	15503 (14.3)	17065 (15.8)	53220	4088 (7.7)	6664 (6.2)	6283 (40.5)	2349 (15.2)					
English language centres‡ (20)	2002	176524	40453 (22.9)	35067 (19.9)	153626	19825 (12.9)	19809 (11.2)	18614 (46.0)	7094 (17.5)					
Global total (233)	2002	798685	112630 (14.1)	100967 (12.6)	526103	45872 (8.7)	54824 (6.9)	48767 (43.3)	22482 (20.0)					

Symptoms of severe asthma: respondents with current wheeze who had ≥ 4 attacks of wheeze in the last year or had ≥ 1 nights per week sleep disturbance from wheeze in the last year or had wheeze affecting speech in the last year.

*Number of children. †The data presented are restricted to respondents who answered "yes" to the question about current wheeze. ‡Centres in Australia, Canada, Channel Islands, Isle of Man, New Zealand, Republic of Ireland, the UK and the USA.

severe episodes of wheeze in the past 12 months (symptoms of severe asthma), and (2) symptoms in the past 12 months reported from the video questionnaire which showed a young person wheezing at rest. Symptoms of severe asthma are defined as those with current wheeze who, according to the written questionnaire, in the past 12 months, have had ≥ 4 attacks of wheeze, or ≥ 1 night per week sleep disturbance from wheeze, or wheeze affecting speech. This definition is based on previous ISAAC analyses that showed a combination of these features of more severe wheezing episodes correlated more closely with asthma mortality and hospital admissions than current wheeze alone.⁸ Reported "asthma ever" was defined from the question "Have you (Has your child) ever had asthma?"

The written questionnaire was translated from English, according to the ISAAC Phase Three protocol,⁶ into one local language in 191 centres (80.3%), and into more than one in 15 centres (6.3%). If any back-translated questions were inaccurate, those questions were not used in the analyses. A total of 54 different languages were used (Supplementary table S1). English and Spanish were the most common languages (21.0% and 20.2% of centres respectively).

Data analysis

We assessed each centre's adherence to the ISAAC protocol and excluded any with serious discrepancies; minor deviations are noted with footnotes in Supplementary table S1. Response rate was calculated by the number of participants divided by the sum of the total number of eligible children from the participating schools in that centre. Symptom prevalence values in each centre were calculated by dividing the number of positive responses to each question by the number of completed questionnaires for the written and video questionnaires separately. Thus, any apparent inconsistencies between responses to the stem and branch questions were accepted and not recoded. To assess the proportion of children with more severe manifestations of the disease amongst those with asthma symptoms, the number of respondents with severe wheeze was divided by the number of current wheezers derived from the written questionnaire. The kappa statistic was used to examine the relationships between the written and video questionnaire in the 13–14 year age group. An ecological economic analysis was performed to examine the effect of economic development on the prevalence of asthma symptoms. This analysis used a generalised linear mixed model with a logit link and the centre as a random effect to examine the association between country-level gross national income (GNI) and the centre-level symptom data. The GNI data were categorised into low, middle and high based on World Bank cut-off values for 2001.⁹ The regional analyses were based on the standard ISAAC regions which are broadly the same as the regions defined by the World Health Organization, but we also performed analyses specifically for English language countries (Australia, Canada, Isle of Man, New Zealand and the UK for 6–7 year olds, and Australia, Canada, Channel Islands, Isle of Man, New Zealand, Republic of Ireland, the UK and the USA for the 13–14 year olds). All analyses were carried out using SAS version 9.1. A p value of <0.05 was considered significant.

RESULTS

Altogether 407 data sets from both age groups were received and the data and methodology checks were completed. Of these, 30 were excluded due to low response rates (16 data sets), <1000

participants (12) or an inability to calculate a response rate (2). The remaining 377 data sets comprised 1 187 496 school-children from 237 centres in 98 countries, of which 128 centres (689 413 participants) in 64 countries (34 new countries) had not undertaken ISAAC Phase Three time trends studies.

The 13–14 year age group

There were 798 685 participants from 233 centres in 97 countries. The overall response rate was 88.1% (Supplementary table S1). The global average for current wheeze based on the written questionnaire was 14.1%, ranging from 5.1% in Northern and Eastern Europe to 22% in Oceania (table 1). Thirty-five centres (15%) had a prevalence of current wheeze $\geq 20\%$ and these were mostly from the English language countries and Latin America. Twenty-two centres (9.4%) had a prevalence of $<5\%$ and they were mostly in the Indian subcontinent, Asia-Pacific, Eastern Mediterranean, and Northern and Eastern Europe (fig 1).

Globally, 6.9% of adolescents had symptoms of severe asthma, ranging from 3.8% in Asia-Pacific and Northern and Eastern Europe to 11.3% in North America (table 1). Similar to current wheeze, centres with the highest prevalence of severe asthma symptoms ($\geq 7.5\%$) were mostly found in the English language countries and Latin America, although these also included many centres in Africa. Centres with the lowest prevalence ($<2.5\%$) were again located mainly in the Indian subcontinent, Northern and Eastern Europe, Asia-Pacific and

the Eastern Mediterranean (fig 2 and Supplementary table 2). However, a different pattern was observed in the proportion of current wheezers with symptoms of severe asthma. Africa (51%), the Indian subcontinent (48.2%) and the Eastern Mediterranean (47.2%) were ranked higher than English language countries (46%) and Latin America (38.3%) (Supplementary fig S1). Globally, 20% of current wheezers with symptoms of severe asthma did not report “asthma ever”. This was more commonly seen in the Eastern Mediterranean (28.8%), Africa (28.5%), the Indian subcontinent (24.5%) and Northern and Eastern Europe (23.4%) than in Asia-Pacific (20%), Latin America (18.9%), English language countries (17.5%) or Western Europe (15.2%) (table 1 and Supplementary fig S2).

A total of 526 103 adolescents from 136 centres in 60 countries completed the video questionnaire. In general, the symptom prevalence rates for current wheeze based on the video questionnaire were lower than those derived from the written questionnaire, and there was a fair agreement between these measures ($\kappa = 0.39$, 95% CI 0.38 to 0.39) (table 1 and Supplementary table S2).

The 6–7 year age group

There were 388 811 participants from 144 centres in 61 countries. The overall response rate was 84.5% (Supplementary table S1). The mean global prevalence for current wheeze was 11.5%, ranging from 6.8% in the Indian subcontinent to 21.7% in Oceania (table 2). Twenty-one centres

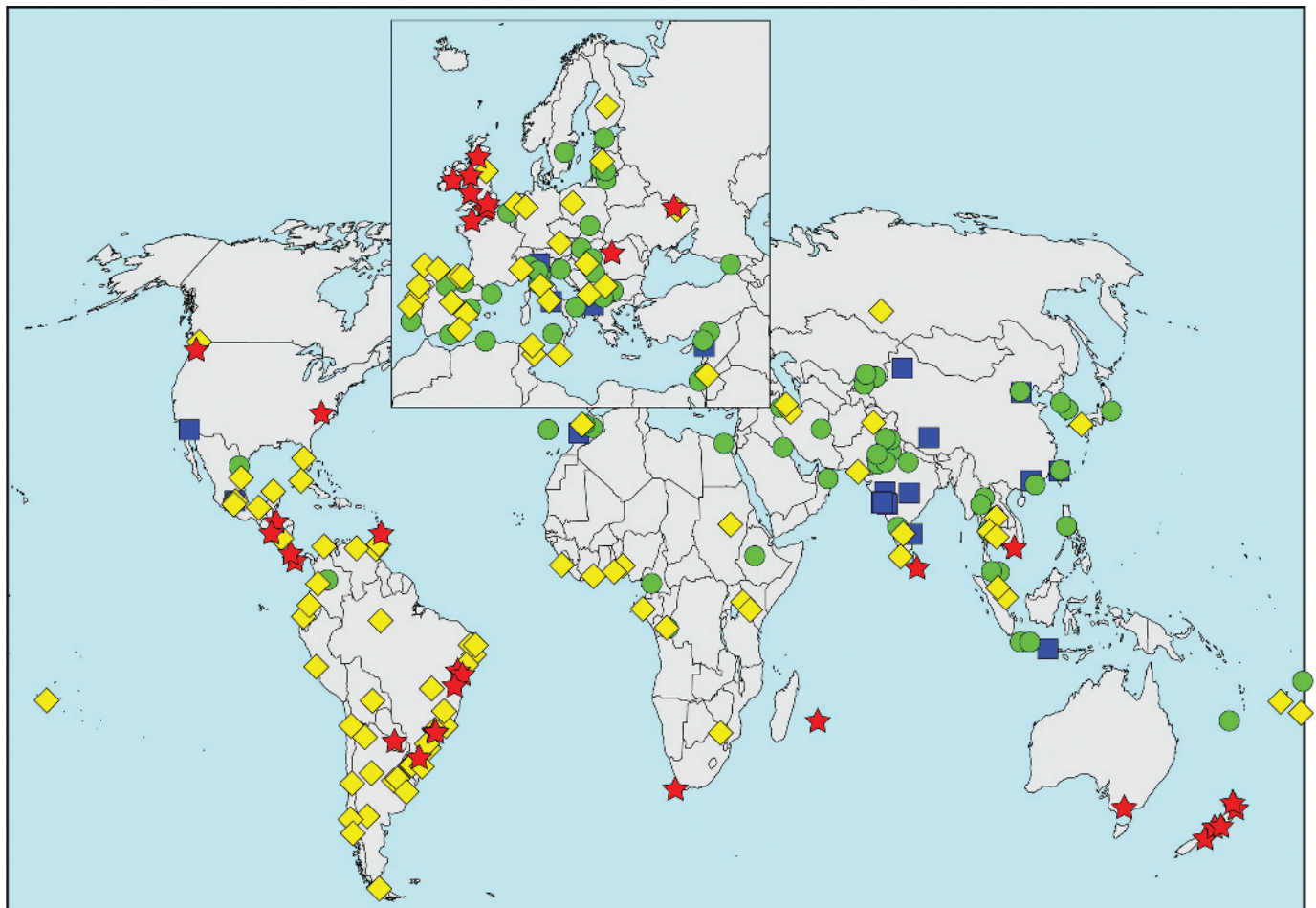


Figure 1 Prevalence of current wheeze according to the written questionnaire in the 13–14 year age group. See text for definition of current wheeze. The symbols indicate prevalence values of $<5\%$ (blue square), 5 to $<10\%$ (green circle), 10 to $<20\%$ (yellow diamond) and $>20\%$ (red star).

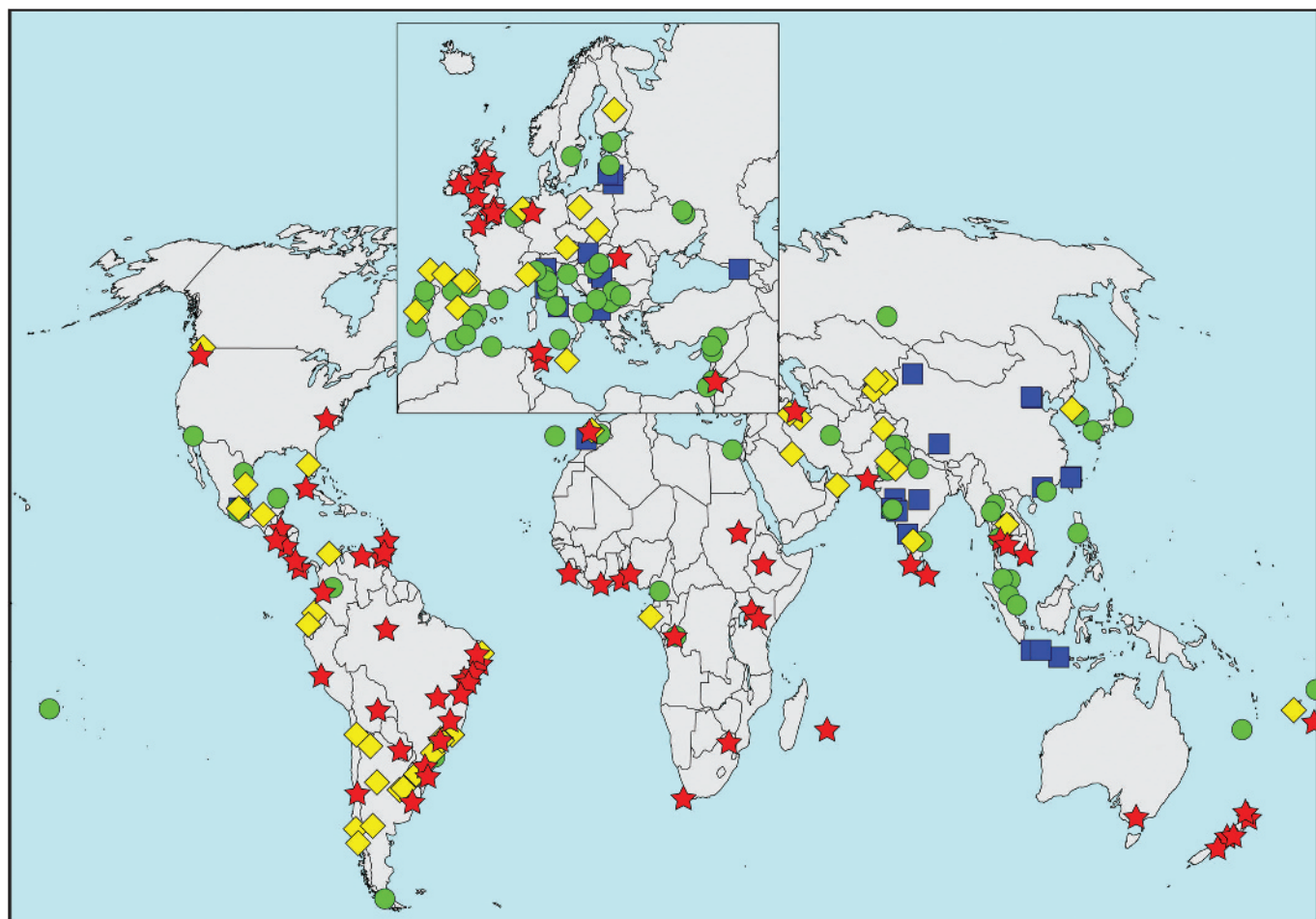


Figure 2 Prevalence of symptoms of severe asthma according to the written questionnaire in the 13–14 year age group. See text for definition of symptoms of severe asthma. The symbols indicate prevalence values of <2.5% (blue square), 2.5 to <5% (green circle), 5 to <7.5% (yellow diamond) and >7.5% (red star).

(14.6%) had a prevalence of current wheeze $\geq 20\%$, and all but two were in English language countries or Latin America. Seventeen centres (11.8%) had a prevalence of <5%, and these were mostly from the Indian subcontinent, Asia-Pacific and Northern and Eastern Europe (fig 3 and Supplementary table S3).

There were 4.9% of children worldwide with symptoms of severe asthma, ranging from 3.2% in Asia-Pacific and Northern and Eastern Europe to 9.5% in Oceania (table 2). Centres with high prevalence ($\geq 7.5\%$) were mostly found in Latin America and English language countries, whereas most of the low prevalence (<2.5%) centres were from the Indian subcontinent, Asia-Pacific and Northern and Eastern Europe (fig 4). However, centres with a high proportion of current wheezers with symptoms of severe asthma ($\geq 50\%$) were mostly seen in the Indian subcontinent, Eastern Mediterranean, Africa and Latin America. Those with a low proportion (<30%) were mostly from Asia-Pacific and Northern and Eastern Europe (Supplementary fig S3). Globally, 16.5% of current wheezers with severe asthma symptoms had never received a diagnosis of asthma. Undiagnosed asthma amongst these subjects was highest in Africa (40.2%) and lowest in English language countries (5.8%) (table 2 and Supplementary fig S4).

Associations with GNI

Centres in lower income countries tended to have lower prevalence of current wheeze based on the written questionnaire

(odds ratios (OR) for low vs high income 0.49 (95% CI 0.37 to 0.66) and 0.55 (0.42 to 0.72) for the younger and older age groups, respectively) as well as reported “asthma ever” (OR 0.29 (0.21 to 0.41) and 0.35 (0.27 to 0.46) for the younger and older age groups, respectively) in both age groups. While the same trend was seen with symptoms of severe asthma in the younger age group (OR 0.61 (0.42 to 0.89)), this failed to reach statistical significance in the older age group (OR 0.77 (0.58 to 1.02)). However, the trend with GNI was reversed for the prevalence of symptoms of severe asthma among those with current wheeze, although this was only statistically significant in the older age group (OR 1.46 (1.21 to 1.75); OR 1.24 (0.94 to 1.63) for the younger age group). Centres in lower income countries also tended to have a higher proportion of their current wheezers with symptoms of severe asthma who had no reported “asthma ever” (OR 2.1 (1.48 to 2.99) and OR 1.90 (1.53 to 2.35) for the younger and older age groups, respectively).

