

Epidemiology of allergies in Austria. Results of the first Austrian Allergy Report

Thomas Dorner, Kitty Lawrence, Anita Rieder, Michael Kunze

Institute of Social Medicine, Centre for Public Health, Medical University of Vienna, Vienna, Austria

Received March 22, 2007; accepted March 30, 2007
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Epidemiologie von Allergien in Österreich. Ergebnisse des ersten Österreichischen Allergieberichts

Zusammenfassung. Der erste Österreichische Allergiebericht fasst alle zur Verfügung stehenden epidemiologischen Daten zu Allergien in Österreich zusammen. Demnach beträgt die kumulative Prävalenz von Allergien in der Wiener Bevölkerung 27,6 % bei den Männern und 32,2 % bei den Frauen und die Periodenprävalenz im Jahr vor der Befragung 19,6 % bzw. 22,4 %. Bei Gesundenuntersuchungen berichteten 20,8 % der Männer und 23,1 % der Frauen über Allergien. Eine durch Prick-Test nachweisbare allergische Sensibilisierung gegenüber mindestens einem Inhalationsallergen ist jedoch bei 50,8 % der Allgemeinbevölkerung und bei 39,3 % der beschwerdefreien Personen nachweisbar. Eine Auswertung der Krankenhausentlassungen aller österreichischen Krankenhäuser zeigt, dass im Jahr etwa 12.000 Personen aufgrund einer Allergie in Krankenhäuser aufgenommen werden. Übereinstimmend mit internationalen Studien sind manche Bevölkerungsschichten in Österreich häufiger betroffen als andere. Frauen sind von Allergien etwas häufiger betroffen als Männer, das Geschlechterverhältnis ist bei Kindern jedoch umgekehrt. Allergien kommen in allen Altersgruppen vor, wie aus den meisten internationalen Studien hervorgeht, sind am häufigsten Personen in der 3. Lebensdekade betroffen. Personen in höher gebildeten Schichten, höher qualifizierten Berufen und städtischen Regionen sind häufiger von Allergien betroffen als Personen aus niedrigeren sozio-ökonomischen Schichten und Gemeinden mit hoher Agrarquote. Der international aufgezeigte steigende Trend ist auch für Österreich nachvollziehbar mit einer Steigerung der Prävalenz von Heuschnupfen, Asthma und atopischem Ekzem, bei den Untersuchungen um jeweils das 2fache, 3,6fache

und 4,6fache zwischen 1986 und 2003/04. Zwischen 2003/04 und 2005 ist jedoch ein deutlicher Rückgang in der Allergieprävalenz zu verzeichnen. Gesundheitsberichte wie der erste österreichische Allergiebericht liefern die Basis für die internationale Vergleichbarkeit von Eckdaten. Die Auswirkungen von Erkrankungen auf das Gesundheitswesen können abgeschätzt und basierend auf den Daten Public Health Strategien entwickelt werden.

Schlüsselwörter: allergische Sensibilisierung, Gesundheitsbericht, Prävalenz, Inzidenz, Krankenhausentlassungen.

Summary. The first Austrian Allergy Report is a compilation of all available epidemiological data relating to allergies in Austria. According to this report the cumulative prevalence of allergies in the Viennese population is 27.6% for men and 32.2% for women and the period prevalence in the year before questioning 19.6% and 22.4% respectively. 20.8% of men and 23.1% of women reported about allergies at health examinations. However, an allergy sensitivity to at least one inhalation allergen, verifiable by means of a prick test, is detectable in 50.8% of the general population and in 39.3% of those free from ailments. Analysis of the hospital discharge statistics of all Austrian hospitals shows that around 12,000 people per year were admitted on grounds of an allergy. In accordance with international studies some population subgroups are more often affected than others. Women suffer from allergies somewhat more frequently than men, although the sex difference is reversed among children. Allergies occur in all age groups, with most studies showing that people in their twenties are most frequently affected. People with higher levels of education, in more highly qualified jobs and living in urban areas are more commonly affected by allergies than people from lower socio-economic levels and rural communities. The internationally identified increase in trend can also be identified in Austria with a 2fold, 3.6fold, and 4.6fold increase in the prevalence of hay fever, asthma and atopic eczema respectively, determined from the military health examinations of all recruits for national service between 1986 and

Correspondence: Dr. Thomas Dorner, Institute of Social Medicine, Centre for Public Health, Medical University of Vienna, Rooseveltplatz 3, 1090 Vienna, Austria.
Fax: ++43-1-427764681
E-mail: thomas.dorner@univie.ac.at

2003/04, although a clear decline in allergy prevalence was registered between 2003/04 and 2005. Health reports like the first Austrian Allergy Report provide the basis for international comparison of basic data. These data also enable the evaluation of the impact of different diseases on the health system as well as the development of public health strategies.

