



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

의학석사 학위논문

**Trends in the prevalence of chronic  
allergic diseases in Korea: Claim  
data analysis of Health Insurance  
Review and Assessment Service**

건강보험 심사평가원 자료를 통하여  
분석한 만성 알레르기질환의 유병율 추이

2015년 2월

서울대학교 대학원  
의과대학 의학과 면역학전공  
김병근

## **Abstract**

# Trends in the prevalence of chronic allergic diseases in Korea: Claim data analysis of Health Insurance Review and Assessment Service

**Byung Keun Kim**

**Immunology, Department of Medicine**

**The Graduate School**

**Seoul National University**

**Background:** Although the prevalence of chronic allergic diseases has increased worldwide for several decades, some developed countries recently have shown a slowdown in the incidence of allergic diseases. The aim of this study was to evaluate the recent trends in the prevalence of asthma and other chronic allergic diseases in Korea.

**Methods:** From a database of approximately 50 million beneficiaries in the Korean National Health Insurance (NHI) and Health Insurance Review and Assessment Service (HIRA), data-sets of patients with diagnoses of atopic dermatitis, allergic rhinitis, and asthma were extracted. We analyzed the annual prevalence of asthma, allergic rhinitis, and atopic dermatitis in Korea from 2009 to 2013.

**Results:** The prevalence per 1,000 people of atopic dermatitis, allergic rhinitis, and asthma in 2013 was 20.3, 127.3, and 39.4, respectively. When divided into 10-year age groups, the prevalence of all three diseases was highest in the age group under 10. The prevalence of atopic dermatitis and allergic rhinitis had a decreasing pattern with older age, but for asthma, it showed an increasing pattern for the age group 30-39 and another peak for the age group 70-79. During the study period from 2009 to 2013, the prevalence of allergic rhinitis steadily increased in all age groups including the fastest growth in the age group under 10 with an annual average growth rate of 3.2%. In contrast, the prevalence of asthma and atopic dermatitis did not increase during the same period and instead showed a decrease in the age group under 10.

**Conclusion:** We analyzed the prevalence of chronic allergic diseases in Korea based on nationwide health insurance data. While the prevalence of allergic rhinitis increased for the past 5 years, the prevalence of asthma and atopic dermatitis did not show an increase. These results suggest that the prevalence of chronic allergic diseases in Korea might have plateaued currently.

**Key words:** Prevalence, Asthma, Allergic rhinitis, Atopic dermatitis

**Student Number:** 2010-21846

# Contents

Abstract (English) .....	i
Introduction .....	1
Methods .....	2
Results .....	4
Discussion .....	13
References .....	18
Abstract (Korean) .....	iv

## List of tables

Table 1. ....	7
---------------	---

## List of Figures

Figure 1. ....	8
Figure 2. ....	9
Figure 3. ....	10
Figure 4. ....	11
Figure 5. ....	12

# Introduction

The burden from chronic allergic diseases has been on a rise worldwide for the past several decades, known as the so-called ‘allergic epidemic’ (1, 2). However, many researchers are asking whether this trend is ongoing nowadays. Actually, the extent of increase in allergic diseases must vary by country and diseases. Some reports have already shown a decreasing or stationary prevalence of allergic diseases in children in Western developed countries despite the still increasing prevalence of allergic diseases in developing countries where the prevalence had been very low in the past (3).

With this background, it is important to obtain current epidemiologic data on chronic allergic diseases in order to make a long-term plan. To get precise epidemiologic data, a study based on a large standardized population is required. However, a large-scale epidemiologic study is very expensive as well as difficult to perform. In addition, the heterogeneity of the study methods makes it difficult to integrate the results of previous studies for assessing changes over time. While the International Study of Asthma and Allergies in Childhood (ISSAC) Phase Three was announced and is full of suggestions about the epidemiology of allergic diseases in children (3), data are scarce about the prevalence of allergic diseases in adults.

In Korea, a nation-wide disease database that includes the people of the whole country is available because a single mandatory government-established insurance system was established in 1989. We evaluated the recent trends in the prevalence and economic burden of atopic dermatitis, allergic rhinitis and asthma in Korea with data of the HIRA.

# Methods

## 1. Data source

Korea has adopted a National Health Insurance (NHI) program, which is a nationwide health insurance system for the residents of Korea. All people should be insured through the NHI program, and all medical institutions are engaged in the same program. Although there are several optional medical insurances, the NHI program is the only mandatory health insurance system regulated by the law. In 2013, 98.0% of the total population in Korea was registered in the NHI program, and all physicians must submit billing claim to the NHI program with diagnostic codes in Korea.

Health Insurance Review & Assessment Service (HIRA) is the organization that conducts reviews and assessments of medical fees paid by the NHI program. The HIRA reviews all concerns about the expenses of the NHI program. Therefore, all the information of the insured who receive medical treatment must gathered by HIRA. The HIRA compiles a summary of nationwide annual statistical data on its homepage ([www.hira.or.kr](http://www.hira.or.kr)), which contains the number of patients who visited a medical institution and healthcare cost for the past five years. Age data can be retrieved as 10-year age groups. Medical cost data from the HIRA includes expenses paid to clinics and hospitals such as the charge for the doctor's examination, tests, prescriptions, and medicines during inpatient care but does not include expenses paid to facilities outside of hospitals such as pharmacies for medicines prescribed in outpatient clinics. Demographic data including total and 10-year population registered by the NHI by year were extracted from the Korean Statistical Information Service (KOSIS) homepage ([www.kosis.kr](http://www.kosis.kr)).