DISCUSSION

The ISAAC Phase Three study, with its much greater number of schoolchildren, participating centres and countries than those of Phase One, has again shown that striking variations in the prevalence of asthma symptoms exist between different geographic areas and populations. Generally, the differences in prevalence between countries were more marked than those within individual countries. There were 13-fold and 9-fold

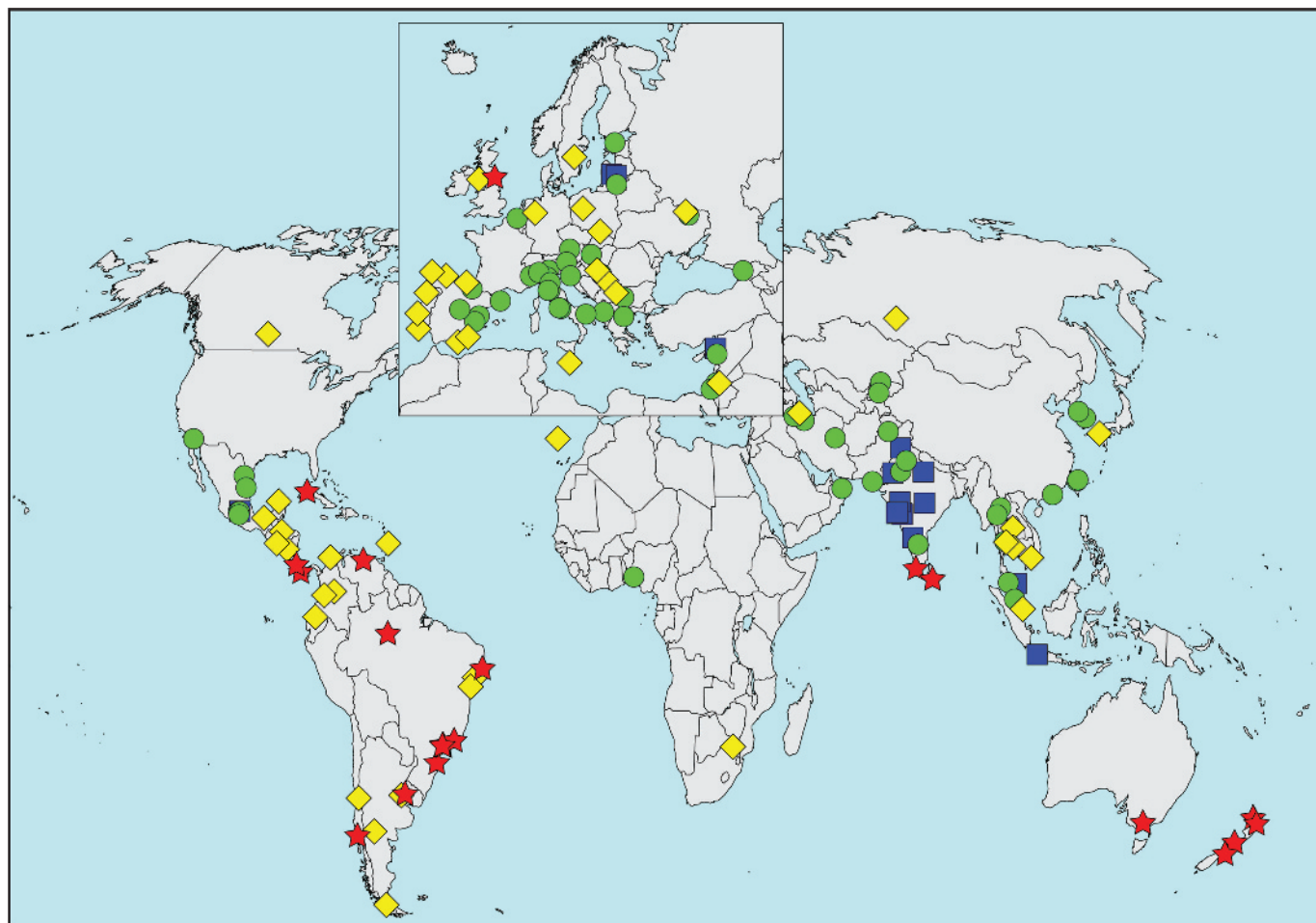
Asthma

Table 2 Prevalence of asthma symptoms in the 6–7 year age group by region

Region (no of centres)	Year	No*	Current wheeze	Asthma ever	Symptoms of severe asthma (total participants denominator)	Symptoms of severe asthma† (current wheeze denominator)	Symptoms of severe asthma without asthma ever† (current wheeze denominator)
			No (%)	No (%)	No (%)	No (%)	No (%)
Africa (2)	2003	5876	590 (10.0)	202 (3.4)	532 (9.1)	308 (52.2)	237 (40.2)
Asia-Pacific (18)	2000	60052	5723 (9.5)	6572 (10.9)	1893 (3.2)	1639 (28.6)	677 (11.8)
Eastern Mediterranean (13)	2000	40573	3824 (9.4)	2823 (7.0)	1920 (4.7)	1690 (44.2)	847 (22.1)
Indian subcontinent (16)	2002	50106	3395 (6.8)	2271 (4.5)	1766 (3.5)	1430 (42.1)	669 (19.7)
Latin America (35)	2002	93851	16266 (17.3)	10495 (11.2)	7289 (7.8)	6683 (41.1)	3071 (18.9)
North America (2)	2002	4014	767 (19.1)	803 (20.0)	283 (7.1)	282 (36.8)	51 (6.6)
Northern and Eastern Europe (21)	2001	42583	3717 (8.7)	1719 (4.0)	1350 (3.2)	1270 (34.2)	719 (19.3)
Oceania (6)	2002	13888	3020 (21.7)	4053 (29.2)	1318 (9.5)	1297 (42.9)	161 (5.3)
Western Europe (31)	2002	77868	7497 (9.6)	7536 (9.7)	2826 (3.6)	2666 (35.6)	945 (12.6)
English language centres‡ (8)	2002	18035	3784 (21.0)	4999 (27.7)	1674 (9.3)	1648 (43.6)	218 (5.8)
Global total (144)	2001	388811	44799 (11.5)	36474 (9.4)	19177 (4.9)	17265 (38.5)	7377 (16.5)

Symptoms of severe asthma: respondents with current wheeze who had ≥ 4 attacks of wheeze in the last year or had ≥ 1 nights per week sleep disturbance from wheeze in the last year or had wheeze affecting speech in the last year.

*Number of children. †The data presented are restricted to respondents who answered “yes” to the question about current wheeze. ‡Centres in Australia, Canada, Isle of Man, New Zealand and the UK.

**Figure 3** Prevalence of current wheeze in the 6–7 year age group. See text for definition of current wheeze. The symbols indicate prevalence values of <5% (blue square), 5 to <10% (green circle), 10 to <20% (yellow diamond) and >20% (red star).

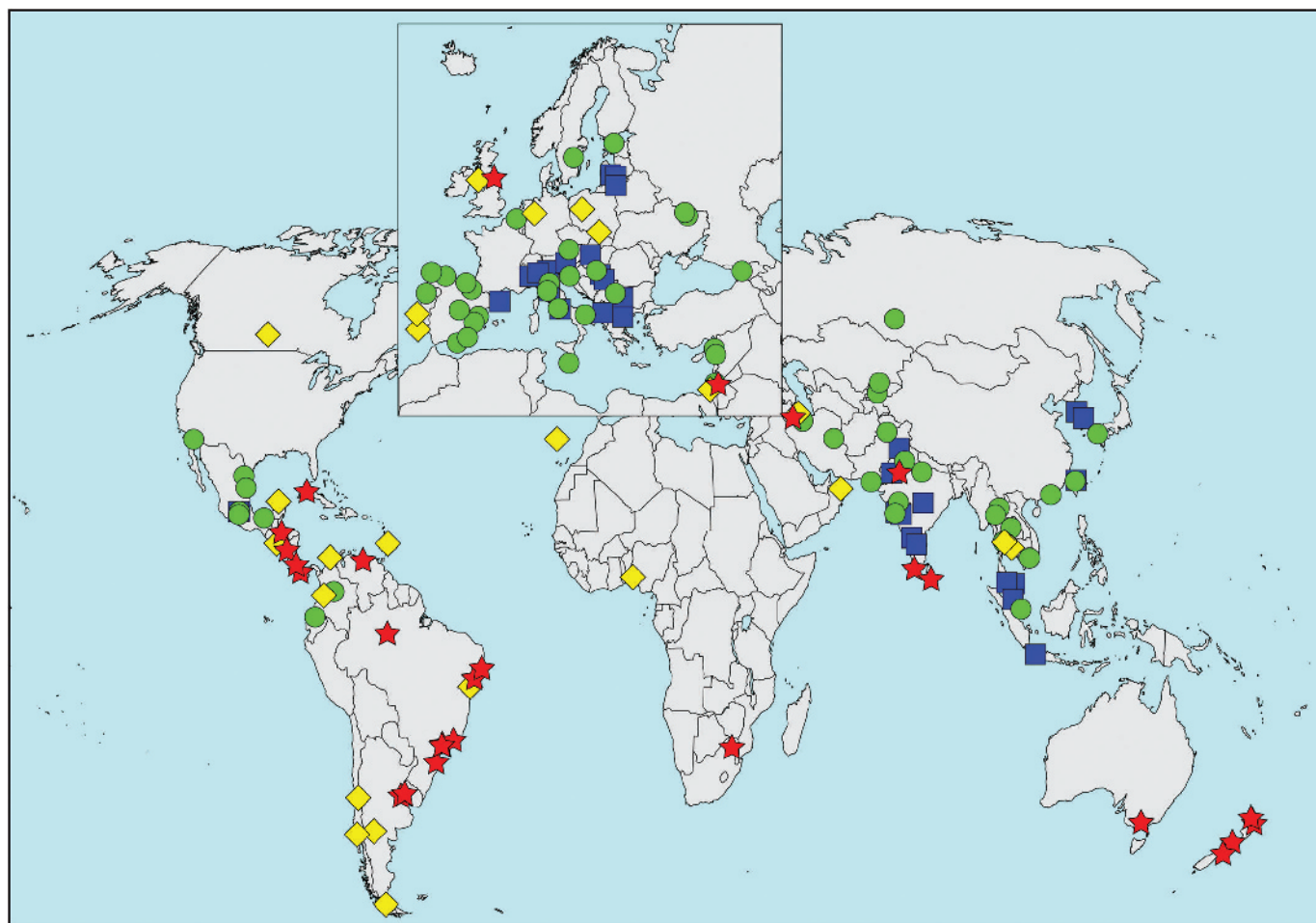


Figure 4 Prevalence of symptoms of severe asthma in the 6–7 year age group. See text for definition of symptoms of severe asthma. The symbols indicate prevalence values of <2.5% (blue square), 2.5 to <5% (green circle), 5 to <7.5% (yellow diamond) and >7.5% (red star).

differences between countries with the highest (Costa Rica 37.6% and Isle of Man 31.2%) and lowest (Indonesia 2.8% and Albania 3.4%) prevalence rates of 12-month wheeze based on the written questionnaire in the 6–7 year and 13–14 year age groups, respectively. The intercentre variations were even bigger, ranging from 2.4% in Jodhpur (India) to 37.6% in Costa Rica in the 6–7 year age group and from 0.8% in Tibet (China) to 32.6% in Wellington (New Zealand) in the 13–14 year age group. The intercountry variations are also large for the prevalence of symptoms of severe asthma, ranging from 1.1% in Indonesia to 20.3% in Costa Rica in the 6–7 year olds, and from 1.1% in Albania to 16% in Costa Rica in the 13–14 year olds. At the centre level, the values ranged from 0% in Pune (India) to 20.3% in Costa Rica in the older age group and from 0.1% to 16% in the two respective centres in the younger age group (Supplementary tables S2, S3).

While the clinical significance of having only one wheezing episode in a year is questionable, the occurrence of frequent, sleep-disturbing or speech-limiting attacks is widely accepted as clinically important. The latter two symptoms, in particular, are highly specific for bronchial hyper-responsiveness to methacholine.⁷ Furthermore, the prevalence of symptoms of severe asthma, defined in the same way as the current study, has been shown to correlate more strongly than that of current wheeze with national asthma hospitalisation and mortality rates in both age groups.⁸ Severe or frequent symptoms are also less likely to go unnoticed by subjects who have no family

history of asthma and come from deprived family backgrounds,¹⁰ such as those in the developing countries. The prevalence rates of symptoms of severe asthma can therefore be justifiably used as surrogates of disease burden, especially in areas where data on healthcare utilisation and mortality are unavailable. The standardised way in which the study was conducted, as well as its high response and participation rates, also makes these data useful for comparisons of asthma burden between different populations and time points.

The international patterns of severe wheeze are in accord with those seen for current wheeze in both age groups—that is, the highest ranked centres were mostly from the English language countries and Latin America, and the lowest ranked ones were mainly found in the Indian subcontinent, Asia-Pacific, the Eastern Mediterranean, and Northern and Eastern Europe. Africa, however, had proportionally more centres with a high prevalence of severe asthma symptoms than for current wheeze. The proportion of current wheezers with severe asthma symptoms was higher in Africa, the Indian subcontinent and the Eastern Mediterranean than in the English language countries for both age groups. This suggests that the disease may be clinically more severe in these less affluent countries than the more affluent English language countries, although the latter have amongst the highest symptom prevalence of asthma worldwide. Ecological economic analyses also revealed that although the high-income centres tended to have a higher prevalence of current wheeze, a reverse trend was

found in the prevalence of symptoms of severe asthma among current wheezers. There may be several reasons underlying this observation. First, asthma care is likely to be poorer in these developing countries, although a recent epidemiological survey showed that suboptimal asthma management was a global phenomenon.^{11–13} Secondly, there may be less awareness of wheeze being a symptom of asthma, even in those with frequent wheezing, similar to the situation amongst ethnic minorities in developed countries.¹⁴ This notion is further supported by the finding that undiagnosed asthma among those current wheezers with severe asthma symptoms was most commonly seen in these lower income countries (Supplementary figs S2, S4). Children with undiagnosed frequent symptoms are also more likely to receive inadequate care for their asthma and may fall into a vicious downward spiral of asthma control.¹⁴ Thirdly, differences in the levels of environmental exposure, including air pollutants and infective agents, may also contribute to the greater severity observed in these countries. These reasons may also explain the observed time trends of asthma prevalence—that is, prevalence has decreased in previously high prevalence countries, such as the affluent English language countries, but increased in the less affluent developing countries where prevalence was previously low.⁵

ISAAC Phase One revealed high prevalences of reported asthma symptoms in English language countries and Latin America, a higher prevalence in Western Europe than Eastern Europe with a clear Northwest–Southeast gradient, and relatively low prevalences in Africa and Asia.^{2,3} The current Phase Three study, with the addition of 128 new centres, confirmed that high prevalence centres were mostly in English language countries and Latin America, as well as confirming the Northwest–Southeast gradient seen in Europe. However, the additional new centres in Africa showed that the prevalence of asthma symptoms in this continent, especially those of severe disease, were one of the highest in the world. While Asia-Pacific and the Indian subcontinent still had many low prevalence centres, new centres such as Ho Chi Minh City (Vietnam) and Sri Lanka were among the highest. Other new centres of interest include Tibet (China), which had the lowest prevalence of current wheeze in the adolescents, and the additional centres in Mexico, which had low prevalence rates in contrast to the generally high rates seen in Latin America. Further studies on these centres of extreme prevalence rates, especially among those of similar ethnic background, may help define the causative factors for asthma. A previous ISAAC Phase Two study on 9- to 10-year-old Chinese schoolchildren in Hong Kong and two cities in mainland China (Guangzhou and Beijing) has shown that the higher prevalence of asthma symptoms in Hong Kong could be explained by differences in environmental factors and diet.¹⁵

ISAAC phase three has provided the most comprehensive estimate of the worldwide symptom prevalence of asthma to date. This data set comprises centres of different levels of economic development from every continent, including many from developing countries in Africa, Eastern Europe and Latin America where asthma prevalence and severity data, until now, were scant or non-existent. While English language countries and Latin America may have the highest prevalence of asthma, the disease appears to be less often recognised and more severe in Africa, the Indian subcontinent and the Eastern Mediterranean. This global map of asthma is invaluable not only for public health planning, but also for generating hypotheses in explaining the aetiological factors for this common disorder.

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Ethics approval: Centres were expected to obtain ethics approval and parental consent according to the requirements of their country.

REFERENCES

1. Asher MI, Keil U, Anderson HR, *et al.* International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. *Eur Respir J* 1995;**8**:483–91.
2. The International Study of Asthma and Allergies in Childhood (ISAAC) Steering Committee. Worldwide variation in prevalence of asthma, allergic rhinoconjunctivitis, and atopic eczema: ISAAC. *Lancet* 1998;**351**:1225–32.
3. ISAAC Steering Committee. Worldwide variations in the prevalence of asthma symptoms: the International Study of Asthma and Allergies in Childhood (ISAAC). *Eur Respir J* 1998;**12**:315–35.
4. Asher MI, Montefort S, Björkstén B, *et al.* Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC phases one and three repeat multicountry cross-sectional surveys. *Lancet* 2006;**368**:733–43.
5. Pearce N, Ait-Khaled N, Beasley R, *et al.* Worldwide trends in the prevalence of asthma symptoms: phase III of the International Study of Asthma and Allergies in Childhood (ISAAC). *Thorax* 2007;**62**:758–66.
6. Ellwood P, Asher MI, Beasley R, *et al.* The International Study of Asthma and Allergies in Childhood (ISAAC): Phase Three rationale and methods. *Int J Tuberc Lung Dis* 2005;**9**:10–16.
7. Lai CKW, Chan JKW, Chan A, *et al.* Comparison of the ISAAC video questionnaire (AVQ 3.0) with the ISAAC written questionnaire for estimating asthma associated with bronchial hyperreactivity. *Clin Exp Allergy* 1997;**27**:540–45.
8. Anderson HR, Gupta R, Kapetanakis V, *et al.* International correlations between indicators of prevalence, hospital admissions and mortality for asthma in children. *Int J Epidemiol* 2008;**37**:573–82.
9. World Bank. Data for 2001; <http://go.worldbank.org/U9BK7IA1J0> (accessed 8 October 2007).
10. Michel G, Silverman M, Strippoli MPF, *et al.* Parental understanding of wheeze and its impact on asthma prevalence estimates. *Eur Respir J* 2006;**28**:1124–30.
11. Lai CKW, de Guia TS, Kim YY, *et al.* Asthma control in the Asia-Pacific region: the Asthma Insights and Reality in Asia-Pacific Study. *J Allergy Clin Immunol* 2003;**111**:263–8.
12. Rabe KF, Adachi M, Lai CKW, *et al.* Worldwide severity and control of asthma in children and adults: the global asthma insights and reality surveys. *J Allergy Clin Immunol* 2004;**114**:40–7.
13. Cazzoletti L, Marcon A, Janson C, *et al.* Asthma control in Europe: a real-world evaluation based on an international population-based study. *J Allergy Clin Immunol* 2007;**120**:1360–7.
14. Yeatts K, Davis KJ, Sotir M, *et al.* Who gets diagnosed with asthma? Frequent wheeze among adolescents with and without a diagnosis of asthma. *Pediatrics* 2003;**111**:1046–54.
15. Wong GWK, Ko FWS, Hui DSC, *et al.* Factors associated with difference in prevalence of asthma in children from three cities in China: multicentre epidemiological survey. *BMJ* 2004;**329**:486–9.