Key words: allergic sensitisation, health report, prevalence, incidence, hospital discharge.

Introduction

The aim of the first Austrian Allergy Report was to present the various dimensions of allergic disease in Austria. All available epidemiological data relating to allergies were compiled. In addition, data were gathered from new sources, such as raw data from population studies, as well as data researched and gathered from institutions connected with public health. The report provides information on the prevalence of allergies and their trends in Austria as well as the populations most affected. The most important epidemiological findings from the Austrian allergy report in context with international results are presented and discussed in this paper.

Prevalence of allergies in Austria

Prevalence of allergies in Austria is primarily illustrated by self reported data. In the Viennese Health and Social

Survey 1999/2000 (Wiener Gesundheits- und Sozialsurvey) [1], 27.6% of men and 32.2% of women claimed they had suffered from an allergy at some time and 19.6% of men and 22.4% of the women reported having suffered an allergy during the past year [2]. Similar results can be observed in the analysis of 1,009 health examinations carried out all over Austria. Here 20.8% of men and 23.1% of women reported on allergies [2]. Analysis of the 1999 microcensus, a representative survey, which includes about 1% of all Austrian households, imparts a slightly different picture: Only 4.6% of men and 5.1% of women reported suffering from allergies [3]. This large difference in the numbers of the micro-census, the Viennese Health and Social Survey and the health examinations could be due to methodological differences. For the microcensus, participants were asked about "disorders due to allergies", thus these results are more likely to reflect the point prevalence of allergic disorders at the time of questioning and not so much the proportion of the population generally suffering from allergies.

The frequency of allergic diseases showed substantial differences in various studies. The self reported prevalence of allergic illnesses derived from the Viennese Health and Social Survey are presented for different age groups of both men and women, in tables 1 and 2. The most frequently suffered allergy was rhinitis. In the Viennese Health and Social Survey 17.2% of men and 16.9% of women reported suffering from allergic rhinitis [1]. Within the framework of the European Community

Table 1. Allergies in men by age group; data source [1]:

Allergies	age (years)					total
	16-24	25-44	45-59	60-74	75+	
	men (in %)					
Allergic Rhinitis – seasonally dependent	12.3	17.9	11.6	7.1	2.1	13.0
Allergic Rhinitis – independent of season	2.4	5.6	3.0	4.9	2.2	4.2
Urticaria	0.5	1.9	0.7	2.0	2.8	1.5
Asthma	3.4	4.1	3.9	2.7	0.0	3.5
Allergy related intestinal problems	0.3	1.2	0.6	1.4	2.8	1.1
Allergic skin rash	5.0	8.1	5.2	4.8	6.3	6.4
Other allergies	7.8	8.7	4.0	3.9	3.9	6.4
None	77.3	65.7	76.6	78.4	82.9	72.9

Table 2. Allergies in women by age group; data source [1]:

Allergies	age (years)					total
	16-24	25-44	45-59	60-74	75+	
	women (in %)					
Allergic Rhinitis – seasonally dependent	10.4	14.2	8.6	8.5	6.3	10.7
Allergic Rhinitis – independent of season	3.2	6.2	5.5	5.7	2.8	5.3
Urticaria	0.7	3.2	2.1	2.4	0.7	2.3
Asthma	6.2	3.1	3.3	3.8	6.3	3.9
Allergy related intestinal problems	0.3	0.6	0.6	1.0	1.8	0.8
Allergic skin rash	9.1	11.0	9.3	5.6	8.1	9.3
Other allergies	14.9	10.4	12.3	8.9	3.3	10.3
None	68.5	63.9	70.8	70.4	78.3	68.6

Respiratory Health Surveys (ECRHS) [4] allergic rhinitis was documented in 18.3% of Viennese men and 14.4% of Viennese women [5]. The prevalence of hay fever amongst children and adolescents was investigated by an Austrian centre within the scope of the International Study of Asthma and Allergy in Childhood (ISAAC) [6]. Of the 6–8 year olds 15.5% of boys and 11.2% of girls reported having symptoms of allergic rhinitis during the past 12 months, this was reported by 19.7% of boys and 25.3% of the girls in the 12–15 year age group. Hay fever was diagnosed in 11.0% of male and 6.6% of female 6–8 year olds, and further in 21.8% of male and 19.0% of female 12–15 year olds [7]. The military health examinations of 2005 revealed that hay fever was diagnosed in 5.5% of national service recruits [2].

