

## Prevalence of rhinitis in Polish population according to the ECAP (Epidemiology of Allergic Disorders in Poland) study

Częstość występowania nieżytów nosa w polskiej populacji na podstawie badania Epidemiologia Chorób Alergicznych w Polsce (ECAP)

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### SUMMARY

The prevalence of allergic disorders, especially allergic rhinitis (AR), has dramatically increased in the past few decades and multicentre, standardized, randomized epidemiological studies are required to quantify this phenomenon in Poland.

**Aim:** The aim of the study was to estimate the prevalence of rhinitis and allergic rhinitis in Poland.

**Material and Method:** The ECAP study was conducted using the ECRHS II and ISAAC questionnaires translated into the Polish language and validated, in selected nine regions of Poland, including eight cities and one rural area. The respondents within the regions were selected by means of multistage proportional stratified random sampling based on the identity number (PESEL) as the operat. The survey was conducted in 20 454 subjects (response rate of 41.9%) and 18 617 questionnaires were valid. Approximately 25% of the subjects (n=4783) were subsequently evaluated by clinicians (response rate of 43.4%).

**Results:** Rhinitis was self-reported by 36.08% of the respondents (37.8% of 6-7 year olds, 34.5% of 13-14 year olds, and 36.0% of adults). The lowest prevalence rate was in the rural region (22.9%). Allergic rhinitis (AR) was self-reported by 22.54% of the respondents (23.6% of 6-7 year olds, 24.6% of 13-14 year olds, and 21.0% of adults). Again, the lowest prevalence rate was in the rural region (16.0%). AR was more frequent in males (24.0%) than in females (21.2%) (OR= 1.079; 95%CI: 1.044-1.116). AR was actually diagnosed by a clinician in 28.9% , including intermittent AR in 47.7% and persistent AR in 52.3%. Seasonal AR was diagnosed in 15.55%, and perennial rhinitis in 15.2%

**Conclusion:** Allergic rhinitis is common in Poland as it affects nearly 25% of the population and it is a major social problem. Standards of early detection and prevention of allergic rhinitis should be introduced.

**Hasła indeksowe:** epidemiologia, nieżyt nosa, alergiczny nieżyt nosa, ECAP, ECRHS II, ISAAC

**Key words:** epidemiology, rhinitis, allergic rhinitis, ECAP, ECRHS II, ISAAC

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### Introduction

Rhinitis is defined by the European Academy of Allergology and Clinical Immunology (EAACI) as inflammation of the nasal mucous membrane manifested by one or more typical clinical symptoms: watery rhinorrhoea, itching, sneezing, and nasal congestion and obstruction. According to its specific pathomechanism, rhinitis is classified into allergic rhinitis (AR), eosinophilic non-allergic rhinitis and infectious rhinitis. The updated ARIA (Allergic Rhinitis and its Impact on Asthma) report of 2008 proposes a new classification of AR based on the

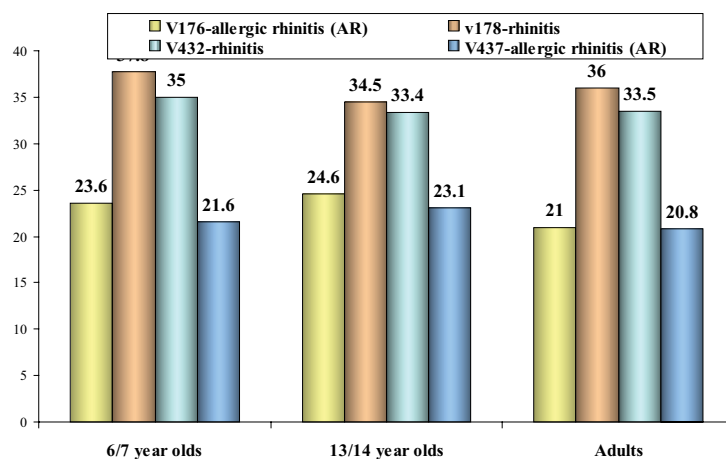
duration of clinical symptoms, into intermittent and persistent rhinitis with an additional division based on the severity of symptoms, i.e. mild and moderate-severe. The traditional classification of AR into seasonal and perennial may be still found in the literature. The symptoms of seasonal rhinitis are observed during the pollen season when the concentrations of allergens in the air are high. However, since the periods of pollination vary a lot depending on the geographical region, this classification is less universal [1, 2, 3].