APPENDIX: ISAAC PHASE THREE STUDY GROUP

ISAAC Steering Committee: N Ait-Khaled* (Union Internationale Contre la Tuberculose et les Maladies Respiratoires, Paris, France); H R Anderson (Department of Public Health Sciences, St Georges, University of London, UK); M I Asher (Department of Paediatrics: Child and Youth Health, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand); R Beasley* (Medical Research Institute of New Zealand, Wellington, New Zealand); B Björkstén* (Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden); B Brunekreef (Institute of Risk Assessment Science, Universiteit Utrecht, The Netherlands); J Crane (Wellington Asthma Research Group, Wellington School of Medicine, New Zealand); P Ellwood (Department of Paediatrics: Child and Youth Health, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand); C Flohr (Centre for Evidence Based Dermatology, University of Nottingham, UK); S Foliaki* (Ministry of Health, Kingdom of Tonga); F Forastiere (Department of Epidemiology, localHealth Authority, Rome, Italy); L García-Marcos (Instituto de Salud Respiratoria, Universidad de Murcia, Spain); U Keil* (Institut für Epidemiologie und Sozialmedizin, Universität Münster, Germany); C K W Lai* (Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong); J Mallol* (Department of Respiratory Medicine, University of

Santiago de Chile, Chile); E A Mitchell (Department of Paediatrics: Child and Youth Health, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand); S Montefort* (Department of Medicine, University of Malta, Malta); J Odhiambo* (Centre Respiratory Diseases Research Unit, Kenya Medical Research Institute, Nairobi, Kenya); N Pearce (Centre for Public Health Research, Massey University, Wellington, New Zealand); C F Robertson (Murdoch Children's Research Institute, Melbourne, Australia); J Shah* (Jaslok Hospital & Research Centre, Mumbai, India); A W Stewart (Population Health, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand); D Strachan (Department of Public Health Sciences, St Georges, University of London, UK); E von Mutius (Dr von Haunerschen Kinderklinik der Universität München, Germany); S K Weiland (Department of Epidemiology, University of Ulm, Germany); G Weinmayr (Institute of Epidemiology, University of Ulm, Germany); H Williams (Centre for Evidence Based Dermatology, Queen's Medical Centre, University Hospital, Nottingham, UK); G Wong (Department of Paediatrics, Prince of Wales Hospital, Hong Kong, SAR China).

*Regional Coordinators

ISAAC International Data Centre: M I Asher, T O Clayton, P Ellwood, E A Mitchell, Department of Paediatrics: Child and Youth Health; and A W Stewart, School of Population Health, Faculty of Medical and Health Sciences, The University of Auckland, New Zealand.

ISAAC Phase Three National Coordinators not identified in Supplementary table S1: Canada, Professor Malcolm Sears; Channel Islands, Professor Ross Anderson; Chile, Dr Viviana Aguirre; Columbia (interim), Professor Javier Mallol; Croatia, Professor Vladimir Ahel; Greece, Associate Professor Christina Gratziau; Hong Kong, Dr Christopher Lai; India, Dr Jayant Shah; Indonesia, Professor Karnen Baratawidjaja; Isle of Man, Professor Ross Anderson; Japan, Professor Sankei Nishima; Kingdom of Tonga, Dr Toakase Fakakovi; The Netherlands, Dr Roy Otten; Nouvelle Calédonie, Dr Sylvie Barny; Polynesie Française, Dr René Chansin; Republic of Ireland, Dr Patrick Manning; République Démocratique du Congo, Dr Etienne Bahati; Russia, Professor Rakhim M Khaitov; Samoa, Dr Nuualofa Tuuau-Potoi; Singapore, Professor Beewah Lee; Sudan, Dr Asma El Sony; Sweden, Dr Lennart Nilsson.

Pulmonary puzzle

An unusual case of dyspnoea

CLINICAL PRESENTATION

A 66-year-old woman presented with progressive exertional dyspnoea, productive cough and dysphonia, particularly when singing; she also experienced a dry obstructed nose, sore mouth and mild dysphagia. She had previously been diagnosed with autoimmune disease affecting her eyes, nasal passages, oropharynx and oesophagus, for which she had received treatment with prednisolone and cyclophosphamide. Immunosuppression continued with azathioprine. She also suffered from aortic stenosis and hypothyroidism, which was treated with levothyroxine. No perinatal respiratory difficulties were known and she had never been intubated. Despite being a non-smoker, she had had frequent lower respiratory tract infections.

Physical examination showed no additional signs but chest radiography revealed ill-defined consolidation in the right upper lobe. Bronchoscopy was performed to exclude mycobacterial infection and showed an abnormal supraglottic region with a ring-like narrowing with scarring extending posteriorly from fused arytenoids through which the true vocal cords could be seen (fig 1). The laryngeal structures did not collapse with inspiration and movement of the true vocal cords was normal. No associated glottic or subglottic abnormalities were identified.

QUESTION

What is the abnormality at bronchoscopy and what are the differential diagnoses? What symptoms can arise?

See page 515.



Figure 1 Appearance of supraglottic region at bronchoscopy.

This case was submitted by:

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Competing interests: None.

Patient consent: Obtained.

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Figure S1: Prevalence of symptoms of severe asthma amongst wheezers in the past 12 months in 13-14 year age group. The symbols indicate prevalence values of <30% (blue square), 30 to <40% (green circle), 40 to <50% (yellow diamond) and >50% (red star).

Figure S2: Prevalence of unreported asthma amongst wheezers with symptoms of severe asthma in the past 12 months in 13-14 year age group. The symbols indicate prevalence values of <10% (blue square), 10 to <20% (green circle), 20 to <30% (yellow diamond) and >30% (red star).

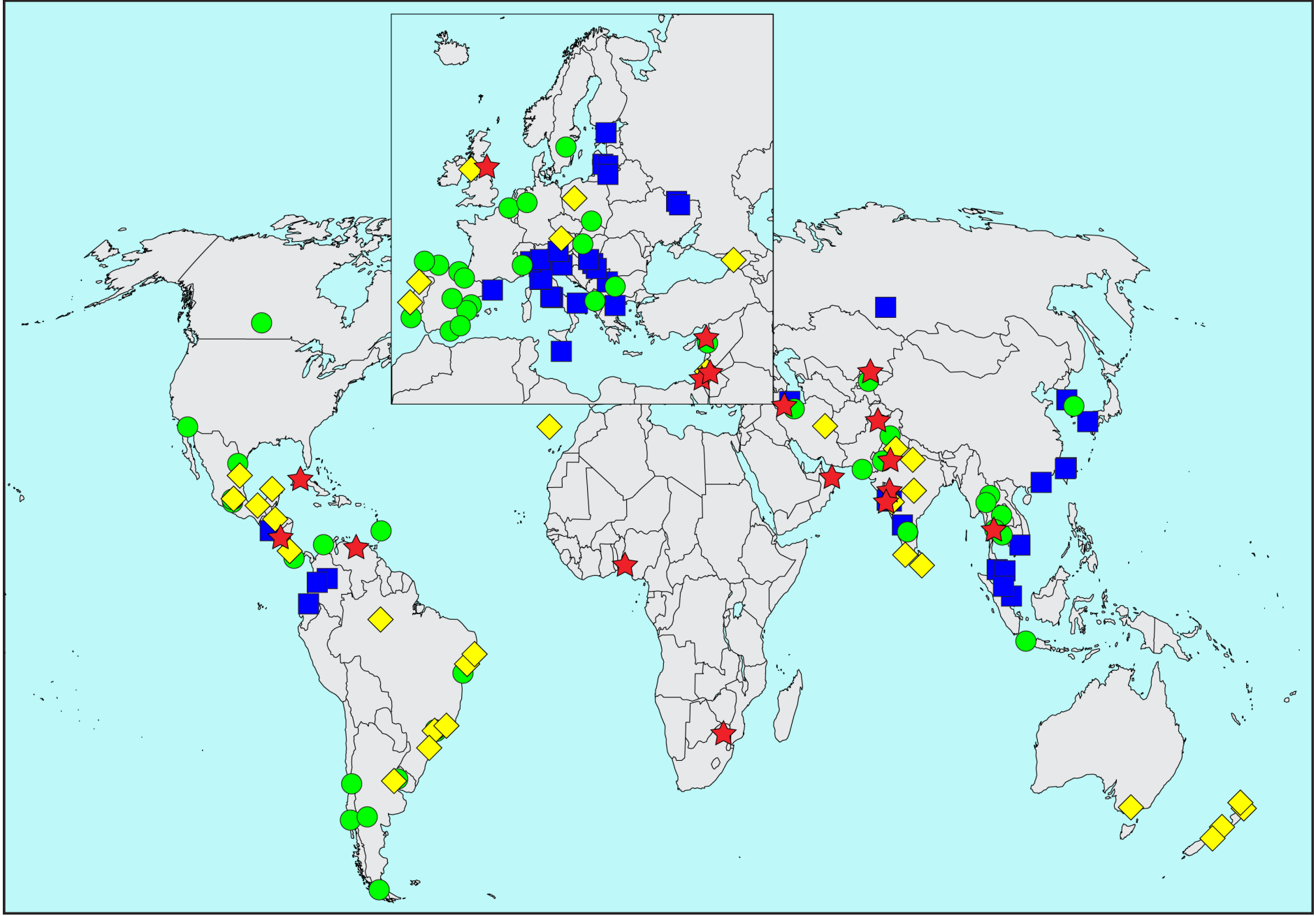
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Table S1: Participating centres, principal investigators, year of study, number of participants, response rates, languages used and country income category for both age groups

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Africa												
Algeria												
Wilaya of Algiers	Prof Badia Benhabylès						2002	4203	89.6	20	French	Middle
Cameroon												
Yaounde*	Prof Christopher Kuaban**						2003	2983	90.6	12	French	Low
Congo												
Brazzaville*	Prof Joseph M'Boussa						2002	1012	87.3	16	French	Low
Cote d'Ivoire												
Urban Cote d'Ivoire*. ¹	Dr Bernard Ngoran Koffi**						2001	3342	82.5	9	French	Low
Ethiopia												
Addis Ababa	Assoc Prof Kibrebeal Melaku						2003	3195	96.8	28	Amharic	Low
Gabon												
Port-Gentil*. ²	Dr Isabelle Ekoume Hypolite**						2003	3166	78.7	21	French	Middle
Kenya												
Eldoret	Dr Fabian O Esamai						2001	3289	100.0	72	English	Low
Nairobi	Dr Lucy Ng'ang'a**						2001	3023	99.7	15	English	Low
Country Total								6312	99.8	87		
Morocco												
Benslimane*. ^{2,3}	Prof Zoubida Bouayad**						1999	1008	100.0	5	Arabic	Middle
Boulmene*. ^{2,3}	Prof Zoubida Bouayad**						2002	1254	100.0	9	Arabic	Middle
Casablanca ^{2,3}	Prof Zoubida Bouayad**						2001	1777	100.0	13	Arabic	Middle
Marrakech ^{1,2,3}	Prof Zoubida Bouayad**						2002	1689	99.9	9	Arabic	Middle
Country Total								5728	100.0	36		
Nigeria												
Ibadan	Prof Babatunde O Onadeko	2002	2396	86.2	25	English	2001	3142	99.7	23	English	Low
Republique Democratique du Congo												
Kinshasa*	Prof Dr Jean-Marie Kayembe						2003	2930	92.9	73	French	Low
Reunion Island												
Reunion Island*. ³	Dr Isabella Annesi-Maesano**						2000	2362	78.1	37	French	
République de Guinée												
Conakry*	Prof Oumou Younoussa Sow						1997	3115	98.1	44	French	Low
South Africa												
Cape Town	Prof Heather J Zar**						2002	5037	83.4	53	Afrikaans (25.6%), English (40.9%), Xhosa (33.5%)	Middle
Polokwane*. ^{3,4,5,6}	Prof Kuku Voyi	2004	3480		63	Afrikaans (4.6%), English (9.1%), North Sotho (86.3%)	2004	4660		76	Afrikaans (10.3%), English (27.1%), North Sotho (62.6%)	Middle
Country Total								9697	83.4	129		

[illegible]

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Provincial Korea ^{3,5}	Prof Ha-baik Lee**	2000	4258	93.8	23	Korean	2000	7375	96.3	21	Korean	Middle
Seoul ^{3,5}	Prof Ha-baik Lee**	2000	1760	97.0	9	Korean	2000	2888	96.7	10	Korean	Middle
<i>Country Total</i>			6018	94.7	32			10263	96.4	31		
Taiwan												
Taipei	Dr Jing-Long Huang**	2001	4832	96.8	24	Chinese	2001	6378	95.9	23	Chinese	
Taoyuan*	Dr Chun-Chieh Kao	2002	3293	98.0	18	Chinese	2002	3190	96.4	7	Chinese	
<i>Country Total</i>			8125	97.3	42			9568	96.0	30		
Thailand												
Bangkok	Dr Pakit Vichyanond**	2001	4209	72.8	15	Thai	2001	4669	93.8	11	Thai	Middle
Chantaburi*	Dr Thanong Prasarnphanich	2001	3321	79.4	33	Thai	2001	2901	90.2	14	Thai	Middle
Chiang Mai ¹⁶	Assoc Prof Muthita Trakultivakorn	2001	3106	83.9	22	Thai	2001	3538	95.7	12	Thai	Middle
Chiangrai*, ^{16,17,18}	Dr Rawee Nettagul	1995	1677	93.2	8	Thai	1995	1809	99.5	3	Thai	Middle
Khon Kaen*, ¹	Assoc Prof Jamaree Teeratakulpisarn	1999	2658	78.5	11	Thai	1999	3410	85.9	5	Thai	Middle
Nakorn Pathom*	Dr Aree Kongpanichkul	1996	1821	65.0	20	Thai	1996	6975	99.1	10	Thai	Middle
<i>Country Total</i>			16792	77.6	109			23302	94.3	55		
Vietnam												
Ho Chi Minh City*	Dr Baich Vaén Cam	2001	3879	98.0	9	Vietnamese	2001	4240	87.7	8	Vietnamese	Low
Region Total			60052	87.4	388			99688	93.1	328		
Eastern Mediterranean												
Egypt												
Cairo*, ^{1,7}	Dr Maggie Louis Naguib						2002	3047	89.6	6	Arabic	Middle
Iran												
Birjand*	Dr Mohammed-Reza Masjedi**	1996	2693	96.2	49	Persian	1996	2829	96.7	19	Persian	Middle
Rasht	Dr Mohammed-Reza Masjedi**	2001	3057	97.4	64	Persian	2002	3004	99.8	22	Persian	Middle
Tehran	Dr Mohammed-Reza Masjedi**	2001	3008	80.9	45	Persian	2001	3119	99.8	24	Persian	Middle
Zanjan*	Dr Mohammed-Reza Masjedi**	1996	2777	92.2	28	Persian	1996	2805	98.4	14	Persian	Middle
<i>Country Total</i>			11535	91.0	186			11757	98.7	79		
Jordan												
Amman*	Dr Faisal Abu-Ekteish	2001	2598	86.6	23	Arabic	2001	2447	81.6	23	Arabic	Middle
Kuwait												
Kuwait ^{2,19,20}	Dr Jawad A al-Momen						2001	2882	91.6	16	Arabic	High
Malta												
Malta ^{3,5}	Prof Stephen Montefort**	2001	3795	79.7	44	English (6.8%), Maltese (93.2%)	2002	4136	90.0	18	English (11.7%), Maltese (88.3%)	Middle
Pakistan												
Islamabad*, ^{18,21,22,23}	Dr Mohammad Osman Yusuf	2002	3966	65.9	28	English, Urdu (Unknown proportions)	2002	4069	98.1	18	English (32.0%), Urdu (68.0%)	Low
Karachi ¹¹	Dr Naseeruddin Mahmood**	2002	2113	87.2	9	English (37.1%), Urdu (62.9%)	2001	2999	96.0	11	English (54.2%), Urdu (45.8%)	Low
<i>Country Total</i>			6079	72.0	37			7068	97.2	29		
Palestine												
North Gaza*, ^{10,24}	Mr Shaban Mortaja	2000	3575	86.8	12	Arabic	2000	3627	89.6	10	Arabic	Middle