Allergic asthma was reported by 3.5% of men and 3.9% of women in the Viennese Health and Social Survey [1]. In the microcensus, 1.4% of Austrian men and 1.2% of Austrian women reported symptoms due to asthma [3]. 3.1% of the Austrian sample in the ECRHS were documented with "diagnosed asthma". Here "diagnosed asthma" was assumed when the patient had either suffered an acute asthma attack during the past 12 months or in cases where medication for asthma was being taken at the time of questioning [4]. In the ISAAC study 10.7% of male and 9.0% of female 6–8 year olds and 11.8% of the male and 11.9% of the female 12–15 years olds, reported wheezing during the past 12 months. Asthma was diagnosed in 5.6% of male and 3.1% of female children, as well as, 8.1% of male and 4.6% of female adolescents [7]. The prevalence of asthma in Austrians eligible for national service was 2.3% in 2005 [2].

According to the Viennese Health and Social Survey 4.5% of men and 9.3% of women suffered from allergic eczema, whilst a further 1.5% of men and 2.3% of women complained of urticaria [1]. In the 1999 Microcensus 1.4% of men and 1.8% of women reported problems due to allergic eczema [3]. In the ISAAC study 5.9% of 6–8 year old boys and 7.9% of 6–8 year old girls reported symptoms of atopic dermatitis. These symptoms were also reported by 5.2% of male and 8.2% of female 12–15 year-olds. The diagnosis atopic dermatitis was made for 10.5% of male and 10.3% of female children, as well as, 4.0% of male and 6.1% of female adolescents [7]. Atopic eczema was diagnosed in 1.1% of national service recruits at the military health examinations in 2005 [2].

International epidemiology of allergy

International comparable data for the prevalence of different allergic diseases can, above all, be drawn from two international studies: The ECRHS [8] and the ISAAC [6].

The ECRHS was carried out in order to measure the extent of allergic asthma, asthma-like symptoms and allergic rhinitis in the European Union and selected other countries. This study was conducted in 30 regions of 15 states in the European Union (in 1994), Switzerland, Estonia, Algeria, India, New Zealand, Australia and the USA. In every region 1,500 men and 1,500 women aged 20 to 44 years were randomly selected. These people were sent a questionnaire with a total of 10 questions

regarding age and sex, as well as symptoms and treatment of allergies of the respiratory system answerable with either "yes" or "no" [8].

In the participating centres the prevalence of nasal allergy and hay fever ranged from 9.5% in Algiers (Algeria) to 40% in Melbourne (Australia). The highest prevalence was documented in the non-European centres e. g. Australia, the USA and New Zealand (Melbourne 40.9%, Portland 39.4%, Hawkes Bay 37.7%, Wellington 36.6%, Christchurch 36.1% and Auckland 35.1%). The lowest prevalence was recorded in the non-European centres of Algiers at 9.5%, and in Bombay at 10.1%. In Europe the prevalence of nasal allergy and hay fever was conspicuously high in French and British centres with 34.4% in Montpellier, 30.3% in Paris, 30.2% in Bordeaux, 29.2% in Cambridge, 28.3% in Norwich, 28.1% in Grenoble and 26.7% in Ipswich. The prevalence was notably low in Spanish regions, some Italian centres and in one of the German centres, with prevalences of nasal allergy and hay fever reaching 12.1% in Albacete, 12.5% in Pavia, 12.6% in Galdakao, 13.1% in Barcelona, and 13.4% in both Oviedo and in Erfurt. In Austria, the prevalence of allergic rhinitis was found to be 16.4% (95% confidence interval: 14.8–17.9) in the lowest quartile of the participating centres (median: 20.9%) [4].