These different definitions of rhinitis make comparison of epidemiological data difficult. Such reports however are very important and international medical organizations conduct numerous studies to assess the epidemiology of allergic disorders. The International Study of Asthma and Allergy in Childhood (ISAAC) conducted in the years 1992-2003 in children aged 6-7 years and 13-14 years and The European Community Respiratory Health Survey (ECRHS) conducted twice in the 1990s in adults aged 20-44 years are among the most comprehensive and highest regarded surveys. They have increased our knowledge of the causes of asthma, atopic rhinitis and eczema. What is very important they have allowed definition of standards required of epidemiological studies to evaluate the prevalence of allergic disorders and assess how advanced they are. Introduction of questionnaires including very simple questions allowed standardizing of diagnostic criteria to be used internationally [4, 5, 6].

Both studies have confirmed that nowadays rhinitis is one of the most common respiratory disorders, especially allergic rhinitis, which affects mostly people of productive age. Although, AR is not a life-threatening condition and is not associated with high mortality, it has a huge socioeconomic impact as it affects people at the ages normally associated with active employment or attending school. AR symptoms such as rhinorrhoea, swelling and sneezing significantly affect the patients' daily activities, their ability to get a good night's sleep, performance at work or school, and their psychological wellbeing. Additionally, chronic rhinitis is often associated with serious complications such as rhinosinusitis, nasal polyps, recurrent otitis media and adenoid hypertrophy with sleep apnoea and sleep disturbances. What is very important allergic rhinitis and bronchial asthma frequently co-exist and one hypothesis proposes that they are manifestations of the continuum of one disease and have the same underlying pathophysiological mechanism, with implications for the diagnosis and treatment of AR [7, 8, 9, 10].

The efficacy of prophylaxis and treatment largely depends on reliable epidemiological studies and ongoing evaluation of incidence and prevalence of the disease. Updated epidemiological information, i.e. data on incidence, prevalence and morbidity also allow evaluation of the extent of the disease in different age groups and geographical regions, estimation of the impact of such variables as race, gender and living conditions, and recognition of the risk factors – genetic and familial and environmental, both outside and inside the home [11].

An urgent need to complete and update epidemiological data on allergic disorders, which would include information from a large part of the country was perceived in Poland and a survey using validated and



**Fig. 1.** Mean prevalence (%) of rhinitis in Poland as assessed by ECRHS and ISAAC questionnaires (n=16817)

**RCRHS:** V176 15 Do you have any nasal allergies, including a runny nose caused by allergy to pollens (hay fever)?; V178 16 Have you ever had a problem with sneezing or a runny or blocked nose when you did not have a fever, a cold or the flu?

**ISAAC:** V432IM2 1 Have you ever had a problem with sneezing or a runny or blocked nose when you did not have a fever, a cold or the flu?; v437 IM2 6 Have you ever had hay fever (runny nose caused by allergy)

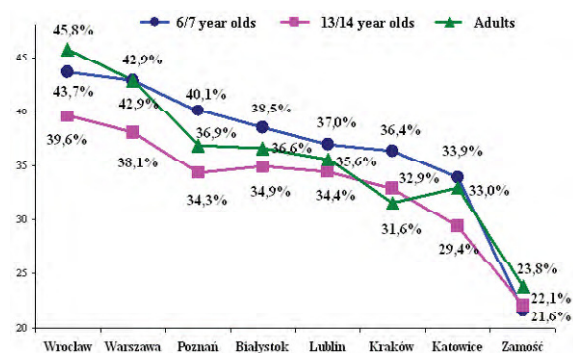
integrated questionnaires sourced from the ECRHS II and ISAAC met that need.

The aim of ECAP was to assess the prevalence of rhinitis and allergic rhinitis in a Polish population of children, adolescents and young adults using the methodology of ECRHS and ISAAC.