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Ramallah ^{*,10,24}	Dr Nuha El Sharif ^{**}	2000	3754	79.7	41	Arabic	2000	3929	90.2	41	Arabic	Middle
<i>Country Total</i>			7329	83.0	53			7556	89.9	51		
Sultanate of Oman												
Al-Khod	Assoc Prof Omar Al-Rawas ^{**}	2001	4130	97.5	138	Arabic	2001	3747	97.2	108	Arabic	Middle
Syrian Arab Republic												
Aleppo ^{*,7,8}	Dr Khaldoun Tabbah						2001	3063	94.7	11	Arabic	Middle
Lattakia [*]	Prof Youssef Mohammad	2003	2373	99.1	16	Arabic	2001	3010	99.8	13	Arabic	Middle
Tartous [*]	Dr Samira Mohammad ^{**}	2001	2734	99.8	24	Arabic	2001	2995	99.9	14	Arabic	Middle
<i>Country Total</i>			5107	99.5	40			9068	98.0	38		
Region Total			40573	86.2	521			51708	94.3	368		
Indian Sub-Continent												
India												
Bangalore [*]	Assist Prof Sylvan Rego	2003	2959	97.6	19	English	2002	3440	98.9	10	English	Low
Bikaner [*]	Dr Mohammed Sabir						2001	3059	95.4	12	Hindi	Low
Borivali ¹	Dr Vasant A Khatav						2003	1004	99.9	6	English (10.0%), Hindi (30.1%), Marathi (60.0%)	Low
Chandigarh	Prof Lata Kumar						2001	3122	99.4	21	English	Low
Chennai (3) ^{1,17}	Dr Gururaj Setty						2002	2181	94.8	9	English (40.0%), Tamil (60.0%)	Low
Davangere [*]	Dr P S Suresh Babu	2002	3043	98.3	20	Kannada	2002	2945	93.6	20	Kannada	Low
Jaipur ^{*,2}	Prof Virendra Singh	2001	2545	75.4	50	Hindi	2001	3607	87.4	52	Hindi	Low
Jodhpur ²⁵	Dr K C Jain	2003	2114	70.5	20	English	2003	2341	79.6	16	Hindi	Low
Kottayam	Dr T U Sukumaran	2002	2619	96.4	18	Malayalam	2002	3685	98.5	26	Malayalam	Low
Lucknow ^{*,11,12}	Prof Shally Awasthi	2002	3000	85.7	17	English (26.5%), Hindi (73.5%)	2001	3000	75.0	15	English (28.6%), Hindi (71.4%)	Low
Ludhiana [*]	Prof Jugesh Chhatwal	2002	3225	90.4	11	Hindi	2002	3108	94.4	11	Hindi	Low
Mumbai (16) ^{17,26}	Dr Mohan Keshav Joshi	2003	2865	95.5	14	English (20.0%), Marathi (80.0%)						Low
Mumbai (18)	Dr Asha Vijaykumar Pherwani	2002	4862	99.2	20	English (40.0%), Marathi (60.0%)	2002	2982	99.4	10	English (30.0%), Marathi (70.0%)	Low
Mumbai (29) ^{*,7}	Dr Sumant Narayan Mantri	2002	1833	99.8	28	Marathi	2002	1829	99.9	44	Marathi	Low
Nagpur ^{*,7,18,23}	Dr Sundeep Salvi	2002	4294	100.0	18	English (24.9%), Hindi (16.2%), Marathi (58.8%)	2002	4150	100.0	15	English (35.7%), Hindi (11.5%), Marathi (52.8%)	Low
New Delhi (7)	Prof S K Sharma	2002	3706	82.4	20	English (52.9%), Hindi (47.1%)	2001	3469	86.7	22	English (35.8%), Hindi (64.2%)	Low
Pimpri ^{*,1,7,23}	Dr Sundeep Salvi	2002	3838	99.1	19	English (30.0%), Marathi (70.0%)	2002	3128	89.8	8	English (20.0%), Marathi (80.0%)	Low
Pune	Dr Neeta Milind Hanumante	2001	2711	90.4	5	English (25.0%), Marathi (75.0%)	2001	1983	70.8	5	English (25.0%), Marathi (75.0%)	Low
Rasta Peth ^{*,1}	Assoc Prof Sheila Bhawe	2001	3147	100.0	11	English (34.0%), Marathi (66.0%)	2001	3065	86.6	7	English (34.0%), Marathi (66.0%)	Low
<i>Country Total</i>			46761	92.0	290			52098	91.1	309		
Sri Lanka												
Sri Lanka [*]	Dr Kirthi D Gunasekera ^{**}	2001	3345	99.5	88	Tamil (21.5%), Sinhala (78.5%)	2001	3717	99.6	85	Tamil (24.8%), Sinhala (75.2%)	Low
Region Total			50106	92.4	378			55815	91.6	394		
Latin America												
Argentina												
Córdoba	Dr Carlos E Baena-Cagnani ^{**}						2002	3445	99.4	20	Spanish	Middle
Neuquén [*]	Prof Gustavo Enrique Zabert	2002	1930	61.9	53	Spanish	2002	3172	95.6	21	Spanish	Middle
Rosario City ^{*,24}	Prof Dr Carlos D Crisci	2001	2952	87.0	41	Spanish	2001	3099	93.4	49	Spanish	Middle
Salta [*]	Dr Maximiliano Gómez						2002	3000	82.8	20	Spanish	Middle
<i>Country Total</i>			4882	75.0	94			12716	92.7	110		
Bolivia												
Santa Cruz [*]	Dr Rosario Pinto Vargas ^{**}						2002	3257	98.2	53	Spanish	Middle
Brazil												
Aracaju [*]	Dr Jackeline Machado Motta	2003	2443	61.1	75	Portuguese	2002	3043	75.9	48	Portuguese	Middle
Belo Horizonte [*]	Assoc Prof Paulo Augusto M Camargos						2002	3088	70.6	14	Portuguese	Middle
Brasília [*]	Dr Wellington G Borges						2002	3009	92.7	39	Portuguese	Middle

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Caruaru*	Assis Prof Almerinda Silva						2002	3026	84.1	26	Portuguese	Middle
Curitiba	Prof Nelson Rosário						2001	3628	90.5	16	Portuguese	Middle
Feira de Santana*	Assoc Prof Leda de Freitas Souza						2002	1732	99.7	15	Portuguese	Middle
Itajaí*	Dr Cláudia dos Santos Dutra Bernhardt	2001	1511	75.7	37	Portuguese	2001	2737	94.0	36	Portuguese	Middle
Maceió*	Prof Francisco José Passos	2002	1990	66.1	83	Portuguese	2002	2745	91.2	81	Portuguese	Middle
Manaus Amazonas*	Dra Maria do Socorro Cardoso	2002	3011	83.3	126	Portuguese	2002	3009	93.7	34	Portuguese	Middle
Nova Iguaçu*	Assoc Prof Antônio José Ledo Aves da Cunha	2002	3249	66.3	48	Portuguese	2002	3185	98.0	37	Portuguese	Middle
Passo Fundo* ²	Dr Arnaldo Porto Neto						2002	2949	86.7	26	Portuguese	Middle
Porto Alegre	Dr Gilberto B Fischer						2003	3007	97.0	27	Portuguese	Middle
Recife ²⁷	Dr Murilo de Britto						2002	2865	95.5	49	Portuguese	Middle
Rural Santa Maria*	Prof Dirceu Solé**						2003	3057	91.2	69	Portuguese	Middle
Salvador ²²	Assoc Prof Leda de Freitas Souza	2002	1069	68.1	27	Portuguese	2002	3020	80.5	16	Portuguese	Middle
Santa Maria*	Prof Dirceu Solé**						2003	3065	95.5	46	Portuguese	Middle
Santo Andre*	Assoc Prof Neusa Wandalsen	2000	2167	80.7	20	Portuguese	2000	3232	94.4	20	Portuguese	Middle
São Paulo ^{22,28}	Prof Dirceu Solé**	2002	3047	68.2	39	Portuguese	2002	3161	96.5	23	Portuguese	Middle
São Paulo West*	Dr Antonio Carlos Pastorino	2002	3312	64.4	35	Portuguese	2002	3181	74.7	21	Portuguese	Middle
Vitória da Conquista* ⁸	Assoc Prof Leda de Freitas Souza						2002	1679	84.0	18	Portuguese	Middle
<i>Country Total</i>			21799	69.5	490			58418	88.3	661		
Chile												
Calama*	Dr Luis Alberto Vera Benavides						2002	1618	80.9	17	Spanish	Middle
Chiloe*	Dra Amanda Contreras						2002	3000	90.9	40	Spanish	Middle
Punta Arenas ²	Dr Lidia Amarales	2001	3052	87.1	26	Spanish	2001	3044	89.6	32	Spanish	Middle
South Santiago	Dr Pedro Aguilar	2001	3075	90.4	35	Spanish	2001	3026	84.8	23	Spanish	Middle
Valdivia	Dr Mario A Calvo	2001	3183	89.2	36	Spanish	2001	3105	94.1	34	Spanish	Middle
<i>Country Total</i>			9310	88.9	97			13793	88.6	146		
Colombia												
Barranquilla*	Dr Alfonso M Cepeda**	2002	3209	99.1	57	Spanish	2002	3204	98.7	39	Spanish	Middle
Bogotá*	Dr Gustavo Aristizábal	2002	3256	88.9	56	Spanish	2002	3830	98.2	30	Spanish	Middle
Cali*	Dr Gustavo A Ordoñez	2002	3005	75.7	52	Spanish	2002	3100	93.9	21	Spanish	Middle
<i>Country Total</i>			9470	87.1	165			10134	97.0	90		
Costa Rica												
Costa Rica ¹⁴	Dr Manuel E Soto-Quirós**	2002	3234	80.9	54	Spanish	2002	2436	69.6	20	Spanish	Middle
Cuba												
La Habana* ^{6,7}	Dra Patricia Varona Pérez**	2002	1803	100.0	28	Spanish	2002	3026		18	Spanish	
Ecuador												
Guayaquil* ²⁹	Dr César Bustos						2002	3082	97.0	8	Spanish	Middle
Quito* ^{3,5}	Dr Sergio Barba**	2003	3055	96.5	37	Spanish	2003	3014	97.7	24	Spanish	Middle
<i>Country Total</i>								6096	97.3	32		
El Salvador												
San Salvador*	Dr Margarita Figueroa Colorado**	2003	1365	88.9	24	Spanish	2003	3260	93.1	28	Spanish	Middle
Honduras												
San Pedro Sula* ^{2,6,16}	Dr Agustin Bueso-Engelhardt**	2002	1907	76.3	37	Spanish	2002	2675		23	Spanish	Middle
Mexico												
Ciudad Victoria* ¹⁶	Dr Roberto García-Almaraz	2003	2603	73.1	47	Spanish	2003	3122	79.5	11	Spanish	Middle
Ciudad de México (1)*	Dra Blanca E Del-Río-Navarro	2002	3205	91.6	47	Spanish	2002	3891	99.8	25	Spanish	Middle
Ciudad de México (3)*	Dra Mercedes Barragán-Meijueiro	2002	3493	89.6	41	Spanish	2002	3474	99.3	33	Spanish	Middle
Ciudad de México (4)*	Dra Nelly Ramírez-Chanona						2002	2662	98.7	31	Spanish	Middle
Cuernavaca	Prof Isabelle Romieu	2002	2579	84.3	74	Spanish	2002	1431	85.9	14	Spanish	Middle
Mexicali Valley*	Dr J Valente Merida-Palacio	2003	2568	74.3	29	Spanish	2002	2988	93.6	16	Spanish	Middle
Monterrey*	Dr Sandra Nora González-Díaz	2001	3030	93.2	38	Spanish	2001	3006	93.9	18	Spanish	Middle
Mérida*	Dr Manuel Baeza-Bacab**	2003	2896	90.6	24	Spanish	2002	3019	95.2	14	Spanish	Middle
Toluca* ²	Dr Francisco J Linares-Zapién	2002	3235	89.5	11	Spanish	2002	3021	86.1	6	Spanish	Middle
Villahermosa*	Dr Sergio Romero-Tapia	2002	2678	89.3	30	Spanish	2002	3109	94.2	14	Spanish	Middle
<i>Country Total</i>			26287	86.1	341			29723	92.7	182		
Nicaragua												
Managua*	Dr José Félix Sánchez**	2002	3286	96.0	68	Spanish	2002	3263	94.5	47	Spanish	Low
Panama												
David-Panamá	Dr Gherson Cukier**	2001	2942	92.5	41	Spanish	2001	3183	92.9	39	Spanish	Middle
Paraguay												
Asunción ²	Dr Jaime A Guggiari-Chase**						2002	3000	99.3	24	Spanish	Middle
Peru												
Lima	Dr Pascual Chiarella**						2001	3022	99.2	8	Spanish	Middle
Uruguay												
Montevideo	Dra Dolores Holgado**						2002	3177	90.8	19	Spanish	Middle

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Paysandú ^{*.1}	Dra María Cristina Lapides	2002	1512	95.6	53	Spanish	2002	1738	97.4	6	Spanish	Middle
<i>Country Total</i>								4915	93.0	25		
Venezuela												
Caracas*	Dr Oscar Aldrey**	2002	2999	66.6	99	Spanish	2002	3000	93.8	63	Spanish	Middle
Region Total			93851	81.3	1628			165917	91.1	1569		
North America												
Barbados												
Barbados ^{10,14,24}	Dr Malcolm E Howitt**	2001	2759	85.9	84	English	2001	2498	70.6	23	English	
Canada												
Saskatoon ^{22,26}	Dr Donna Rennie	2003	1255	63.3	62	English						High
Vancouver*	Prof Alex Ferguson						2003	2853	79.6	20	English	High
Trinidad and Tobago												
St Augustine ^{*,14}	Dr Michelle A Monteil	2002					2002	3512	73.2	24	English	Middle
Tobago*	Dr Michelle A Monteil	2002					2002	1464	91.7	11	English	Middle
<i>Country Total</i>								4976	77.8	35		
USA												
Chapel Hill*	Dr Karin Yeatts	2000					2000	128443	75.3	494	English	High
Sarasota*	Dr Hugh H Windom	2003					2003	1245	81.6	5	English	High
Seattle	Prof Gregory J Redding	2003					2003	2422	86.6	6	English	High
<i>Country Total</i>								132110	75.5	505		
Region Total			4014	77.3	146			142437	75.6	583		
Northern & Eastern Europe												
Albania												
Tiranë	Prof Alfred Priftanji**	2000	2896	87.6	29	Albanian	2001	2983	86.6	29	Albanian	Middle
Bulgaria												
Sofia ^{*,7}	Dr Todor Popov**	2002	1181	89.2	17	Bulgarian	2002	1926	95.6	15	Bulgarian	Middle
Croatia												
Rijeka*	Dr Kristina Lah Tomulic	2002	1633	80.2	34	Croatian	2002	2194	89.8	34	Croatian	Middle
Estonia												
Tallinn ^{3,5}	Dr Mall-Anne Riikjäärv**	2001	2385	85.6	111	Estonian	2001	3603	93.3	32	Estonian	Middle
Finland												
Kuopio County	Dr Juha Pekkanen**						2001	3051	98.8	19	Finnish	High
Former Yugoslav Republic of Macedonia (FYROM)												
Skopje*	Dr Emilija Vlaski**						2002	3026	90.9	17	Macedonian	Middle
Georgia												
Kutaisi	Dr Maia Gotua**	2003	2666	92.9	29	Georgian	2003	2650	88.9	26	Georgian	Low
Hungary												
Svábhegy ^{*,8}	Dr Györgyi Zsigmond**	2003	2451	71.1	73	Hungarian	2003	4219	82.5	76	Hungarian	Middle
Szeged*	Dr Zoltán Novák						2003	2889	93.3	39	Hungarian	Middle
<i>Country Total</i>								7108	86.6	115		
Kyrgyzstan												
Balykchi*	Dr Cholpon Imanalieva**						2002	1382	83.4	10	Russian (30.1%), Kyrgyz (69.9%)	Low
Bishkek*	Dr Cholpon Imanalieva**	2002	3146	93.2	27	Russian (68.2%), Kyrgyz (31.8%)	2002	5048	89.9	27	Russian (60.5%), Kyrgyz (39.5%)	Low
Jalalabat*	Prof Shairbek Sulaimanov	2003	1664	93.6	50	Russian (3.9%), Kyrgyz (42.1%), Uzbek (54.0%)	2003	2404	79.7	21	Russian (18.6%), Kyrgyz (61.5%), Uzbek (19.8%)	Low
<i>Country Total</i>			4810	93.3	77			8834	85.9	58		
Latvia												
Riga	Dr Vija Svabe						2004	1283	94.8	23	Latvian (44.8%), Russian (55.2%)	Middle
Lithuania												
Kaunas	Assoc Prof Jolanta Kudzyte**	2002	2772	92.0	54	Lithuanian	2001	2723	90.5	16	Lithuanian	Middle
Panevezys ^{*,20}	Prof Jurgis Bojarskas	1997	1176	90.5	21	Lithuanian	1997	1187	87.9	20	Lithuanian	Middle
Siauliai ^{*,20}	Prof Jurgis Bojarskas		1341	89.4	27	Lithuanian		3516	97.7	25	Lithuanian	Middle
<i>Country Total</i>			5289	91.0	102			7426	93.3	61		
Poland												
Kraków	Assoc Prof Grzegorz Lis**	2001	2497	81.3	51	Polish	2002	2545	95.4	18	Polish	Middle
Poznan	Dr Anna Brëborowicz	2002	1999	82.8	35	Polish	2002	1875	84.5	12	Polish	Middle
<i>Country Total</i>			4496	81.9	86			4420	90.4	30		
Romania												
Cluj	Prof Diana Dumitrascu						2001	3019	92.8	20	Romanian	Middle
Russia												
Novosibirsk	Prof Dr Elena G Kondiourina	2002	2730	95.2	50	Russian	2002	3769	97.2	33	Russian	Middle
Serbia and Montenegro												
Belgrade*	Dr Zorica Zivkovic**	2001	1932	96.6	22	Serbian	2001	3228	92.2	27	Serbian	Middle
Nis*	Dr Snezana Zivanovic	2001	1002	95.2	36	Serbian	2001	1207	96.0	10	Serbian	Middle
Novi Sad*	Dr Mila Hadnadjev	2002	1044	71.6	22	Serbian	2002	1171	88.8	12	Serbian	Middle
Podgorica*	Dr Omer Adzovic						2003	1014	76.4	10	Serbian	Middle