The prevalence of asthma-like symptoms as well as diagnosed asthma was also particularly high in the non-European regions (Australian, American and in centres in New Zealand). With the highest prevalence of diagnosed asthma being 11.9% in Melbourne, 11.3% in Wellington, 11.2% in Christchurch, 10.1% in Auckland, 9.0% in Hawkes Bay and 7.1% in Portland, Oregon. In Europe, the prevalence of diagnosed asthma and symptoms compatible with asthma was particularly high in the British centres. Here the prevalence of diagnosed asthma was 7.5%–8.0% and for the symptoms "wheeze without a cold" the prevalence was 17.3%–20.5%. The prevalence of symptoms compatible with asthma was especially high in the Irish centres (16.2–21.6%), whilst the prevalence of diagnosed asthma merely lay slightly above the median.

The lowest prevalences for the symptoms "wheeze without a cold" were recorded in India and Algeria (2.0% and 2.8% respectively). In these centres the prevalence of diagnosed asthma also lay below the lowest quartile. In Europe, the prevalence of diagnosed asthma was lowest in Tartu and Erfurt (2.0% and 2.1% respectively). Prevalences of diagnosed asthma and asthma-like symptoms were notably low in the Mediterranean countries like France, Italy, Spain and Greece, with values for diagnosed asthma of 2.1% in Galdakao (Spain), 2.9% in Athens, 3.3% in Pavia and 3.5% in Grenoble (France). In Austria, the prevalence of symptoms compatible with asthma was 9.4% (95% confidence interval: 8.1–10.6) about the median of 12.7 and the prevalence of diagnosed asthma 3.1% (95% confidence interval: 2.4–3.9) in the lowest quartile of the participating centres (median: 4.7%) [4].

The aim of the ISAAC study was to examine the prevalence of asthma, allergic rhino-conjunctivitis and atopy in 13–14 year-old adolescents. The study was conducted worldwide in 56 different countries. A total of 463,801 children participated in this survey. In order to

Table 3. Number of patients with an allergic disease as the main diagnosis at time of hospital discharge following in patient stay in Austria 2004 (own calculations – data source: Statistik Austria 2006)

	ICD-10	men	women	total
Allergic purpura	[D69.0]	161	160	321
Acute atopic conjunctivitis	[H10.1]	6	5	11
Vasomotor and allergic rhinitis	[J30]	56	52	108
Predominantly allergic asthma	[J45.0]	1,072	1,057	2,129
Mixed asthma	[J45.8]	118	131	249
Asthma, unspecified	[J45.9]	1,440	1,684	3,124
Status asthmaticus	[J46]	119	95	214
Hypersensitivity pneumonitis due to organic dust	[J67]	226	174	400
Atopic dermatitis	[L20]	421	468	889
Allergic contact dermatitis	[L23]	223	395	618
Allergic urticaria	[L50.0]	242	316	558
Drug photoallergic response	[L56.1]	1	4	5
Anaphylactic shock due to adverse food reaction	[T78.0]	19	25	44
Anaphylactic shock, unspecified	[T78.2]	335	384	719
Angioneurotic oedema	[T78.3]	395	468	863
Allergy, unspecified	[T78.4]	679	884	1,563
Anaphylactic shock due to serum	[T80.5]	3	6	9
Anaphylactic shock due to adverse effect of correct drug or medicament properly administered	[T88.6]	15	44	59
Desensitisation to allergens	[Z51.6]	35	31	66
<i>Total</i>		<i>5,566</i>	<i>6,383</i>	<i>11,949</i>

achieve the highest possible response rate, the study was carried out in schools, using either a standardised, written questionnaire, or, more frequently, a video questionnaire.

The prevalence of allergic rhino-conjunctivitis was highest in the centres of Nigeria, Paraguay and Malta, (30–40%). The prevalence of hay fever was very high in regions of Great Britain, New Zealand, Australia, Ireland and Canada, reaching around 30% in the populations studied, followed by most countries in North, Central, and South America. The prevalence of allergic rhino-conjunctivitis was lowest in Eastern European countries, in Indonesia, Romania, Lapland, Estonia, Georgia and Albania, each under 5% of the populations studied. In Austria, the prevalence of allergic rhino-conjunctivitis was around 10% in both centres studied, roughly mid-range of all the centres participating in the study [6].

The highest prevalence of self reported symptoms of asthma was recorded in British centres with up to 40%, as well as in centres in New Zealand, Australia, Ireland and Canada, followed by Malta, Finland, Germany, France and Sweden. The lowest prevalence of self reported symptoms of asthma was found in Greece, Georgia, Romania, Albania and Indonesia. Again the prevalence of self-reported symptoms of asthma in Austria was in the mid-range of all centres studied (12%) [6].