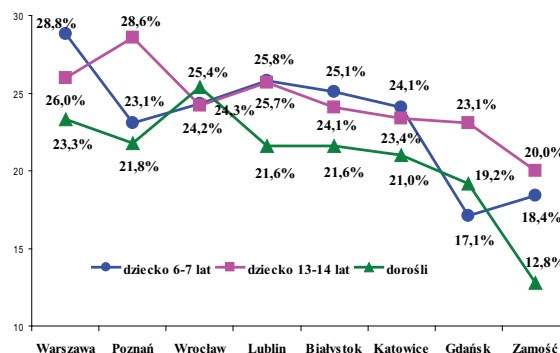
## Material and methods

In total, 22 703 subjects participated in the survey, including 20 454 completing the main questionnaire and 18 617 questionnaires were ultimately accepted as satisfying the quality criteria. As in the ECRHS II and ISAAC, the survey was carried out in children aged 6/7 years and 13/14 years and young adults aged 20-44 years. The main part of the survey was conducted in 4 510 6/7 year olds (24.2% of the total), 4 721 13/14 year olds (25.4%) and 9 386 adults (50.4%). Table 1 shows subjects in particular subgroups by gender. In the clinical part of the study, 4 783 respondents (25.7%) were examined by a physician.

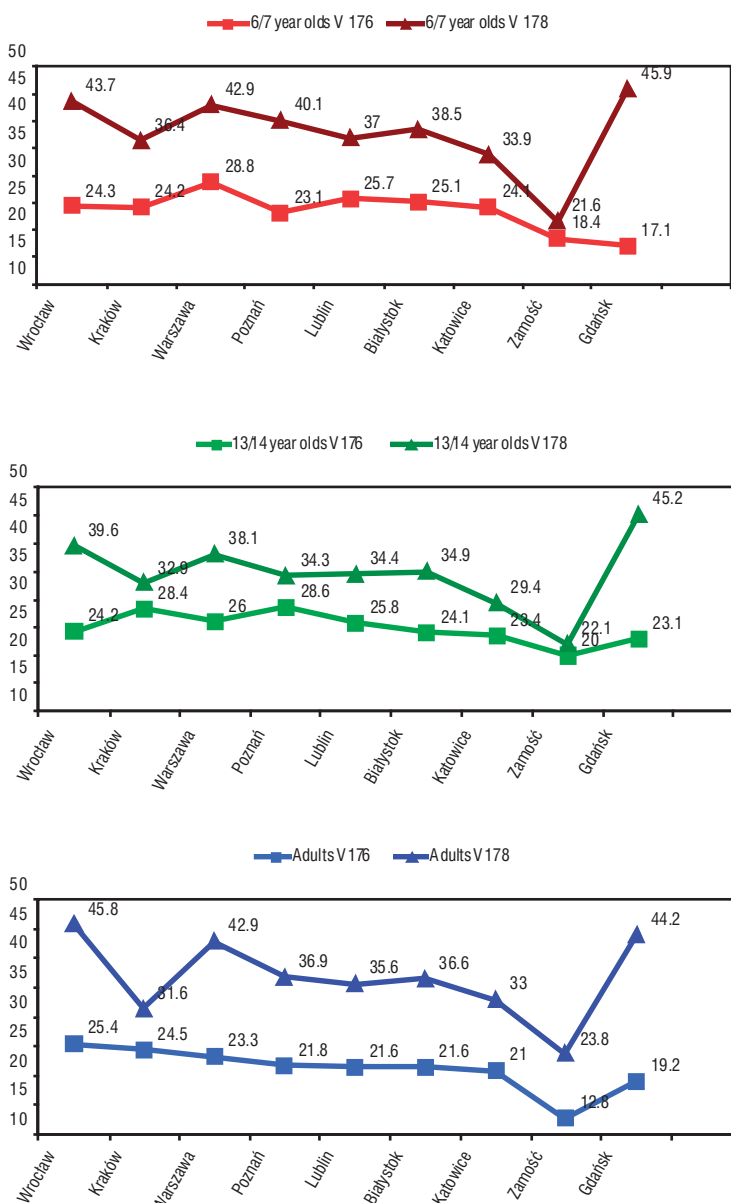
The study Epidemiology of Allergic Diseases in Poland (ECAP) is the continuation of the European Community Respiratory Health Survey II (ECRHS II) [5, 6] and its design also incorporates the principles and methodology of the International Study of Asthma and Allergy in Childhood (ISAAC) [4]. The ECAP survey was conducted in an adult population aged 20-44 years (the ECRHS standard) and in children aged 6/7



**Fig. 2.** Percent of 'Yes' answers to the question about the presence of rhinitis manifestations by age group and region (n= 18 617). "Zamość" describes the rural area



**Fig. 3.** Percent of 'Yes' answers to the question about the presence of AR manifestations by age group and region (n= 18 617).