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Sombor*	Dr Eva Panic	2002	1029	97.1	20	Serbian (93.5%), Hungarian (6.5%)	2002	1105	97.8	20	Serbian (93.0%), Hungarian (7.0%)	Middle
<i>Country Total</i>			5007	89.9	100			7725	90.5	79		
Sweden												
Linköping ^{3,22}	Dr Hartmut Vogt	2002	2089	63.8	51	Swedish	2002	2679	81.2	16	Swedish	High
Ukraine												
Kharkiv	Assoc Prof Viktor Ognev**	2002	1950	99.1	39	Russian	2002	2428	98.9	41	Russian	Low
Rural Kharkiv*	Assoc Prof Viktor Ognev**	1998	3000	95.2	26	English (10.0%), Russian (90.0%)	1998	3968	98.6	27	English (10.0%), Russian (90.0%)	Low
<i>Country Total</i>			4950	96.7	65			6396	98.7	68		
Region Total			42583	86.8	824			72092	90.9	675		
Oceania												
Australia												
Melbourne ⁵	Prof Colin Robertson**	2002	2968	81.9	63	English	2002	2192	92.8	15	English	High
Cook Islands												
Rarotonga*	Dr Roro Daniel**						2003	445	94.3	8	English	
Fiji												
Suva*	Dr Rosalina Sa'aga-Banuve						2002	3093	93.2	69	English	Middle
Kingdom of Tonga												
Nuku'alofa*	Dr Sunia Foliaki						2002	2671	86.7	31	Tongan	Middle
New Zealand												
Auckland	Prof Innes Asher**	2002	3541	84.6	37	English	2001	2870	92.3	15	English	High
Bay of Plenty ^{1,14}	Dr Chris Moyes	2002	2150	79.9	37	English	2002	1976	76.2	8	English	High
Christchurch	Assoc Prof Philip Pattemore	2003	3315	86.0	56	English	2003	3116	88.2	11	English	High
Nelson	Dr Richard MacKay	2003	1867	92.0	39	English	2003	2305	90.5	9	English	High
Wellington	Prof Neil Pearce						2001	3050	96.9	13	English	High
<i>Country Total</i>			10873	85.2	169			13317	89.2	56		
Niue												
Niue Island ^{*,2,30}	Ms Moka Magatogia	2002	47	85.5	1	English	2002	79	92.9	1	English	
Nouvelle Caledonie												
Nouvelle Caledonie*	Dr Isabella Annesi-Maesano						1998	7247	87.2	47	French	
Polynesie Francaise												
Polynesie Francaise ^{*,29}	Dr Isabella Annesi-Maesano						2000	4289	98.8	28	French	
Samoa												
Apia*	Ms Peone Fuimaono						2003	2986	96.0	36	Samoan	Middle
Tokelau												
Tokelau ^{*,30}	Dr Tekie Iosefa**						2003	66	100.0	3	Tokelau	
Region Total			13888	84.5	233			36385	90.8	294		
Western Europe												
Austria												
Kärnten ^{11,24,31}	Assoc Prof Gerald Haidinger**	2002	4847	86.0	121	German						High
Urfahr-Umgebung ^{10,11,24}	Assoc Prof Gerald Haidinger**	2002	2029	92.6	32	German	2003	1439	86.0	14	German	High
<i>Country Total</i>			6876	87.8	153							
Belgium												
Antwerp ^{5,8}	Prof Joost Weyler	2002	5645	77.8	120	Arabic (0.4%), Dutch (98.1%), Hebrew (0.7%), Turkish (0.9%)	2002	3250	96.6	37	Dutch	High
Channel Islands												
Guernsey	Dr Peter Standring						2001	1248	90.2	8	English	
Jersey ^{14,30}	Ms Rosie Goulding						2002	773	78.1	8	English	
<i>Country Total</i>								2021	85.1	16		
Germany												
Münster ¹³	Prof Dr Ulrich Keil**	1999	3830	82.4	55	German	1999	4132	93.9	36	German	High
Greece												
Thessaloniki ^{*,31}	Assoc Prof John Tsanakas	2000	1228	81.3	36	Greek						High
Isle of Man												
Isle of Man ²²	Dr Andreea Steriu	2001	1096	59.9	36	English	2001	1716	88.7	6	English	
Italy												
Bari*	Dr Lucio Armenio	2002	1943	79.9	19	Italian	2002	1287	95.5	11	Italian	High
Colleferro-Tivoli*	Dr Valerio Dell'Orco	2002	1143	90.5	9	Italian	2002	1361	89.8	13	Italian	High
Cosenza ³²	Dr Enea Bonci						2002	925	88.1	9	Italian	High
Emilia-Romagna	Dr Claudia Galassi	2002	2265	97.0	29	Italian	2002	1347	94.9	19	Italian	High
Empoli	Dr M G Petronio	2002	1152	91.4	19	Italian	2002	1229	91.7	11	Italian	High
Firenze	Dr Elisabetta Chellini	2002	1036	83.9	14	Italian	2002	1383	88.4	14	Italian	High
Mantova*	Dr Gabriele Giannella	2002	1288	92.3	15	Italian	2002	1114	97.7	15	Italian	High
Milano	Dr Luigi Bisanti	2002	2249	96.6	20	Italian	2002	1410	96.6	12	Italian	High
Palermo ^{*,33}	Dr Stefania La Grutta						2002	1221	97.4	7	Italian	High
Roma	Dr Francesco Forastiere**	2002	2224	86.2	25	Italian	2002	1325	93.3	12	Italian	High
Siena	Dr Piersante Sestini						2002	1082	91.6	20	Italian	High

Centre	Name	6-7 Year Age Group					13-14 Year Age Group					Income ^{††}
		Year [†]	N ^{***}	Response (%)	Schools (N)	Language(s)	Year [†]	N	Response (%)	Schools (N)	Language(s)	
Torino	Dr Giovannino Ciccone	2002	2361	95.9	20	Italian	2002	1180	98.5	12	Italian	High
Trento	Dr Silvano Piffer	2002	2359	92.5	35	Italian	2002	1311	87.5	20	Italian	High
<i>Country Total</i>			<i>18020</i>	<i>90.8</i>	<i>205</i>			<i>16175</i>	<i>93.0</i>	<i>175</i>		
Netherlands												
Netherlands*	Prof Rutger Engels						2003	6896	91.6	32	Dutch	High
Portugal												
Coimbra ^{*14}	Dr M Lourdes Chiera						2002	1177	78.5	11	Portuguese	High
Funchal ^{14,22}	Dra Rita Câmara	2002	1819	63.5	69	Portuguese	2002	3161	73.2	20	Portuguese	High
Lisbon ^{14,22}	Prof José E Rosado Pinto**	2002	2477	60.4	103	Portuguese	2002	3024	77.5	42	Portuguese	High
Portimao	Dr Carlos Nunes	2001	1069	83.6	35	Portuguese	2002	1109	85.6	11	Portuguese	High
Porto	Dr José M Lopes dos Santos	2002	2464	78.2	72	Portuguese	2002	3336	89.7	37	Portuguese	High
<i>Country Total</i>			<i>7829</i>	<i>68.7</i>	<i>279</i>			<i>11807</i>	<i>80.1</i>	<i>121</i>		
Republic of Ireland												
Republic of Ireland ³	Prof Luke Clancy						2003	3089	90.9	36	English	High
Spain												
A Coruña*	Dr Angel López-Silvarrey Varela	2003	3016	73.8	57	Spanish	2003	2979	93.6	26	Spanish	High
Almería ^{*8}	Dr José Battles Garrido	1996	3349	70.9	65	Spanish	1996	4051	98.6	57	Spanish	High
Asturias*	Dr Ignacio Carvajal Urueña	2002	3193	86.3	55	Spanish	2002	4184	90.2	28	Spanish	High
Barcelona	Dr Rosa M Busquets	2002	3002	82.2	28	Spanish	2002	3066	87.6	20	Spanish	High
Bilbao	Dr Carlos González Díaz	2001	3157	77.3	56	Spanish	2001	3401	89.4	27	Spanish	High
Cartagena	Prof Luis García-Marcos**	2002	2948	72.3	63	Spanish	2002	3998	79.6	35	Spanish	High
Castellón ²	Dr Alberto Arnedo-Pena	2002	3915	88.1	63	Spanish (87.5%), Catalan (12.5%)	2002	4024	91.2	46	Spanish	High
Madrid	Dr Gloria García-Hernández	2002	2347	89.0	50	Spanish	2002	2652	93.2	25	Spanish	High
Pamplona	Prof Francisco Guillén-Grima	2001	3176	78.7	50	Basque (5.9%), Spanish (94.1%)	2001	2932	82.6	38	Basque (16.4%), Spanish (83.6%)	High
San Sebastián ^{*20}	Prof Eduardo G Pérez-Yarza						2002	1195	86.8	16	Spanish	High
Valencia ^{14,22}	Prof Maria M Morales Suárez-Varela	2002	3398	64.5	80	Spanish	2002	3132	78.3	37	Spanish	High
Valladolid	Prof Alfredo Blanco Quirós						2002	2944	91.0	39	Spanish	High
<i>Country Total</i>			<i>31501</i>	<i>77.4</i>	<i>567</i>			<i>38558</i>	<i>88.3</i>	<i>394</i>		
United Kingdom												
North Thames ^{1,3}	Prof H Ross Anderson**						2002	2356	87.7	6	English	High
Scotland ¹	Dr Jane B Austin						2002	4662	88.9	14	English	High
South Thames ^{1,3}	Prof H Ross Anderson**						2002	2432	84.5	8	English	High
Sunderland	Dr Mohammad H Shamssain	2001	1843	91.9	37	English	2001	2193	91.0	43	English	High
Surrey/Sussex	Prof David Strachan						2002	5082	90.8	11	English	High
Wales	Dr Michael Burr						2002	2501	85.2	8	English	High
<i>Country Total</i>								<i>19226</i>	<i>88.4</i>	<i>90</i>		
Region Total			77868	80.3	1488			108309	88.6	957		
Global Total			388811	84.5	5694			798685	88.0	5820		

* Phase Three B centre, ** ISAAC National Coordinator, *** Number of children, † Year during which the majority of participants completed the questionnaire, †† World Bank income data for 2001 was not available for Barbados, Channel Islands, Cook Islands, Cuba, Isle of Man, Niue, Nouvelle Calédonie, Polynésie Française, Réunion Island, Taiwan and Tokelau.

Methodology notes: 1: <10 schools used if ≥10 schools available for the 13-14 year age group.; 2: No ethics committee available to review study design.; 3: Additional question(s) administered before or within ISAAC questionnaire for the 13-14 year age group.; 4: 6-7 year age group response rate cannot be calculated accurately but definitely >60%; 5: Additional question(s) administered before or within ISAAC questionnaire for the 6-7 year age group.; 6: 13-14 year age group response rate cannot be calculated accurately but definitely >70%; 7: Map of study area not available.; 8: Single data entry with no checks.; 9: Unable to provide ethics approval information.; 10: Data recoded to eliminate inconsistent responses for the 13-14 year age group.; 11: Ethics approval not sought for the 6-7 year age group.; 12: Ethics approval not sought for the 13-14 year age group.; 13: European version of video questionnaire used.; 14: 13-14 year age group response rate <80%; 15: Two translations used conjointly with no identification of specific language for each observation.; 16: Partial or complete non-random selection of schools.; 17: <10 schools used if ≥10 schools available for the 6-7 year age group.; 18: Unable to provide total number of schools in the sampling frame for the 6-7 year age group.; 19: No age on the questionnaire.; 20: No date of interview on the questionnaire.; 21: Two translations used conjointly with no identification of specific language for each observation for the 6-7 year age group.; 22: 6-7 year age group response rate <70%; 23: Unable to provide total number of schools in the sampling frame for the 13-14 year age group.; 24: Data recoded to eliminate inconsistent responses for the 6-7 year age group.; 25: Questionnaires not administered in prescribed order for the 6-7 year age group.; 26: 13-14 year age group data excluded.; 27: No date of birth on the questionnaire.; 28: Single data entry with no checks for the 6-7 year age group.; 29: Questionnaires not administered in prescribed order for the 13-14 year age group.; 30: Whole country sample <1000 participants.; 31: 13-14 year age group data not available.; 32: Sample included <1000 participants.; 33: Inadequate map of study area supplied.

Table S2: Prevalence of asthma symptoms in the 13-14 year age group

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma ⁺ (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever ⁺ (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%	N	%
Africa															
Algeria															
Wilaya of Algiers	2002	4203	367	8.7	298	7.1				182	4.3	182	49.6	92	25.1
Cameroon															
Yaounde*	2003	2983	169	5.7	178	6.0				127	4.3	80	47.3	55	32.5
Congo															
Brazzaville*	2002	1012	201	19.9	95	9.4				136	13.4	107	53.2	71	35.3
Cote d'Ivoire															
Urban Cote d'Ivoire*	2001	3342	645	19.3	388	11.6				400	12.0	399	61.9	186	28.8
Ethiopia															
Addis Ababa	2003	3195	290	9.1	75	2.3				262	8.2	185	63.8	169	58.3
Gabon															
Port-Gentil*	2003	3166	324	10.2	348	11.0				186	5.9	143	44.1	78	24.1
Kenya															
Eldoret	2001	3289	455	13.8	416	12.6				346	10.5	302	66.4	137	30.1
Nairobi	2001	3023	543	18.0	502	16.6	3023	326	10.8	365	12.1	365	67.2	155	28.5
Country Total	2001	6312	998	15.8	918	14.5	3023	326	10.8	711	11.3	667	66.8	292	29.3
Morocco															
Benslimane*	1999	1008	89	8.8	89	8.8	1006	105	10.4	57	5.7	48	53.9	30	33.7
Boulmene*	2002	1254	68	5.4	157	12.5	1254	89	7.1	34	2.7	33	48.5	17	25.0
Casablanca	2001	1777	285	16.0	260	14.6	1771	229	12.9	155	8.7	154	54.0	70	24.6
Marrakech	2002	1689	75	4.4	255	15.1	1687	146	8.7	37	2.2	36	48.0	18	24.0
Country Total	2001	5728	517	9.0	761	13.3	5718	569	10.0	283	4.9	271	52.4	135	26.1
Nigeria															
Ibadan	2001	3142	408	13.0	369	11.7	2900	295	10.2	373	11.9	262	64.2	188	46.1
Republique Democratique du Congo															
Kinshasa*	2003	2930	221	7.5	298	10.2				98	3.3	92	41.6	55	24.9
Reunion Island															
Reunion Island*	2000	2362	507	21.5	452	19.1				178	7.5	178	35.1	47	9.3
République de Guinée															
Conakry*	1997	3115	578	18.6	321	10.3				300	9.6	288	49.8	182	31.5
South Africa															
Cape Town	2002	5037	1025	20.3	725	14.4	4986	559	11.2	622	12.3	476	46.4	240	23.4
Polokwane*	2004	4660	838	18.0	311	6.7				657	14.1	378	45.1	274	32.7
Country Total	2003	9697	1863	19.2	1036	10.7	4986	559	11.2	1279	13.2	854	45.8	514	27.6
Sudan															
Khartoum*	2003	2896	361	12.5	450	15.5				275	9.5	210	58.2	47	13.0
Togo															
Lome*	2001	3090	520	16.8	311	10.1				307	9.9	217	41.7	126	24.2
Tunisia															
Grand Tunis*	2001	6119	944	15.4	364	5.9				601	9.8	457	48.4	331	35.1
Sousse	2001	3042	362	11.9	488	16.0				239	7.9	137	37.8	71	19.6

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma ⁺ (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever ⁺ (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%	N	%
<i>Country Total</i>	2001	9161	1306	14.3	852	9.3				840	9.2	594	45.5	402	30.8
Region Total	2002	66334	9275	14.0	7150	10.8	16627	1749	10.5	5937	9.0	4729	51.0	2639	28.5
Asia-Pacific															
China															
Beijing	2001	3530	253	7.2	224	6.3	3523	109	3.1	86	2.4	84	33.2	62	24.5
Guangzhou	2001	3514	170	4.8	161	4.6	3514	135	3.8	62	1.8	46	27.1	32	18.8
Tibet*	2001	2878	24	0.8	31	1.1	2869	3	0.1	12	0.4	9	37.5	5	20.8
Tong Zhou*	2001	3542	36	1.0	39	1.1	3542	11	0.3	7	0.2	7	19.4	4	11.1
Wulumuqi*	2001	3884	148	3.8	158	4.1	3880	84	2.2	52	1.3	50	33.8	31	20.9
<i>Country Total</i>	2001	17348	631	3.6	613	3.5	17328	342	2.0	219	1.3	196	31.1	134	21.2
Hong Kong															
Hong Kong	2002	3321	285	8.6	337	10.1	3321	205	6.2	104	3.1	94	33.0	58	20.4
Indonesia															
Bali*	2001	2569	111	4.3	224	8.7	2563	32	1.2	51	2.0	51	45.9	26	23.4
Bandung	2002	2826	147	5.2	351	12.4				60	2.1	60	40.8	11	7.5
Semarang*	2002	2435	144	5.9	271	11.1	2427	191	7.9	57	2.3	52	36.1	23	16.0
<i>Country Total</i>	2002	7830	402	5.1	846	10.8	4990	223	4.5	168	2.1	163	40.5	60	14.9
Japan															
Fukuoka	2002	2520	327	13.0	501	19.9				98	3.9	95	29.1	17	5.2
Tochigi*	1995	4466	373	8.4	537	12.0				139	3.1	138	37.0	44	11.8
<i>Country Total</i>	1999	6986	700	10.0	1038	14.9				237	3.4	233	33.3	61	8.7
Malaysia															
Alor Setar	2002	2941	274	9.3	317	10.8	2916	132	4.5	91	3.1	79	28.8	41	15.0
Klang Valley	2001	3025	352	11.6	488	16.1	3025	226	7.5	128	4.2	123	34.9	61	17.3
Kota Bharu	2001	2989	172	5.8	269	9.0	2989	83	2.8	77	2.6	55	32.0	30	17.4
<i>Country Total</i>	2001	8955	798	8.9	1074	12.0	8930	441	4.9	296	3.3	257	32.2	132	16.5
Philippines															
Metro Manila	2001	3658	307	8.4	766	20.9	3658	491	13.4	136	3.7	136	44.3	35	11.4
Singapore															
Singapore	2001	4217	481	11.4	1118	26.5	3631	413	11.4	198	4.7	179	37.2	41	8.5
South Korea															
Provincial Korea	2000	7375	630	8.5	408	5.5	7224	419	5.8	353	4.8	340	54.0	235	37.3
Seoul	2000	2888	262	9.1	143	5.0	2870	144	5.0	145	5.0	137	52.3	105	40.1
<i>Country Total</i>	2000	10263	892	8.7	551	5.4	10094	563	5.6	498	4.9	477	53.5	340	38.1
Taiwan															
Taipei	2001	6378	445	7.0	1082	17.0	6378	425	6.7	141	2.2	140	31.5	36	8.1
Taoyuan*	2002	3190	152	4.8	389	12.2	3156	157	5.0	75	2.4	50	32.9	10	6.6
<i>Country Total</i>	2002	9568	597	6.2	1471	15.4	9534	582	6.1	216	2.3	190	31.8	46	7.7
Thailand															
Bangkok	2001	4669	649	13.9	742	15.9	4648	536	11.5	384	8.2	301	46.4	139	21.4
Chantaburi*	2001	2901	466	16.1	398	13.7	2898	107	3.7	298	10.3	241	51.7	127	27.3
Chiang Mai	2001	3538	307	8.7	350	9.9	3499	169	4.8	154	4.4	121	39.4	40	13.0
Chiangrai*	1995	1809	119	6.6	135	7.5				74	4.1	70	58.8	28	23.5
Khon Kaen*	1999	3410	375	11.0	515	15.1	3391	177	5.2	210	6.2	198	52.8	45	12.0
Nakorn Pathom*	1996	6975	478	6.9	665	9.5	6914	295	4.3	250	3.6	245	51.3	115	24.1