The prevalence of symptoms of atopic eczema was highest in the centres of Nigeria, Great Britain, Finland, Sweden, Ireland and New Zealand, as well as in one centre in Ethiopia. In Europe the prevalence of symptoms of atopic eczema was very high in the French centres. The prevalence of symptoms of atopic eczema was lowest in centres in Georgia, Taiwan, Indonesia, China and Alba-

nia. In Austria, the prevalence of symptoms of atopic eczema was below the median of the participating centres (5%) [6].

Prevalence of allergic sensitisation in Austria

Within the scope of the ECRHS study, 600 people in Vienna were tested for sensitisation to inhaled allergens via a prick test, total IgE and allergy specific IgE. 50.8% of the general population showed allergic sensitisation against at least one of the allergens tested following a prick test, even amongst subjects free of symptoms 39.3% showed allergic sensitisation. 61.4% of asthmatics and 86.3% of patients with allergic rhinitis showed sensitisation against at least one of the allergens tested. Increased total IgE (IgE > 25 kU/l) or specific IgE level were obtained in 63.4% of the general population and in 60.0% of those free of symptoms. Sensitisation was serologically verified in 76.1% of asthmatics and 84.9% of patients with allergic rhinitis. In the general population the most frequently documented inhaled allergens were grass pollen, followed by house dust mites, and cats [9].

In the American National Health and Nutrition Examination Survey (NHANES III) 10,863 probands were tested for sensitisation against different allergens by means of a prick test. In this study 54% of the American population were sensitised against at least one allergen [10]. These values are comparable to the 51% found in the Austrian population [9]. A study of 9–11 year-old children in Germany before the re-unification yielded a slightly lower prevalence of positive skin tests, 36.7% of children in former West Germany and only 18.2% children in former East Germany showed allergic sensitisation against at least one of six allergens tested [11].

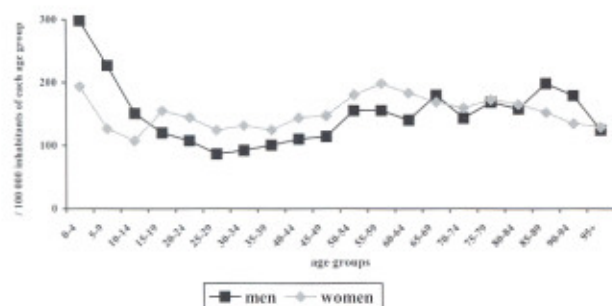


Fig. 1. Hospital discharges with allergies (diverse diagnoses) in Austria, 2004, by sex and age group per 100,000 inhabitants (own calculation – data source: Statistik Austria 2006)

Incidence of allergies in Austrian hospitals

An analysis of the hospital discharge statistics over the last few years allows a comprehensive insight into the burden that allergic diseases place on the intramural sector of the health system. In 2004, 11,949 discharges were registered from Austrian hospitals with allergic diseases as the main diagnosis. The most frequent diagnosis in hospital was asthma: 3,124 cases with "asthma, unspecified" ICD-10 [J45.9] and 2,129 cases with "predominantly allergic asthma" [J45.0]. 1,563 discharges in 2004 carried the main diagnosis "allergy, unspecified" [T78.4] see table 3.

Population groups particularly affected by allergies

Austrian data show that women are in general somewhat more affected by allergic diseases than men. This is apparent from both the self reported data (tables 1 and 2), as well as the hospital discharge data (6,383 women vs. 5,566 men). Conversely, however, hospital statistics show that amongst the children more boys than girls suffer from allergies and amongst the over 85-year-olds, men were also more affected than women (see Fig. 1). The difference between the sexes is especially distinct for the diagnoses "allergy, unspecified" (884 women vs. 679 men), "angioneurotic oedema" (468 women vs. 395 men), "allergic contact dermatitis" (395 women vs. 223 men) and "allergic urticaria" (316 women vs. 242 men). More men are affected by the diagnosis "hypersensitivity pneumonitis due to organic dust" (226 men vs. 174 women).