**Fig. 4.** Comparison of the prevalence rates for rhinitis (V178) and allergic rhinitis (V176) (n=18 617)

years and 13/14 years (the ISAAC standard) living in eight of the largest Polish cities and in one rural area. It consisted of two essential stages of field studies: a survey using the ECRHS and ISAAC questionnaires translated into the Polish language and validated and a medical examination performed according to the ECRHS II standard in 25% of the ECAP respondents. The study regions were selected according to ECRHS guidelines (Polish cities with more than 150 000 inhabitants satisfied the criteria). Since people living in rural areas make up 39% of the Polish population, one rural area (the region of Zamość in the south-east of Poland) was included in the study. The study regions were deliberately chosen but the respondents within the regions were selected by means of multistage proportional stratified random sampling based on the identity number (PESEL) as the operat. The survey was conducted using the method of Computer-Assisted Personal Interviewing (CAPI) with the Personal Digital Assistant (PDA) devices. All data were automatically transmitted to the study centre by means of the GPRS system. To maintain the standards of accuracy and reliability of the survey, four-stage on-going quality control of the collected data was performed.

The data were collected in the years 2006-2008. Adult subjects were surveyed using the original ECRHS II questionnaire, translated into the Polish language and validated while another questionnaire, based on the ISAAC questionnaire, was designed to survey children. As it was necessary to compare findings in adults and in children, the two questionnaires were combined and used as one study instrument. The wording of questions concerning the occurrence of rhinitis and allergic rhinitis is similar in both questionnaires, ECRHS and ISAAC, and the answers are largely very similar (Fig. 1). That is why in all age groups the prevalence of rhinitis and allergic rhinitis was estimated based on answers to the ECRHS questionnaire alone. Rhinitis was recognized based on the answers to the question Have you ever had a problem with sneezing or a runny

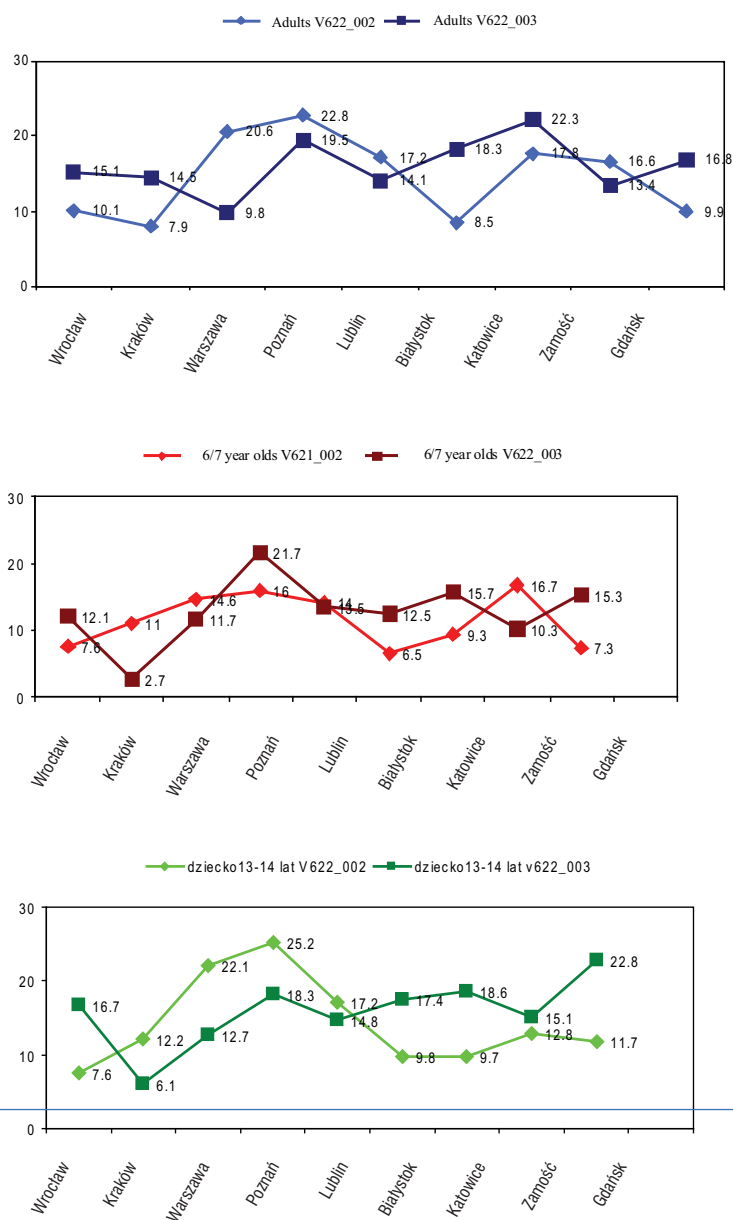
or blocked nose when you did not have a fever, a cold or the flu? (subsequently referred to as rhinitis). The prevalence of allergic rhinitis was assessed based on the answers to the question Do you have any nasal allergies, including a runny nose caused by allergy to pollens (hay fever)? (subsequently referred to as allergic rhinitis – AR).