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma ⁺ (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever ⁺ (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%	N	%
<i>Country Total</i>	1999	23302	2394	10.3	2805	12.0	21350	1284	6.0	1370	5.9	1176	49.1	494	20.6
Vietnam															
Ho Chi Minh City*	2001	4240	1250	29.5	212	5.0	1081	39	3.6	395	9.3	395	31.6	346	27.7
Region Total	2000	99688	8737	8.8	10831	10.9	83917	4583	5.5	3837	3.8	3496	40.0	1747	20.0
Eastern Mediterranean															
Egypt															
Cairo*	2002	3047	213	7.0	158	5.2				118	3.9	81	38.0	37	17.4
Iran															
Birjand*	1996	2829	222	7.8	108	3.8	2827	127	4.5	135	4.8	116	52.3	93	41.9
Rasht	2002	3004	469	15.6	136	4.5	2991	104	3.5	250	8.3	182	38.8	151	32.2
Tehran	2001	3119	341	10.9	80	2.6	3096	122	3.9	157	5.0	145	42.5	126	37.0
Zanjan*	1996	2805	236	8.4	71	2.5	2805	78	2.8	150	5.3	108	45.8	86	36.4
<i>Country Total</i>	1999	11757	1268	10.8	395	3.4	11719	431	3.7	692	5.9	551	43.5	456	36.0
Jordan															
Amman*	2001	2447	302	12.3	185	7.6	2447	167	6.8	190	7.8	189	62.6	90	29.8
Kuwait															
Kuwait	2001	2882	218	7.6	404	14.0	2882	241	8.4	195	6.8	139	63.8	60	27.5
Malta															
Malta	2002	4136	605	14.6	583	14.1				222	5.4	203	33.6	92	15.2
Pakistan															
Islamabad*	2002	4069	408	10.0	238	5.8	3843	202	5.3	219	5.4	208	51.0	127	31.1
Karachi	2001	2999	351	11.7	226	7.5	2978	210	7.1	251	8.4	197	56.1	113	32.2
<i>Country Total</i>	2002	7068	759	10.7	464	6.6	6821	412	6.0	470	6.6	405	53.4	240	31.6
Palestine															
North Gaza*	2000	3627	314	8.7	183	5.0				153	4.2	150	47.8	109	34.7
Ramallah*	2000	3929	336	8.6	268	6.8				155	3.9	153	45.5	98	29.2
<i>Country Total</i>	2000	7556	650	8.6	451	6.0				308	4.1	303	46.6	207	31.8
Sultanate of Oman															
Al-Khod	2001	3747	316	8.4	744	19.9	3728	302	8.1	199	5.3	197	62.3	79	25.0
Syrian Arab Republic															
Aleppo*	2001	3063	157	5.1	141	4.6	3054	188	6.2	96	3.1	69	43.9	47	29.9
Lattakia*	2001	3010	195	6.5	183	6.1	2913	149	5.1	141	4.7	73	37.4	38	19.5
Tartous*	2001	2995	118	3.9	139	4.6	2767	108	3.9	90	3.0	55	46.6	35	29.7
<i>Country Total</i>	2001	9068	470	5.2	463	5.1	8734	445	5.1	327	3.6	197	41.9	120	25.5
Region Total	2001	51708	4801	9.3	3847	7.4	36331	1998	5.5	2721	5.3	2265	47.2	1381	28.8
Indian Sub-Continent															
India															
Bangalore*	2002	3440	406	11.8	166	4.8				200	5.8	186	45.8	124	30.5
Bikaner*	2001	3059	231	7.6	140	4.6	3059	96	3.1	176	5.8	91	39.4	53	22.9
Borivali	2003	1004	15	1.5	53	5.3				7	0.7	7	46.7	6	40.0
Chandigarh	2001	3122	173	5.5	124	4.0	2317	57	2.5	87	2.8	84	48.6	43	24.9
Chennai (3)	2002	2181	76	3.5	29	1.3	1717	66	3.8	84	3.9	30	39.5	23	30.3
Davangere*	2002	2945	200	6.8	176	6.0	2780	160	5.8	24	0.8	24	12.0	0	0.0
Jaipur*	2001	3607	195	5.4	211	5.8	3536	136	3.8	201	5.6	105	53.8	67	34.4

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			N	%	N	%		N	%	N	%	N	%	N	%
Jodhpur	2003	2341	124	5.3	132	5.6	2098	450	21.4	58	2.5	57	46.0	29	23.4
Kottayam	2002	3685	566	15.4	327	8.9	3419	229	6.7	339	9.2	338	59.7	108	19.1
Lucknow*	2001	3000	174	5.8	99	3.3				128	4.3	81	46.6	54	31.0
Ludhiana*	2002	3108	225	7.2	104	3.3	3084	140	4.5	106	3.4	106	47.1	73	32.4
Mumbai (18)	2002	2982	136	4.6	270	9.1				77	2.6	74	54.4	44	32.4
Mumbai (29)*	2002	1829	54	3.0	68	3.7	1655	40	2.4	46	2.5	33	61.1	12	22.2
Nagpur*	2002	4150	125	3.0	233	5.6	4144	80	1.9	62	1.5	59	47.2	22	17.6
New Delhi (7)	2001	3469	184	5.3	224	6.5	3469	185	5.3	121	3.5	115	62.5	0	0.0
Pimpri*	2002	3128	32	1.0	98	3.1	3082	42	1.4	22	0.7	15	46.9	4	12.5
Pune	2001	1983	56	2.8	101	5.1	1951	88	4.5	1	0.1	0	0.0	0	0.0
Rasta Peth*	2001	3065	68	2.2	114	3.7	3063	83	2.7	51	1.7	47	69.1	7	10.3
<i>Country Total</i>	2002	52098	3040	5.8	2669	5.1	39374	1852	4.7	1790	3.4	1452	47.8	669	22.0
Sri Lanka															
Sri Lanka*	2001	3717	854	23.0	434	11.7	3586	314	8.8	441	11.9	425	49.8	284	33.3
Region Total	2002	55815	3894	7.0	3103	5.6	42960	2166	5.0	2231	4.0	1877	48.2	953	24.5
Latin America															
Argentina															
Córdoba	2002	3445	470	13.6	331	9.6	3438	280	8.1	188	5.5	185	39.4	83	17.7
Neuquén*	2002	3172	324	10.2	271	8.5	3167	207	6.5	178	5.6	149	46.0	101	31.2
Rosario City*	2001	3099	416	13.4	297	9.6				204	6.6	189	45.4	102	24.5
Salta*	2002	3000	374	12.5	284	9.5	2998	252	8.4	175	5.8	174	46.5	92	24.6
<i>Country Total</i>	2002	12716	1584	12.5	1183	9.3	9603	739	7.7	745	5.9	697	44.0	378	23.9
Bolivia															
Santa Cruz*	2002	3257	441	13.5	401	12.3	3232	507	15.7	262	8.0	193	43.8	107	24.3
Brazil															
Aracaju*	2002	3043	568	18.7	468	15.4				318	10.5	212	37.3	117	20.6
Belo Horizonte*	2002	3088	551	17.8	303	9.8				273	8.8	183	33.2	111	20.1
Brasília*	2002	3009	594	19.7	446	14.8				278	9.2	194	32.7	104	17.5
Caruaru*	2002	3026	542	17.9	594	19.6				259	8.6	190	35.1	86	15.9
Curitiba	2001	3628	687	18.9	335	9.2				207	5.7	207	30.1	126	18.3
Feira de Santana*	2002	1732	373	21.5	186	10.7	1717	196	11.4	177	10.2	138	37.0	94	25.2
Itajaí*	2001	2737	336	12.3	303	11.1				133	4.9	90	26.8	48	14.3
Maceió*	2002	2745	405	14.8	380	13.8				212	7.7	171	42.2	112	27.7
Manaus Amazonas*	2002	3009	546	18.1	593	19.7				271	9.0	207	37.9	125	22.9
Nova Iguaçu*	2002	3185	377	11.8	232	7.3				169	5.3	161	42.7	110	29.2
Passo Fundo*	2002	2949	604	20.5	430	14.6				239	8.1	189	31.3	101	16.7
Porto Alegre	2003	3007	548	18.2	636	21.2				252	8.4	198	36.1	70	12.8
Recife	2002	2865	548	19.1	515	18.0				207	7.2	199	36.3	103	18.8
Rural Santa Maria*	2003	3057	467	15.3	335	11.0				225	7.4	162	34.7	92	19.7
Salvador	2002	3020	744	24.6	415	13.7	1592	207	13.0	321	10.6	274	36.8	165	22.2
Santa Maria*	2003	3065	513	16.7	453	14.8				215	7.0	162	31.6	72	14.0
Santo Andre*	2000	3232	750	23.2	288	8.9				220	6.8	220	29.3	140	18.7
São Paulo	2002	3161	591	18.7	328	10.4				201	6.4	162	27.4	91	15.4
São Paulo West*	2002	3181	696	21.9	284	8.9				298	9.4	221	31.8	141	20.3
Vitória da Conquista*	2002	1679	512	30.5	222	13.2				262	15.6	197	38.5	119	23.2
<i>Country Total</i>	2002	58418	10952	18.6	7746	13.3	3309	403	12.2	4737	8.1	3737	34.1	2127	19.4

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			N	%	N	%		N	%	N	%	N	%	N	%	
			7													
Chile																
Calama*	2002	1618	179	11.1	222	13.7	1608	166	10.3	103	6.4	79	44.1	38	21.2	
Chiloe*	2002	3000	507	16.9	486	16.2	2982	436	14.6	188	6.3	138	27.2	73	14.4	
Punta Arenas	2001	3044	414	13.6	396	13.0	3043	404	13.3	144	4.7	117	28.3	63	15.2	
South Santiago	2001	3026	515	17.0	484	16.0	3016	382	12.7	236	7.8	173	33.6	91	17.7	
Valdivia	2001	3105	496	16.0	490	15.8	3105	607	19.5	170	5.5	169	34.1	44	8.9	
Country Total	2001	13793	2111	15.	2078	15.1	13754	1995	14.5	841	6.1	676	32.0	309	14.6	
			3													
Colombia																
Barranquilla*	2002	3204	443	13.8	551	17.2				226	7.1	179	40.4	74	16.7	
Bogotá*	2002	3830	324	8.5	363	9.5	3828	303	7.9	139	3.6	122	37.7	73	22.5	
Cali*	2002	3100	428	13.8	529	17.1	3052	387	12.7	238	7.7	172	40.2	87	20.3	
Country Total	2002	10134	1195	11.	1443	14.2	6880	690	10.0	603	6.0	473	39.6	234	19.6	
			8													
Costa Rica																
Costa Rica	2002	2436	666	27.3	565	23.2				390	16.0	336	50.5	108	16.2	
Cuba																
La Habana*	2002	3026	538	17.8	936	30.9	2338	296	12.7	313	10.3	313	58.2	63	11.7	
Ecuador																
Guayaquil*	2002	3082	479	15.5	459	14.9	3081	519	16.8	229	7.4	225	47.0	120	25.1	
Quito*	2003	3014	535	17.8	207	6.9	3014	166	5.5	158	5.2	158	29.5	106	19.8	
Country Total	2003	6096	1014	16.	666	10.9	6095	685	11.2	387	6.3	383	37.8	226	22.3	
			6													
El Salvador																
San Salvador*	2003	3260	1004	30.8	781	24.0				326	10.0	304	30.3	138	13.7	
Honduras																
San Pedro Sula*	2002	2675	589	22.0	490	18.3				204	7.6	195	33.1	71	12.1	
Mexico																
Ciudad Victoria*	2003	3122	451	14.4	183	5.9	3122	238	7.6	193	6.2	163	36.1	106	23.5	
Ciudad de México (1)*	2002	3891	385	9.9	310	8.0	3891	284	7.3	248	6.4	154	40.0	93	24.2	
Ciudad de México (3)*	2002	3474	134	3.9	58	1.7	3474	178	5.1	65	1.9	61	45.5	29	21.6	
Ciudad de México (4)*	2002	2662	265	10.0	177	6.6	2661	196	7.4	110	4.1	92	34.7	56	21.1	
Cuernavaca	2002	1431	166	11.6	81	5.7				58	4.1	57	34.3	38	22.9	
Mexicali Valley*	2002	2988	136	4.6	37	1.2	2988	217	7.3	74	2.5	65	47.8	34	25.0	
Monterrey*	2001	3006	181	6.0	211	7.0	2982	151	5.1	85	2.8	79	43.6	40	22.1	
Mérida*	2002	3019	342	11.3	391	13.0	3019	346	11.5	142	4.7	142	41.5	60	17.5	
Toluca*	2002	3021	200	6.6	155	5.1	3013	156	5.2	108	3.6	103	51.5	57	28.5	
Villahermosa*	2002	3109	327	10.5	462	14.9	3077	279	9.1	183	5.9	166	50.8	71	21.7	
Country Total	2002	29723	2587	8.7	2065	6.9	28227	2045	7.2	1266	4.3	1082	41.8	584	22.6	
Nicaragua																
Managua*	2002	3263	450	13.8	497	15.2				292	8.9	251	55.8	114	25.3	
Panama																
David-Panamá	2001	3183	729	22.9	651	20.5				298	9.4	256	35.1	68	9.3	
Paraguay																
Asunción	2002	3000	628	20.9	385	12.8	3000	319	10.6	325	10.8	325	51.8	184	29.3	
Peru																

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			N	%	N	%		N	%	N	%	N	%	N	%
Lima	2001	3022	593	19.6	1000	33.1	2927	462	15.8	265	8.8	225	37.9	49	8.3
Uruguay															
Montevideo	2002	3177	570	17.9	574	18.1	3175	367	11.6	274	8.6	274	48.1	103	18.1
Paysandú*	2002	1738	238	13.7	261	15.0	1738	135	7.8	122	7.0	121	50.8	49	20.6
Country Total	2002	4915	808	16.4	835	17.0	4913	502	10.2	396	8.1	395	48.9	152	18.8
Venezuela															
Caracas*	2002	3000	463	15.4	890	29.7				291	9.7	239	51.6	64	13.8
Region Total	2002	165917	26352	15.9	22612	13.6	84278	8643	10.3	11941	7.2	10080	38.3	4976	18.9
North America															
Barbados															
Barbados	2001	2498	519	20.8	617	24.7	2498	346	13.9	245	9.8	244	47.0	51	9.8
Canada															
Vancouver*	2003	2853	391	13.7	465	16.3				144	5.0	131	33.5	64	16.4
Trinidad and Tobago															
St Augustine*	2002	3512	460	13.1	450	12.8	3489	262	7.5	268	7.6	206	44.8	72	15.7
Tobago*	2002	1464	196	13.4	197	13.5	1451	179	12.3	191	13.0	131	66.8	63	32.1
Country Total	2002	4976	656	13.2	647	13.0	4940	441	8.9	459	9.2	337	51.4	135	20.6
USA															
Chapel Hill*	2000	128443	28413	22.1	22259	17.3	128443	17065	13.3	14845	11.6	13927	49.0	5626	19.8
Sarasota*	2003	1245	231	18.6	215	17.3	1143	103	9.0	82	6.6	82	35.5	33	14.3
Seattle	2003	2422	540	22.3	490	20.2	2397	208	8.7	257	10.6	235	43.5	90	16.7
Country Total	2002	132110	29184	22.1	22964	17.4	131983	1737	13.2	15184	11.5	14244	48.8	5749	19.7
Region Total	2002	142437	30750	21.6	24693	17.3	139421	18163	13.0	16032	11.3	14956	48.6	5999	19.5
Northern & Eastern Europe															
Albania															
Tiranë	2001	2983	100	3.4	107	3.6	2924	46	1.6	33	1.1	32	32.0	18	18.0
Bulgaria															
Sofia*	2002	1926	158	8.2	105	5.5				87	4.5	57	36.1	32	20.3
Croatia															
Rijeka*	2002	2194	185	8.4	115	5.2	2194	101	4.6	69	3.1	66	35.7	44	23.8
Estonia															
Tallinn	2001	3603	334	9.3	172	4.8	3258	72	2.2	117	3.2	101	30.2	76	22.8
Finland															
Kuopio County	2001	3051	580	19.0	236	7.7	3049	102	3.3	155	5.1	146	25.2	97	16.7
Former Yugoslav Republic of Macedonia (FYROM)															
Skopje*	2002	3026	266	8.8	52	1.7				77	2.5	76	28.6	67	25.2
Georgia															
Kutaisi	2003	2650	134	5.1	87	3.3				60	2.3	60	44.8	36	26.9
Hungary															
Svábhegy*	2003	4219	211	5.0	265	6.3	4218	112	2.7	86	2.0	79	37.4	35	16.6
Szeged*	2003	2889	204	7.1	286	9.9	2849	118	4.1	99	3.4	76	37.3	43	21.1
Country Total	2003	7108	415	5.8	551	7.8	7067	230	3.3	185	2.6	155	37.3	78	18.8
Kyrgyzstan															
Balykchi*	2002	1382	100	7.2	26	1.9	1379	63	4.6	82	5.9	80	80.0	60	60.0