All age groups are affected by allergies, albeit to differing degrees. The Viennese Health and Social Survey documented peak prevalence amongst the 25–44 year-olds with 25.4% of men and 25.9% of women suffering from an allergy during the year before questioning. Looking at individual diagnoses in this investigation, the 25–44 year-old men were most frequently affected by allergic rhinitis, asthma, allergic skin rash and other allergies, whilst the 75+ year olds suffered more from urticaria and allergy related intestinal problems. With some exceptions the women were similarly affected, with the 25–44 year-olds suffering most frequently from allergic rhinitis, urticaria and allergic skin rash, whilst the 16–24 and 75+ year olds most frequently reported suffering from asthma. Allergy related intestinal problems were

reported most frequently by the 75+ year-olds and "other allergies" by the 16–24 year-olds (see tables 1 and 2) [1]. Examination of the data collected from the health examinations carried out by general practitioners revealed that the age group most affected by allergies was the 20–29 year-olds, in the Microcensus of 1999 it was the 15–29 year-olds [3].

International studies have also shown that the peak incidence of allergic diseases can be found amongst adolescents or young adults. One study of 82% of the population of Michigan found the peak prevalence of allergic rhinitis to be amongst the 16–24 year-olds (12% of men and 12.5% women) [12]. The cumulative prevalence of allergic rhinitis was highest amongst the 16–24 year-old men (16.3%), and amongst the 25–34 year-old women (15.3%). The prevalence of asthma was highest amongst the 10–15 year-old males at 6% (actual asthma) and 10.7% (cumulative prevalence) and amongst the 25–34 year-old females at 5.2% (actual asthma) and 7.4% (cumulative prevalence) [12]. In a study evaluating 3,101 people from the age of 2 years and over, prick testing was performed for a variety of allergens. It could be demonstrated that a positive reaction was most prevalent in the third decade [13].

From the hospital discharge statistics it could be derived that children and adolescents were most frequently treated as inpatients on grounds of an allergy diagnosis followed by patients between 55–59 year-olds (Fig. 1). In hospital, children were most often treated for "allergic purpura" [D69.9], "asthma" [J45], "status asthmaticus" [J46], "allergic and dietetic gastroenteritis and colitis" [K52.2] and "atopic dermatitis" [L20]. The illnesses "hypersensitivity pneumonitis due to organic dust" [J67], "allergic contact dermatitis" [L23], "angioneurotic oedema" [T78.3] and again "allergic and dietetic gastroenteritis and colitis" [K52.2] had their peak in the higher age groups.

Significant differences in prevalence could be determined between different socio-economic groups, with an increased prevalence being associated with a higher socio-economic status. The Viennese Health and Social Survey looked at four categories relating to professional level, jobs requiring 1) low level of qualification, 2) medium level of qualification, 3) a high level of qualification as well as 4) those in leading positions. Results showed that the highest prevalence of allergies could be found among those in jobs requiring a high level of qualification, with the prevalence of allergies being lowest amongst those in jobs requiring a low level of qualifications as well as those in leading positions [1]. Occurrence of symptoms due to allergies in relation to educational level were determined based on data from the microcensus. Increased symptoms due to allergies were associated with an increase in educational level. Amongst those with compulsory education alone and no apprenticeship merely 3.2% of men and 3.9% of women claimed to suffer from allergies, the same could be observed amongst those having completed compulsory education with an apprenticeship 3.6% of men and 4.5% of women. Among those graduating from high school or vocational high school 6.2% of the men and 5.5% of the women, and 5.0% of the men and 6.2% of the women respectively reported suffering from problems due

to allergies. Such symptoms were most frequently reported by college and university graduates with 7.1% of the men and 8.1% of the women [3].

A British cohort study found similar differences in prevalence of allergic diseases between different socio-economic levels. Odds for hay fever were 40% lower for the lowest social class compared with the highest [14]. A higher prevalence of allergic diseases could be observed in patients with higher levels of education, higher level of income, and at a higher socio-economic level in a number of other studies [13, 15, 16]. Why these socio-economic differences exist is largely unexplained. With the self-reported, non-objective prevalences these differences could in part be due to cultural and educational differences, which in turn influence awareness of allergic diseases and the reporting of symptoms of allergy [17].