Assessment in a clinic included a physical examination, spirometry, assessment of nasal patency by PNIF and skin prick tests. Physicians who evaluated the study subjects made their diagnosis using the standardized criteria based on the ARIA classification. Intermittent AR was diagnosed when the symptoms persisted for <4 days/ week or <4 weeks/year and chronic AR was diagnosed when the symptoms persisted >4 days/ week or >4 weeks/month. The ARIA classification is based on the criterion of duration and that is why the diagnoses of intermittent and chronic rhinitis were mutually exclusive [1]. To zdanie jest niezbyt jasne – JC Seasonal and perennial AR was diagnosed based on its duration and the period when the symptoms occurred.

The study was approved by the Bioethics Committee at the Medical University of Warsaw and the Main Inspector for Personal Data Protection.

## Results

The response rate, i.e. the percentage of people who agreed to participate in the survey, was 41.9%. Rhinitis proved to be the most common allergic disorder in the study population. The prevalence of rhinitis according to the answers to the question Have you ever had a problem with sneezing or a runny or blocked nose when you did not have a fever, a cold or the flu? differed in particular regions. The average reported prevalence of rhinitis was 37.8% (n=1705) in 6/7 year olds, 34.5% (n=1630) in 13/14 year olds and 36.0% (n=3383) in adults (the mean prevalence rate in the study population was 36.08%). The lowest prevalence of rhinitis (22.9%, n=470) was found in the rural area and it was nearly twice as low as in the city of Gdańsk where it was over 44% (n=826). Detailed data on the number of ‘Yes’ answers to the above question are presented in Fig. 2. The reported prevalence of AR symptoms was lower than that of rhinitis and on average was 23.6% (n=1065) in 6/7 year olds, 24.6% (n=1160) in 13/14 year olds and 21.0% (n=1972) in adults (the mean prevalence rate in the study population was 22.54%). Similarly to rhinitis, allergic rhinitis was the least frequently reported in the rural area (16%, n=328) compared to the mean prevalence rate for cities (22.9%, n=3869). Detailed data are presented in Fig. 3. The prevalence of rhinitis and allergic rhinitis in particular regions by the subjects’ age is shown in Fig. 4.



**Fig. 5.** Comparison of the prevalence rates for intermittent rhinitis (v622\_002) and persistent rhinitis (v622\_003) as diagnosed by allergologists (n=4783)

In total, 4783 people (1329 6/7 year olds, 1321 13/14 year olds and 2133 adults) were seen in clinics. Allergic rhinitis was diagnosed in 1385 people, i.e. 28.9% of all assessed subjects, including intermittent AR in 660 subjects (47.7%) and chronic AR in 725 subjects (52.3%). The distribution of intermittent and chronic AR in particular age group is presented in Fig. 5. Tests for seasonal and perennial AR were performed in 3597 subjects (table 2). Detailed data on seasonal and perennial allergic rhinitis diagnosed by study allergologists are presented in Figs 6 and 7. Comparison of prevalence rates of rhinitis and allergic rhinitis self-reported in the questionnaires and actually diagnosed by allergologists is shown in Fig. 8.