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma ⁺ (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever ⁺ (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%	N	%
Bishkek*	2002	5048	402	8.0	142	2.8	5048	116	2.3	342	6.8	342	85.1	239	59.5
Jalalabat*	2003	2404	185	7.7	51	2.1				119	5.0	78	42.2	72	38.9
<i>Country Total</i>	2002	8834	687	7.8	219	2.5	6427	179	2.8	543	6.1	500	72.8	371	54.0
Latvia															
Riga	2004	1283	135	10.5	93	7.2	1276	39	3.1	50	3.9	41	30.4	27	20.0
Lithuania															
Kaunas	2001	2723	183	6.7	91	3.3	2722	167	6.1	40	1.5	40	21.9	23	12.6
Panevezys*	1997	1187	98	8.3	19	1.6				23	1.9	23	23.5	18	18.4
Siauliai*	1997	3516	261	7.4	77	2.2				69	2.0	69	26.4	53	20.3
<i>Country Total</i>	1998	7426	542	7.3	187	2.5	2722	167	6.1	132	1.8	132	24.4	94	17.3
Poland															
Kraków	2002	2545	240	9.4	173	6.8				133	5.2	100	41.7	58	24.2
Poznan	2002	1875	210	11.2	97	5.2				100	5.3	86	41.0	58	27.6
<i>Country Total</i>	2002	4420	450	10.2	270	6.1				233	5.3	186	41.3	116	25.8
Romania															
Cluj	2001	3019	685	22.7	268	8.9				273	9.0	273	39.9	212	30.9
Russia															
Novosibirsk	2002	3769	423	11.2	146	3.9				126	3.3	126	29.8	88	20.8
Serbia and Montenegro															
Belgrade*	2001	3228	288	8.9	195	6.0	3228	114	3.5	70	2.2	68	23.6	39	13.5
Nis*	2001	1207	150	12.4	73	6.0				36	3.0	32	21.3	13	8.7
Novi Sad*	2002	1171	69	5.9	38	3.2	1167	38	3.3	24	2.0	24	34.8	12	17.4
Podgorica*	2003	1014	104	10.3	73	7.2	1014	39	3.8	47	4.6	47	45.2	26	25.0
Sombor*	2002	1105	120	10.9	52	4.7	1105	26	2.4	34	3.1	33	27.5	17	14.2
<i>Country Total</i>	2002	7725	731	9.5	431	5.6	6514	217	3.3	211	2.7	204	27.9	107	14.6
Sweden															
Linköping	2002	2679	259	9.7	321	12.0	2660	98	3.7	92	3.4	82	31.7	26	10.0
Ukraine															
Kharkiv	2002	2428	508	20.9	133	5.5				116	4.8	78	15.4	69	13.6
Rural Kharkiv*	1998	3968	420	10.6	158	4.0				145	3.7	131	31.2	85	20.2
<i>Country Total</i>	2000	6396	928	14.5	291	4.5				261	4.1	209	22.5	154	16.6
Region Total	2002	72092	7012	9.7	3651	5.1	38091	1251	3.3	2704	3.8	2446	34.9	1643	23.4
Oceania															
Australia															
Melbourne*	2002	2192	670	30.6	818	37.3	2188	323	14.8	265	12.1	255	38.1	64	9.6
Cook Islands															
Rarotonga*	2003	445	47	10.6	66	14.8				24	5.4	18	38.3	3	6.4
Fiji															
Suva*	2002	3093	321	10.4	421	13.6	3093	504	16.3	203	6.6	203	63.2	98	30.5
Kingdom of Tonga															
Nuku'alofa*	2002	2671	432	16.2	335	12.5	2671	285	10.7	212	7.9	209	48.4	90	20.8
New Zealand															
Auckland	2001	2870	645	22.5	801	27.9	2869	320	11.2	287	10.0	252	39.1	75	11.6
Bay of Plenty	2002	1976	408	20.6	560	28.3	1902	255	13.4	155	7.8	148	36.3	31	7.6
Christchurch	2003	3116	868	27.9	1171	37.6	3094	271	8.8	329	10.6	328	37.8	75	8.6

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma ⁺ (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever ⁺ (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%		
Nelson	2003	2305	646	28.0	677	29.4	2295	263	11.5	245	10.6	244	37.8	59	9.1
Wellington	2001	3050	993	32.6	1108	36.3	3045	367	12.1	430	14.1	404	40.7	106	10.7
Country Total	2002	13317	3560	26.7	4317	32.4	13205	1476	11.2	1446	10.9	1376	38.7	346	9.7
Niue															
Niue Island*	2002	79	10	12.7	24	30.4				1	1.3	1	10.0	0	0.0
Nouvelle Caledonie															
Nouvelle Caledonie*	1998	7247	594	8.2	909	12.5	7056	487	6.9	261	3.6	261	43.9	96	16.2
Polynesie Francaise															
Polynesie Francaise*	2000	4289	486	11.3	682	15.9				199	4.6	193	39.7	58	11.9
Samoa															
Apia*	2003	2986	173	5.8	420	14.1	2979	151	5.1	137	4.6	110	63.6	40	23.1
Tokelau															
Tokelau*	2003	66	13	19.7	23	34.8	66	5	7.6	9	13.6	9	69.2	0	0.0
Region Total	2002	36385	6306	17.3	8015	22.0	31258	3231	10.3	2757	7.6	2635	41.8	795	12.6
Western Europe															
Austria															
Urfahr-Umgebung	2003	1439	217	15.1	101	7.0	1424	122	8.6	97	6.7	97	44.7	65	30.0
Belgium															
Antwerp	2002	3250	271	8.3	276	8.5				111	3.4	108	39.9	54	19.9
Channel Islands															
Guernsey	2001	1248	331	26.5	336	26.9	1248	143	11.5	151	12.1	142	42.9	33	10.0
Jersey	2002	773	205	26.5	195	25.2				95	12.3	89	43.4	31	15.1
Country Total	2002	2021	536	26.5	531	26.3	1248	143	11.5	246	12.2	231	43.1	64	11.9
Germany															
Münster	1999	4132	725	17.5	330	8.0	4130	281	6.8	397	9.6	368	50.8	233	32.1
Isle of Man															
Isle of Man	2001	1716	536	31.2	490	28.6				212	12.4	195	36.4	49	9.1
Italy															
Bari*	2002	1287	98	7.6	149	11.6				45	3.5	41	41.8	22	22.4
Colleferro-Tivoli*	2002	1361	67	4.9	167	12.3				29	2.1	27	40.3	18	26.9
Cosenza	2002	925	38	4.1	46	5.0				10	1.1	9	23.7	4	10.5
Emilia-Romagna	2002	1347	109	8.1	129	9.6				48	3.6	46	42.2	19	17.4
Empoli	2002	1229	94	7.6	109	8.9				21	1.7	21	22.3	10	10.6
Firenze	2002	1383	121	8.7	168	12.1				48	3.5	46	38.0	18	14.9
Mantova*	2002	1114	105	9.4	123	11.0				32	2.9	30	28.6	11	10.5
Milano	2002	1410	125	8.9	188	13.3				65	4.6	62	49.6	21	16.8
Palermo*	2002	1221	113	9.3	150	12.3				42	3.4	40	35.4	15	13.3
Roma	2002	1325	151	11.4	197	14.9				65	4.9	59	39.1	25	16.6
Siena	2002	1082	114	10.5	123	11.4				37	3.4	37	32.5	15	13.2
Torino	2002	1180	129	10.9	163	13.8				76	6.4	74	57.4	38	29.5
Trento	2002	1311	54	4.1	132	10.1				12	0.9	12	22.2	1	1.9
Country Total	2002	16175	1318	8.1	1844	11.4				530	3.3	504	38.2	217	16.5
Netherlands															
Netherlands*	2003	6896	840	12.2	898	13.0				365	5.3	361	43.0	124	14.8
Portugal															

Centre	Year	N [#]	Current Wheeze		Asthma Ever		N (Video)	Current Wheeze (Video)		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [‡] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [‡] (Current Wheeze Denominator)	
			N	%	N	%		N	%	N	%	N	%	N	%
Coimbra*	2002	1177	126	10.7	144	12.2	2961	216	7.3	51	4.3	49	38.9	21	16.7
Funchal	2002	3161	284	9.0	479	15.2				132	4.2	127	44.7	55	19.4
Lisbon	2002	3024	443	14.6	472	15.6				188	6.2	184	41.5	85	19.2
Portimao	2002	1109	108	9.7	138	12.4				46	4.1	44	40.7	22	20.4
Porto	2002	3336	437	13.1	504	15.1				164	4.9	164	37.5	82	18.8
<i>Country Total</i>	2002	11807	1398	11.8	1737	14.7	2961	216	7.3	581	4.9	568	40.6	265	19.0
Republic of Ireland															
Republic of Ireland	2003	3089	825	26.7	665	21.5				294	9.5	275	33.3	97	11.8
Spain															
A Coruña*	2003	2979	453	15.2	551	18.5	2976	237	8.0	208	7.0	190	41.9	55	12.1
Almeria*	1996	4051	299	7.4	323	8.0	4036	184	4.6	134	3.3	134	44.8	51	17.1
Asturias*	2002	4184	650	15.5	804	19.2	4182	399	9.5	291	7.0	266	40.9	86	13.2
Barcelona	2002	3066	276	9.0	376	12.3	3062	181	5.9	98	3.2	93	33.7	26	9.4
Bilbao	2001	3401	467	13.7	743	21.8	3401	372	10.9	213	6.3	201	43.0	45	9.6
Cartagena	2002	3998	426	10.7	471	11.8	3991	210	5.3	173	4.3	158	37.1	57	13.4
Castellón	2002	4024	286	7.1	363	9.0	4021	268	6.7	112	2.8	105	36.7	45	15.7
Madrid	2002	2652	267	10.1	378	14.3	2651	207	7.8	151	5.7	142	53.2	35	13.1
Pamplona	2001	2932	235	8.0	319	10.9	2922	225	7.7	106	3.6	92	39.1	34	14.5
San Sebastián*	2002	1195	165	13.8	260	21.8	1195	92	7.7	71	5.9	68	41.2	13	7.9
Valencia	2002	3132	322	10.3	423	13.5	3078	217	7.1	135	4.3	124	38.5	42	13.0
Valladolid	2002	2944	240	8.2	365	12.4	2940	227	7.7	121	4.1	96	40.0	31	12.9
<i>Country Total</i>	2001	38558	4086	10.6	5376	13.9	38455	2819	7.3	1813	4.7	1669	40.8	520	12.7
United Kingdom															
North Thames	2002	2356	627	26.6	577	24.5				248	10.5	232	37.0	97	15.5
Scotland	2002	4662	1295	27.8	1141	24.5				548	11.8	532	41.1	211	16.3
South Thames	2002	2432	636	26.2	620	25.5				302	12.4	280	44.0	109	17.1
Sunderland	2001	2193	352	16.1	565	25.8				164	7.5	153	43.5	21	6.0
Surrey/Sussex	2002	5082	1153	22.7	1236	24.3	5002	507	10.1	461	9.1	438	38.0	138	12.0
Wales	2002	2501	688	27.5	678	27.1				295	11.8	272	39.5	85	12.4
<i>Country Total</i>	2002	19226	4751	24.7	4817	25.1	5002	507	10.1	2018	10.5	1907	40.1	661	13.9
Region Total	2002	108309	15503	14.3	17065	15.8	53220	4088	7.7	6664	6.2	6283	40.5	2349	15.2
English language centres[†]	2002	176524	40453	22.9	35067	19.9	153626	19825	12.9	19809	11.2	18614	46.0	7094	17.5
Global Total	2002	798685	112630	14.1	100967	12.6	526103	45872	8.7	54824	6.9	48767	43.3	22482	20.0

* Phase Three B centres.

[#] Number of children.

[‡] The data presented are restricted to respondents who answered "yes" to the question about current wheeze.

Symptoms of severe asthma: Respondents with current wheeze who had 4 or more attacks of wheeze in the last year or had 1 or more nights per week sleep disturbance from wheeze in the last year or had wheeze affecting speech in the last year.

[†] Centres in Australia, Canada, Channel Islands, Isle of Man, New Zealand, Republic of Ireland, United Kingdom and USA.

Table S3: Prevalence of asthma symptoms in the 6-7 year age group

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [‡] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [‡] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
Africa												
Nigeria												
Ibadan	2002	2396	133	5.6	80	3.3	161	6.7	76	57.1	62	46.6
South Africa												
Polokwane*	2004	3480	457	13.1	122	3.5	371	10.7	232	50.8	175	38.3
Region Total	2003	5876	590	10.0	202	3.4	532	9.1	308	52.2	237	40.2
Asia-Pacific												
Hong Kong												
Hong Kong	2001	4448	416	9.4	353	7.9	140	3.1	106	25.5	51	12.3
Indonesia												
Bandung	2002	2503	71	2.8	119	4.8	27	1.1	27	38.0	7	9.9
Japan												
Fukuoka	2002	2958	537	18.2	679	23.0	97	3.3	93	17.3	7	1.3
Malaysia												
Alor Setar	2002	3786	217	5.7	370	9.8	60	1.6	50	23.0	8	3.7
Klang Valley	2001	3044	225	7.4	362	11.9	72	2.4	62	27.6	18	8.0
Kota Bharu	2001	3110	135	4.3	348	11.2	41	1.3	34	25.2	4	3.0
Country Total	2001	9940	577	5.8	1080	10.9	173	1.7	146	25.3	30	5.2
Singapore												
Singapore	2001	5389	547	10.2	837	15.5	141	2.6	136	24.9	22	4.0
South Korea												
Provincial Korea	2000	4258	237	5.6	387	9.1	100	2.3	84	35.4	40	16.9
Seoul	2000	1760	115	6.5	175	9.9	39	2.2	34	29.6	19	16.5
Country Total	2000	6018	352	5.8	562	9.3	139	2.3	118	33.5	59	16.8
Taiwan												
Taipei	2001	4832	475	9.8	694	14.4	104	2.2	103	21.7	24	5.1
Taoyuan*	2002	3293	251	7.6	431	13.1	84	2.6	64	25.5	13	5.2
Country Total	2002	8125	726	8.9	1125	13.8	188	2.3	167	23.0	37	5.1
Thailand												
Bangkok	2001	4209	633	15.0	451	10.7	270	6.4	224	35.4	139	22.0
Chantaburi*	2001	3321	390	11.7	357	10.7	203	6.1	147	37.7	70	17.9
Chiang Mai	2001	3106	241	7.8	190	6.1	107	3.4	87	36.1	38	15.8
Chiangrai*	1995	1677	121	7.2	160	9.5	46	2.7	41	33.9	12	9.9
Khon Kaen*	1999	2658	272	10.2	308	11.6	92	3.5	84	30.9	30	11.0
Nakorn Pathom*	1996	1821	149	8.2	177	9.7	82	4.5	75	50.3	24	16.1
Country Total	1999	16792	1806	10.8	1643	9.8	800	4.8	658	36.4	313	17.3
Vietnam												
Ho Chi Minh City*	2001	3879	691	17.8	174	4.5	188	4.8	188	27.2	151	21.9
Region Total	2000	60052	5723	9.5	6572	10.9	1893	3.2	1639	28.6	677	11.8
Eastern Mediterranean												
Iran												
Birjand*	1996	2693	136	5.1	70	2.6	69	2.6	58	42.6	40	29.4
Rasht	2001	3057	467	15.3	213	7.0	170	5.6	139	29.8	83	17.8
Tehran	2001	3008	259	8.6	64	2.1	92	3.1	91	35.1	73	28.2
Zanjan*	1996	2777	262	9.4	109	3.9	209	7.5	137	52.3	104	39.7