Large regional differences in prevalence of allergies were found across Austria. The federal states with the highest percentage of allergy-related symptoms reported were Salzburg (6.1%) and Upper Austria (6.0%). Those in which the fewest people reported suffering from allergies were Burgenland and Carinthia (each 3.2%), and the Tyrol (3.9%) [3]. The hospital data showed that the highest numbers of cases with allergic diseases as the main diagnosis were registered in the Tyrol, Carinthia and Upper Austria with age standardised intensities of 169/100,000, 166/100,000 and 164/100,000 inhabitants respectively. Allergic diseases were diagnosed least frequently in the federal states of Burgenland, Vorarlberg and Lower Austria with age-standardised intensities of 97/100,000, 116/100,000 and 130/100,000 inhabitants respectively.

According to the microcensus the proportion of people reporting symptoms due to allergies was higher in districts with more than 20,000 inhabitants, up to 6.0% of men and 7.0% of women, than in districts with fewer than 20,000 inhabitants. In the smaller communities the proportion of allergic people decreased with increasing proportion of agriculture and was lowest in areas where the proportion of agriculture was greater than 15% (3.3% for both men and women). In Vienna, on the other hand, far fewer people reported health problems due to allergies than other communities with over 20,000 inhabitants.

A higher prevalence of asthma in urban areas was also a finding of the second National Health and Nutrition Examination Survey in the USA. In this survey 7.1% of children living in urban areas reported having asthma compared with 5.7% in rural areas ($p < 0.05$) [18].

Epidemiological trends of allergic diseases

Only a very limited amount of systemic data exists in Austria in regard of epidemiological trends of allergic diseases. The results of the military health examinations of national service recruits, providing records from 1986 to 2005, are, however, very informative. In addition, hospital discharge statistics are also available.

National service recruits are obliged to undergo a health examination principally to determine their fitness for military service. Self reported symptoms and diseases declared have, as far as possible, to be confirmed by a doctor. Military health examination records from

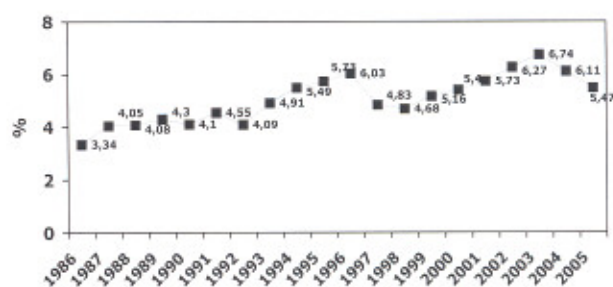


Fig. 2. Prevalence of hay fever among 18 year olds eligible for national service (own calculation – data source: BMLV, FGG8 2006)

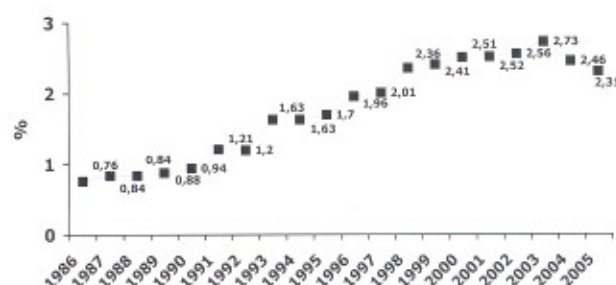


Fig. 3. Prevalence of asthma among 18 year olds eligible for national service (own calculation – data source: BMLV, FGG8 2006)

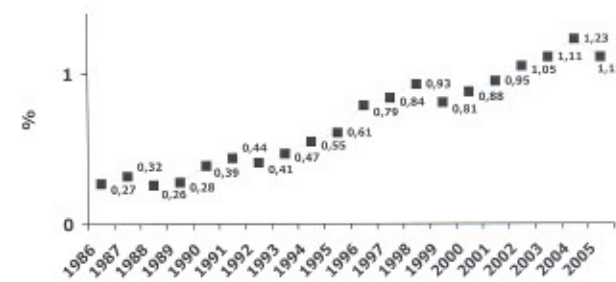


Fig. 4. Prevalence of atopic eczema among 18 year olds eligible for national service (own calculation – data source: BMLV, FGG8 2006)

1986–2005 show that the prevalence of allergic diseases amongst 18 year-old national service recruits has dramatically increased. The most substantial increase could be observed for bronchial asthma. The prevalence was 0.76% in 1986 and rose almost 4 fold over the years to 2.73% in 2003. The prevalence of allergic rhinitis doubled from 3.34% in 1986 to 6.74% in 2003. The prevalence of atopic eczema increased from 0.27% in 1986 to 1.23% in 2004. Since 2003 military health examination records show a clear decrease in the prevalence of allergic diseases. It is not clear whether these numbers indicate an actual turn in the trend or whether they merely reflect seasons with a low pollen count, see Fig. 2 to 4 [2].