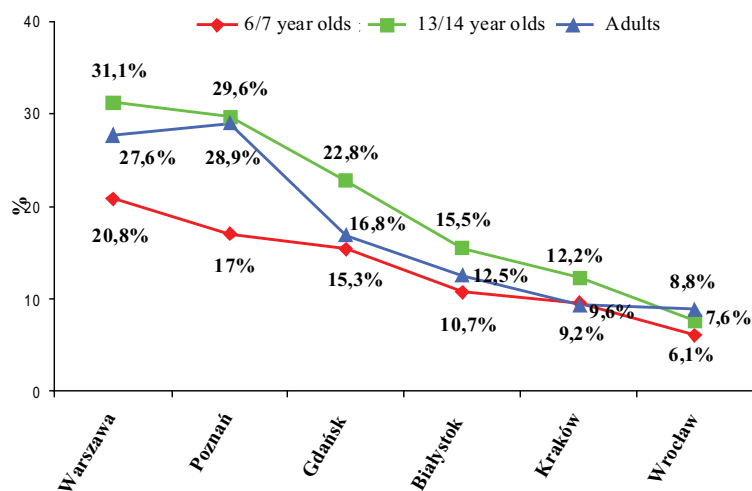


Fig. 6. Prevalence of seasonal AR as diagnosed by allergologists (n=2597)

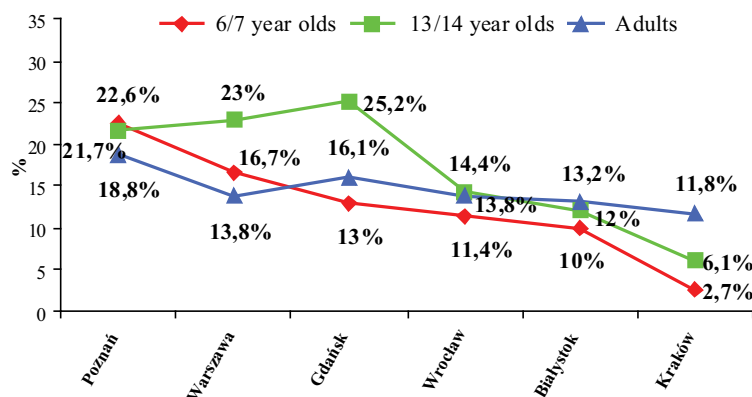


Fig. 7. Prevalence of perennial AR as diagnosed by allergologists (n=2597)

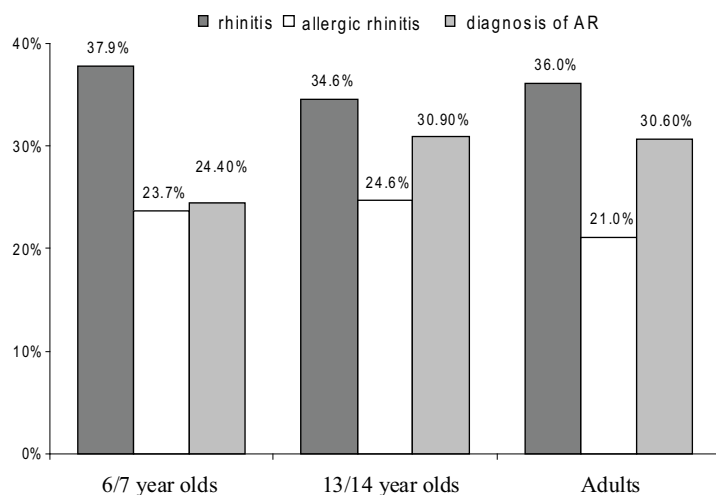


Fig. 8. 'Yes' answers to the questions about the manifestations of rhinitis and allergic rhinitis (n = 18 617) vs diagnosis of AR by allergologists (n = 4 783)

## Discussion

The ECAP survey is the largest epidemiological study of allergic disorders in Central and Eastern Europe and the first to be validated. It is also one of the largest studies worldwide to be conducted in one country. In total, 22 0703 people participated in the study and 18 617 questionnaires were included in the final analysis.