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [†] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [†] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
<i>Country Total</i>	1999	11535	1124	9.7	456	4.0	540	4.7	425	37.8	300	26.7
Jordan												
Amman*	2001	2598	436	16.8	260	10.0	267	10.3	267	61.2	107	24.5
Malta												
Malta	2001	3795	564	14.9	566	14.9	159	4.2	143	25.4	38	6.7
Pakistan												
Islamabad*	2002	3966	212	5.3	136	3.4	115	2.9	110	51.9	63	29.7
Karachi*	2002	2113	176	8.3	153	7.2	99	4.7	60	34.1	22	12.5
<i>Country Total</i>	2002	6079	388	6.4	289	4.8	214	3.5	170	43.8	85	21.9
Palestine												
North Gaza*	2000	3575	347	9.7	279	7.8	210	5.9	186	53.6	101	29.1
Ramallah*	2000	3754	351	9.4	320	8.5	173	4.6	169	48.1	86	24.5
<i>Country Total</i>	2000	7329	698	9.5	599	8.2	383	5.2	355	50.9	187	26.8
Sultanate of Oman												
Al-Khod	2001	4130	347	8.4	437	10.6	209	5.1	209	60.2	86	24.8
Syrian Arab Republic												
Lattakia*	2003	2373	111	4.7	93	3.9	62	2.6	62	55.9	19	17.1
Tartous*	2001	2734	156	5.7	123	4.5	86	3.1	59	37.8	25	16.0
<i>Country Total</i>	2002	5107	267	5.2	216	4.2	148	2.9	121	45.3	44	16.5
Region Total	2000	40573	3824	9.4	2823	7.0	1920	4.7	1690	44.2	847	22.1
Indian Sub-Continent												
India												
Bangalore*	2003	2959	169	5.7	79	2.7	58	2.0	57	33.7	34	20.1
Davangere*	2002	3043	104	3.4	120	3.9	8	0.3	8	7.7	8	7.7
Jaipur*	2001	2545	143	5.6	148	5.8	321	12.6	90	62.9	43	30.1
Jodhpur	2003	2114	51	2.4	64	3.0	20	0.9	19	37.3	8	15.7
Kottayam	2002	2619	602	23.0	304	11.6	291	11.1	291	48.3	80	13.3
Lucknow*	2002	3000	104	3.5	70	2.3	96	3.2	43	41.3	24	23.1
Ludhiana*	2002	3225	134	4.2	56	1.7	47	1.5	47	35.1	34	25.4
Mumbai (16)	2003	2865	73	2.5	84	2.9	10	0.3	10	13.7	4	5.5
Mumbai (18)	2002	4862	229	4.7	184	3.8	66	1.4	66	28.8	23	10.0
Mumbai (29)*	2002	1833	70	3.8	66	3.6	67	3.7	53	75.7	14	20.0
Nagpur*	2002	4294	164	3.8	222	5.2	71	1.7	66	40.2	28	17.1
New Delhi (7)	2002	3706	223	6.0	251	6.8	103	2.8	93	41.7	0	0.0
Pimpri*	2002	3838	182	4.7	95	2.5	110	2.9	99	54.4	62	34.1
Pune	2001	2711	108	4.0	91	3.4	0	0.0	0	0.0	0	0.0
Rasta Peth*	2001	3147	119	3.8	73	2.3	62	2.0	58	48.7	32	26.9
<i>Country Total</i>	2002	46761	2475	5.3	1907	4.1	1330	2.8	1000	40.4	394	15.9
Sri Lanka												
Sri Lanka*	2001	3345	920	27.5	364	10.9	436	13.0	430	46.7	275	29.9
Region Total	2002	50106	3395	6.8	2271	4.5	1766	3.5	1430	42.1	669	19.7
Latin America												
Argentina												
Neuquén*	2002	1930	287	14.9	139	7.2	130	6.7	113	39.4	62	21.6
Rosario City*	2001	2952	528	17.9	166	5.6	220	7.5	220	41.7	126	23.9
<i>Country Total</i>	2002	4882	815	16.7	305	6.2	350	7.2	333	40.9	188	23.1
Brazil												
Aracaju*	2003	2443	404	16.5	277	11.3	207	8.5	162	40.1	86	21.3

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [†] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [†] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
Itajaí*	2001	1511	311	20.6	156	10.3	172	11.4	145	46.6	70	22.5
Maceió*	2002	1990	484	24.3	192	9.6	266	13.4	240	49.6	158	32.6
Manaus Amazonas*	2002	3011	736	24.4	628	20.9	364	12.1	325	44.2	116	15.8
Nova Iguaçu*	2002	3249	854	26.3	338	10.4	425	13.1	388	45.4	253	29.6
Salvador*	2002	1069	185	17.3	88	8.2	70	6.5	60	32.4	37	20.0
Santo Andre*	2000	2167	519	24.0	106	4.9	185	8.5	185	35.6	130	25.0
São Paulo	2002	3047	743	24.4	191	6.3	332	10.9	281	37.8	199	26.8
São Paulo West*	2002	3312	1033	31.2	234	7.1	528	15.9	462	44.7	325	31.5
<i>Country Total</i>	<i>2002</i>	<i>21799</i>	<i>5269</i>	<i>24.2</i>	<i>2210</i>	<i>10.1</i>	<i>2549</i>	<i>11.7</i>	<i>2248</i>	<i>42.7</i>	<i>1374</i>	<i>26.1</i>
Chile												
Punta Arenas	2001	3052	535	17.5	241	7.9	177	5.8	164	30.7	89	16.6
South Santiago	2001	3075	453	14.7	257	8.4	166	5.4	150	33.1	80	17.7
Valdivia	2001	3183	680	21.4	501	15.7	223	7.0	223	32.8	67	9.9
<i>Country Total</i>	<i>2001</i>	<i>9310</i>	<i>1668</i>	<i>17.9</i>	<i>999</i>	<i>10.7</i>	<i>566</i>	<i>6.1</i>	<i>537</i>	<i>32.2</i>	<i>236</i>	<i>14.1</i>
Colombia												
Barranquilla*	2002	3209	487	15.2	356	11.1	178	5.5	176	36.1	63	12.9
Bogotá*	2002	3256	327	10.0	175	5.4	106	3.3	92	28.1	47	14.4
Cali*	2002	3005	521	17.3	290	9.7	168	5.6	155	29.8	82	15.7
<i>Country Total</i>	<i>2002</i>	<i>9470</i>	<i>1335</i>	<i>14.1</i>	<i>821</i>	<i>8.7</i>	<i>452</i>	<i>4.8</i>	<i>423</i>	<i>31.7</i>	<i>192</i>	<i>14.4</i>
Costa Rica												
Costa Rica	2002	3234	1216	37.6	902	27.9	655	20.3	595	48.9	150	12.3
Cuba												
La Habana*	2002	1803	569	31.6	705	39.1	346	19.2	346	60.8	78	13.7
Ecuador												
Quito*	2003	3055	512	16.8	153	5.0	143	4.7	143	27.9	103	20.1
El Salvador												
San Salvador*	2003	1365	261	19.1	403	29.5	84	6.2	72	27.6	23	8.8
Honduras												
San Pedro Sula*	2002	1907	357	18.7	289	15.2	176	9.2	167	46.8	64	17.9
Mexico												
Ciudad Victoria*	2003	2603	224	8.6	124	4.8	106	4.1	92	41.1	53	23.7
Ciudad de México (1)*	2002	3205	217	6.8	144	4.5	81	2.5	72	33.2	29	13.4
Ciudad de México (3)*	2002	3493	126	3.6	77	2.2	61	1.7	61	48.4	17	13.5
Cuernavaca	2002	2579	216	8.4	89	3.5	72	2.8	71	32.9	43	19.9
Mexicali Valley*	2003	2568	227	8.8	200	7.8	106	4.1	83	36.6	32	14.1
Monterrey*	2001	3030	255	8.4	170	5.6	102	3.4	101	39.6	49	19.2
Mérida*	2003	2896	368	12.7	361	12.5	149	5.1	149	40.5	38	10.3
Toluca*	2002	3235	192	5.9	65	2.0	64	2.0	64	33.3	41	21.4
Villahermosa*	2002	2678	268	10.0	312	11.7	120	4.5	110	41.0	28	10.4
<i>Country Total</i>	<i>2002</i>	<i>26287</i>	<i>2093</i>	<i>8.0</i>	<i>1542</i>	<i>5.9</i>	<i>861</i>	<i>3.3</i>	<i>803</i>	<i>38.4</i>	<i>330</i>	<i>15.8</i>
Nicaragua												
Managua*	2002	3286	563	17.1	558	17.0	332	10.1	309	54.9	123	21.8
Panama												
David-Panamá	2001	2942	668	22.7	597	20.3	285	9.7	243	36.4	65	9.7
Uruguay												
Paysandú*	2002	1512	341	22.6	148	9.8	136	9.0	135	39.6	81	23.8
Venezuela												
Caracas*	2002	2999	599	20.0	863	28.8	354	11.8	329	54.9	64	10.7

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [†] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [†] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
Region Total	2002	93851	16266	17.3	10495	11.2	7289	7.8	6683	41.1	3071	18.9
North America												
Barbados												
Barbados	2001	2759	538	19.5	565	20.5	198	7.2	197	36.6	32	5.9
Canada												
Saskatoon	2003	1255	229	18.2	238	19.0	85	6.8	85	37.1	19	8.3
Region Total	2002	4014	767	19.1	803	20.0	283	7.1	282	36.8	51	6.6
Northern & Eastern Europe												
Albania												
Tiranë	2000	2896	144	5.0	75	2.6	58	2.0	55	38.2	29	20.1
Bulgaria												
Sofia*	2002	1181	66	5.6	51	4.3	26	2.2	23	34.8	8	12.1
Croatia												
Rijeka*	2002	1633	159	9.7	64	3.9	48	2.9	47	29.6	21	13.2
Estonia												
Tallinn	2001	2385	230	9.6	98	4.1	68	2.9	63	27.4	36	15.7
Georgia												
Kutaisi	2003	2666	185	6.9	87	3.3	89	3.3	89	48.1	56	30.3
Hungary												
Svábhegy*	2003	2451	161	6.6	121	4.9	54	2.2	52	32.3	18	11.2
Kyrgyzstan												
Bishkek*	2002	3146	163	5.2	34	1.1	151	4.8	151	92.6	121	74.2
Jalalabat*	2003	1664	114	6.9	23	1.4	46	2.8	40	35.1	28	24.6
<i>Country Total</i>	<i>2003</i>	<i>4810</i>	<i>277</i>	<i>5.8</i>	<i>57</i>	<i>1.2</i>	<i>197</i>	<i>4.1</i>	<i>191</i>	<i>69.0</i>	<i>149</i>	<i>53.8</i>
Lithuania												
Kaunas	2002	2772	182	6.6	72	2.6	50	1.8	50	27.5	24	13.2
Panevezys*	1997	1176	49	4.2	20	1.7	13	1.1	13	26.5	7	14.3
Siauliai*	1997	1341	53	4.0	12	0.9	11	0.8	11	20.8	8	15.1
<i>Country Total</i>	<i>1999</i>	<i>5289</i>	<i>284</i>	<i>5.4</i>	<i>104</i>	<i>2.0</i>	<i>74</i>	<i>1.4</i>	<i>74</i>	<i>26.1</i>	<i>39</i>	<i>13.7</i>
Poland												
Kraków	2001	2497	361	14.5	145	5.8	147	5.9	141	39.1	79	21.9
Poznan	2002	1999	249	12.5	117	5.9	124	6.2	122	49.0	65	26.1
<i>Country Total</i>	<i>2002</i>	<i>4496</i>	<i>610</i>	<i>13.6</i>	<i>262</i>	<i>5.8</i>	<i>271</i>	<i>6.0</i>	<i>263</i>	<i>43.1</i>	<i>144</i>	<i>23.6</i>
Russia												
Novosibirsk	2002	2730	312	11.4	69	2.5	86	3.2	86	27.6	63	20.2
Serbia and Montenegro												
Belgrade*	2001	1932	204	10.6	145	7.5	47	2.4	47	23.0	19	9.3
Nis*	2001	1002	165	16.5	98	9.8	38	3.8	37	22.4	9	5.5
Novi Sad*	2002	1044	86	8.2	26	2.5	18	1.7	18	20.9	12	14.0
Sombor*	2002	1029	114	11.1	47	4.6	30	2.9	30	26.3	11	9.6
<i>Country Total</i>	<i>2002</i>	<i>5007</i>	<i>569</i>	<i>11.4</i>	<i>316</i>	<i>6.3</i>	<i>133</i>	<i>2.7</i>	<i>132</i>	<i>23.2</i>	<i>51</i>	<i>9.0</i>
Sweden												
Linköping	2002	2089	213	10.2	195	9.3	87	4.2	84	39.4	30	14.1
Ukraine												
Kharkiv	2002	1950	243	12.5	133	6.8	79	4.1	36	14.8	25	10.3
Rural Kharkiv*	1998	3000	264	8.8	87	2.9	80	2.7	75	28.4	50	18.9
<i>Country Total</i>	<i>2000</i>	<i>4950</i>	<i>507</i>	<i>10.2</i>	<i>220</i>	<i>4.4</i>	<i>159</i>	<i>3.2</i>	<i>111</i>	<i>21.9</i>	<i>75</i>	<i>14.8</i>
Region Total	2001	42583	3717	8.7	1719	4.0	1350	3.2	1270	34.2	719	19.3

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [‡] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [‡] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
Oceania												
Australia												
Melbourne	2002	2968	594	20.0	756	25.5	249	8.4	240	40.4	29	4.9
New Zealand												
Auckland	2002	3541	793	22.4	1002	28.3	365	10.3	353	44.5	45	5.7
Bay of Plenty	2002	2150	509	23.7	650	30.2	209	9.7	209	41.1	37	7.3
Christchurch	2003	3315	739	22.3	1115	33.6	333	10.0	333	45.1	36	4.9
Nelson	2003	1867	377	20.2	517	27.7	160	8.6	160	42.4	14	3.7
Country Total	2003	10873	2418	22.2	3284	30.2	1067	9.8	1055	43.6	132	5.5
Niue												
Niue Island*	2002	47	8	17.0	13	27.7	2	4.3	2	25.0	0	0.0
Region Total	2002	13888	3020	21.7	4053	29.2	1318	9.5	1297	42.9	161	5.3
Western Europe												
Austria												
Kärnten	2002	4847	363	7.5	199	4.1	110	2.3	108	29.8	60	16.5
Urfahr-Umgebung	2002	2029	148	7.3	93	4.6	63	3.1	61	41.2	31	20.9
Country Total	2002	6876	511	7.4	292	4.2	173	2.5	169	33.1	91	17.8
Belgium												
Antwerp	2002	5645	423	7.5	340	6.0	164	2.9	163	38.5	77	18.2
Germany												
Münster	1999	3830	492	12.8	176	4.6	201	5.2	192	39.0	116	23.6
Greece												
Thessaloniki*	2000	1228	97	7.9	120	9.8	29	2.4	27	27.8	5	5.2
Isle of Man												
Isle of Man*	2001	1096	158	14.4	228	20.8	76	6.9	74	46.8	9	5.7
Italy												
Bari*	2002	1943	161	8.3	188	9.7	51	2.6	42	26.1	16	9.9
Colleferro-Tivoli*	2002	1143	81	7.1	149	13.0	24	2.1	21	25.9	4	4.9
Emilia-Romagna	2002	2265	202	8.9	189	8.3	57	2.5	53	26.2	19	9.4
Empoli	2002	1152	112	9.7	85	7.4	32	2.8	30	26.8	15	13.4
Firenze	2002	1036	89	8.6	87	8.4	25	2.4	24	27.0	6	6.7
Mantova*	2002	1288	82	6.4	97	7.5	20	1.6	17	20.7	4	4.9
Milano	2002	2249	171	7.6	215	9.6	49	2.2	48	28.1	11	6.4
Roma	2002	2224	187	8.4	249	11.2	56	2.5	50	26.7	12	6.4
Torino	2002	2361	127	5.4	183	7.8	50	2.1	42	33.1	14	11.0
Trento*	2002	2359	128	5.4	141	6.0	39	1.7	37	28.9	11	8.6
Country Total	2002	18020	1340	7.4	1583	8.8	403	2.2	364	27.2	112	8.4
Portugal												
Funchal	2002	1819	200	11.0	259	14.2	102	5.6	98	49.0	31	15.5
Lisbon	2002	2477	351	14.2	194	7.8	167	6.7	164	46.7	88	25.1
Portimao	2001	1069	141	13.2	52	4.9	60	5.6	56	39.7	41	29.1
Porto*	2002	2464	246	10.0	247	10.0	118	4.8	113	45.9	42	17.1
Country Total	2002	7829	938	12.0	752	9.6	447	5.7	431	45.9	202	21.5
Spain												
A Coruña*	2003	3016	389	12.9	414	13.7	148	4.9	141	36.2	33	8.5
Almeria*	1996	3349	339	10.1	243	7.3	120	3.6	119	35.1	58	17.1
Asturias*	2002	3193	370	11.6	472	14.8	126	3.9	115	31.1	27	7.3
Barcelona*	2002	3002	254	8.5	337	11.2	64	2.1	62	24.4	15	5.9

Centre	Year	N [#]	Current Wheeze		Asthma Ever		Symptoms of Severe Asthma (Total Participants Denominator)		Symptoms of Severe Asthma [†] (Current Wheeze Denominator)		Symptoms of Severe Asthma Without Asthma Ever [‡] (Current Wheeze Denominator)	
			N	%	N	%	N	%	N	%	N	%
Bilbao	2001	3157	390	12.4	656	20.8	130	4.1	121	31.0	16	4.1
Cartagena	2002	2948	326	11.1	317	10.8	136	4.6	122	37.4	32	9.8
Castellón	2002	3915	325	8.3	287	7.3	118	3.0	107	32.9	42	12.9
Madrid	2002	2347	220	9.4	232	9.9	92	3.9	84	38.2	23	10.5
Pamplona	2001	3176	225	7.1	307	9.7	80	2.5	73	32.4	18	8.0
Valencia	2002	3398	315	9.3	287	8.4	122	3.6	108	34.3	40	12.7
<i>Country Total</i>	<i>2001</i>	<i>31501</i>	<i>3153</i>	<i>10.0</i>	<i>3552</i>	<i>11.3</i>	<i>1136</i>	<i>3.6</i>	<i>1052</i>	<i>33.4</i>	<i>304</i>	<i>9.6</i>
United Kingdom Sunderland	2001	1843	385	20.9	493	26.7	197	10.7	194	50.4	29	7.5
Region Total	2002	77868	7497	9.6	7536	9.7	2826	3.6	2666	35.6	945	12.6
English language centres[†]	2002	18035	3784	21.0	4999	27.7	1674	9.3	1648	43.6	218	5.8
Global Total	2001	388811	44799	11.5	36474	9.4	19177	4.9	17265	38.5	7377	16.5

* Phase Three B centres.

Number of children.

‡ The data presented are restricted to respondents who answered “yes” to the question about current wheeze.

Symptoms of severe asthma: Respondents with current wheeze who had 4 or more attacks of wheeze in the last year or had 1 or more nights per week sleep disturbance from wheeze in the last year or had wheeze affecting speech in the last year.

† Centres in Australia, Canada, Isle of Man, New Zealand and United Kingdom.