Looking at the hospital discharge statistics, the number of main diagnoses with allergic diseases remained constant during the years from 2001 to 2004,

150/100,000 inhabitants in 2001 and 143/100,000 inhabitants in 2002. The diagnosis "vasomotor and allergic rhinitis" [J30] decreased in Austria from 2.1/100 000 in 2001 to 1.32/100,000 in 2004 as did the frequency of the diagnosis "asthma" [J45] which decreased from 90.5/100,000 in 2001 to 73.9/100,000 inhabitants in 2004. Even the diagnosis of "status asthmaticus" was significantly reduced (4.7/100,000 to 2.6/100,000 inhabitants) in this period. On the other hand, an increase in the main diagnosis "allergy, not specified" [T78.4], from 14.2 to 19.1/100,000 inhabitants between 2001 and 2004 was observed [2].

An increase in the prevalence of allergies has been documented in a large number of international studies. In the Annual Health Interview Survey the prevalence of self-reported asthma rose in the USA from 30.7/1,000 to 53.8/1,000 inhabitants over the years 1980 to 1993/94 [19].

A Scottish study determined an increase in the prevalence of hay fever in 8–13 year-old children rising from 3.2% in 1964 to 11.9% in 1989. During this time the proportion of boys increased from 49.4% in 1964 to 60.1% in 1989. It was discussed whether this increase in prevalence was attributable not only to improvements in diagnosis, but also to the prevalence of respiratory symptoms associated with the actual increase in prevalence of atopic illnesses, especially amongst boys [20].

An increase in atopic diseases was substantiated by studies, which not only relied on self reported occurrence of symptoms, but also included objective parameters. In addition to completing a questionnaire lung function parameters were measured and a provocation test was performed in a study of British school children. In this study an increase in prevalence of hay fever from 9% in 1973 to 15% in 1988 was established [21]. In an Australian study, carried out in two centres, bronchial hyper-reactivity was measured by means of a histamine provocation test and atopic disposition by means of a prick test, in 8–10 year-old school children. The prevalence of bronchial hyper-reactivity increased in both centres, doubling in the first centre, over the years 1982 to 1992, to 19.8%, and rising 1.4 times to 18.1% in the other centre. The prevalence of bronchial hyper-reactivity mainly increased in atopic children. The prevalence of atopy remained unchanged. The authors of this study concluded that exposure to higher doses of allergens led to an increase in abnormalities in the airways of atopic children, or that mechanisms formerly having a protective effect on the airways of atopic children had been modified by environmental factors [22].

A series of hypotheses try to explain the increase in incidence of allergic diseases. A complex interaction between genetic and environmental factors has been made responsible for the increasing trend in allergic diseases. Genetically sensitised people are more likely to develop an atopic disease in the presence of particular environmental and lifestyle factors. These environmental factors include viral infections, passive smoking, exposure to sulphur dioxide, dust, diesel exhaust and ozone. Other lifestyle factors, such as number of siblings, childhood infections, nutrition, growing up in an anthropologically oriented family or on a farm, were discussed

as possible influences in the development of allergic diseases. With respect to the primary prevention of allergies the consensus is that smoking during pregnancy and passive smoking during childhood should be avoided [23].

In summary, the first Austrian Allergy Report represents a comprehensive overview of the extent of allergies in the Austrian population and identifies particular higher risk groups. The internationally observed increase in epidemiological trends can also be seen in Austria. Health reports of this nature and scope are extremely useful in the field of public health since by this means public interest in and awareness of allergies can be increased and strengthened. In turn this could lead to an increased likelihood for early and adequate diagnosis and treatment of patients. Early medical interventions including immunotherapy may influence the natural course of allergic diseases, which in turn should result in an improvement in quality of life and, in the long term, savings in expenditure on therapy.

Acknowledgements

Our special thanks goes to the following Institutions who made their data available to us: Ministry of Defence, Austrian Armed Forces, Stadt Wien, MA 15 – Gesundheit und Soziales, Bereichsleitung für Strukturentwicklung, Statistik Austria. The First Austrian Allergy Report was supported by ALK-Abelló Allergie-Service GesmbH

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