Since the ECAP used the same study instruments, i.e. standardized questionnaires and clinical evaluation, as the ECRHS and ISAAC it has been possible to compare the epidemiology of allergic disorders in Poland and in industrialized countries. The results show the current state of Poles' health and allow us to forecast how allergic disorders may develop in the very near future. Alas, the forecast is not optimistic.

In the ECAP study, allergic rhinitis accounted for a very large proportion of all cases of rhinitis, which confirms the opinion that allergy is the most common cause of rhinitis [12]. In the Polish population surveyed, especially in the rural area, in the majority of cases, the cause of rhinitis was allergic, probably due to higher concentrations of airborne allergens. The ECAP results confirm reports by other authors who consider allergic rhinitis the predominating manifestation of allergy. In the ECAP survey, in urban areas the prevalence rate of rhinitis was up to 45% while AR was reported by up to 28% of the respondents (mean prevalence rate of AR was 22.5%). In Europe, the mean prevalence of AR in adults estimated by ECRHS II was 20.9%. According to the ISAAC data in children and adolescents, it ranged from 1.4% in Albania to 39.7% in Portugal, mean 7.5% [4, 6]. Comparison with epidemiological data from other countries in different geographical regions, places Poland at the top of the list of the most hypersensitive societies. Rough estimates suggest a staggering figure of over 8.5 million patients suffering from allergic rhinitis. Assuming that two-thirds will need some kind treatment, either short- or long-term, this is a major socioeconomic problem and a real challenge for allergologists, ENT specialists, paediatricians and the entire health care system.

In most regions surveyed by the ECAP, allergic rhinitis was more frequent in children and adolescents than in adults. This trend is particularly worrying as it may reflect the growing incidence of upper respiratory allergy. Another concern is that AR is responsible for a 4 to 8-fold increase in the risk for asthma and untreated it may result in asthma progression and frequent exacerbations [7, 13, 14]. One possible conclusion from the ECAP is the need to persuade paediatricians and ENT specialists that early diagnosis and prevention of allergic rhinitis in children is mandatory.

The results of clinical evaluation confirm the survey findings and demonstrate a high prevalence of

**Table 1.** Composition of the study group by gender and age

		6/7 year olds	13/14 year olds	Adults 20-44 years	Total
Females	n	2218	2275	5518	10011
	%	49.2	48.2	58.8	53.8
Males	n	2292	2446	3868	8606
	%	50.8	51.8	41.2	46.2
Total	n	4510	4721	9386	18617

**Table 2.** Frequency of intermittent and persistent AR (n=4783) and seasonal and perennial AR (n=2597) as diagnosed by allergologists in particular age groups.

Age group	AR (n=4783)				AR (n=2597)			
	Intermittent		Persistent		Seasonal		Perennial	
	n	%	n	%	n	%	n	%
6/7 year olds	151	11.4	173	13.0	85	11.2	96	12.6
13/14 year olds	189	14.3	220	16.7	134	17.9	135	18.1
20-44 years	320	15.0	332	15.6	182	16.7	161	14.8
Total	660	13.8	725	15.2	401	15.55	392	15.20

allergic rhinitis in the Polish population. Differences in diagnosis, niejasne especially in adults, may be due to two factors. AR is frequently underdiagnosed in adults because patients do not consult a doctor and treat themselves with OTC products, and as a result their condition remains undiagnosed by a doctor. On the other hand, as frequently emphasized in reports of epidemiological studies, people who are ill are more willing to participate in the clinical evaluation part of a study, which may give a false picture of the actual morbidity.

Considering all that, it must be realized that allergies, especially allergic rhinitis, are a serious medical, social and economic problem.

## Conclusions

Rhinitis affects on average a third of the Polish population while allergic rhinitis is found in 25%. Both are very common in children, adolescents and young adults and it is necessary to make paediatricians, ENT specialists and health care managers in Poland aware of this very important medical and socio-economic problem.

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