## 2. Data analysis

The data does not include any identification information from the individual patients. We used diagnostic codes from the International Classification of Diseases-10 (ICD-10) to extract specific data about atopic dermatitis, allergic rhinitis and asthma from the HIRA homepage. The diagnostic codes are L20 for atopic dermatitis, J302, J303, and J304 for allergic rhinitis, J45 and J46 for asthma. The prevalence was determined by the number of patients with each diagnostic code divided by the total registered number of patients by the NHI. Means with standard error were used to determine changing trends. Other statistical values such as confidence interval or p-value were not mentioned because of the large sample size close to the total population of Korea.



## Results

### 1. Recent changes in the prevalence of three major allergic diseases in Korea

Table 1 shows the annual number of patients and costs at medical institutions for atopic dermatitis, allergic rhinitis and asthma in Korea. The prevalence of three diseases in 2013 was 20.3, 127.3 and 39.4 per 1,000 people, respectively. The prevalence was higher in women than in men, especially for allergic rhinitis. The prevalence of allergic rhinitis increased continuously yearly 3.3% on average for the past five years while that of the other two diseases slightly decreased during same period (Figure 1).

### 2. Recent changes in the prevalence of allergic diseases in 10-year age groups

For atopic dermatitis, the age group under 10 years old showed the highest prevalence among the 10-year age groups. In 2013, the prevalence of atopic dermatitis in the age groups under and over 10 years old was 110.3 and 11.5 per 1,000 people, respectively. Especially in people over 30 years old, the prevalence of atopic dermatitis was below 10 per 1,000 people. The temporal trend in the prevalence of atopic dermatitis for 5 years was generally stationary, on average -1.5% and 0.3% yearly change for under and over 10 years olds. (Figure 2-a).

The prevalence of allergic rhinitis in the age group under 10 years old was also the highest among the 10-year age groups. The prevalence in the under and over 10 year-olds was 383.5 and 102.7 per 1,000 people in 2013. The former increased yearly by a steep 12.4% on average, but the latter

showed little change (yearly 2.2%) for the past 5 years. In contrast to atopic dermatitis, the prevalence of allergic rhinitis was still above 100 per 1,000 people in people over 30 years old groups (Figure 2-b).

In contrast with the other two diseases, the prevalence of asthma showed two peaks in the 10-year age groups. The prevalence in the under 10 years old group was 153.7 in 2013. That of asthma was the lowest in the 20-29 years old group and stationary for the 30-39 and 40-49 years old groups ranging from 14.2 to 20.5 per 1,000 people. The 50-59 years old group showed a distinct increase in asthma, and there was another peak in the 70-79 years old group, of which the prevalence was 69.1 per 1,000 people. Regarding the trend in the past five years, the prevalence of asthma in the under 10 years old group showed more change than in all the other age groups (yearly -5.3% and -3.7% on average, respectively) (Figure 2-c).

Figure 3 shows population structures of the total population and the patients of three allergic diseases. As mentioned above, the patient population for the under 10-year old group was the largest for atopic dermatitis, allergic rhinitis and asthma. Except for that, the number of allergic rhinitis patients had a similar pattern as the total population structure. In contrast, the number of patients for allergic dermatitis decreased with older age and number of patients for asthma was the largest in the 50-59 years old group.

### 3. Asthma exacerbation

We analyzed exacerbation of asthma with the disease classification code J46. While the prevalence of asthma has not much changed in the past five years, the prevalence of asthma exacerbation has been increasing yearly by 22.6% on average in the same period (Figure 4-a). The increases in asthma

exacerbation was remarkable in past two years and in the older age group over fifties, along with the trend in the prevalence of asthma in over 50 years old groups (Figure 4-b). It can be confirmed that the increase of asthma exacerbation is definitely more severe at older ages, and there is little difference in the under 10-year old group (on average, yearly -2.49% change for the under 10 years old and 30.0% for the over 50 years old group). Furthermore, this trend is more distinct with over time for the past recent five years (Figure 4-c).

#### 4. Economic burden

Total cost paid to medical institutions by the NHI program was 32.2, 183.1 and 146.3 million dollars for atopic dermatitis, allergic rhinitis and asthma, respectively (Table 1). Costs for atopic dermatitis have changed little for the past five years while those of allergic rhinitis have been increased along with the change in prevalence (yearly 2.1% and 6.5% change on average, respectively). The costs of asthma have been decreased yearly by 4.1% for the past five years (Figure 5-a). Instead, the medical costs per person were 31.6, 27.8 and 74.5 dollars, respectively, and have been changed less for the past five years (yearly 3.1%, 2.1% and 0.2% on average for each disease). Therefore, the change in total medical costs spent by medical institutions seems to mostly come from the change in prevalence (Figure 5-b). Similar results are seen when divided by the 10-year age groups.

**Table 1 Annual number of patients and costs at medical institutions (USD) for atopic dermatitis, allergic rhinitis and asthma in Korea from 2009 to 2013 (Dollars).**

	2009		2010		2011		2012		2013	
	Patients	Costs	Patients	Costs	Patients	Costs	Patients	Costs	Patients	Costs
Atopic dermatitis	1,051,747	29,692,819	1,049,290	30,813,452	1,010,527	30,508,568	981,028	29,760,316	1,015,186	32,231,457
Allergic rhinitis	5,455,725	145,069,790	5,759,879	156,068,692	5,783,520	160,654,023	6,269,286	174,762,956	6,361,676	183,072,673
Asthma	2,377,683	175,184,735	2,245,778	168,862,394	2,264,275	170,053,219	2,181,144	156,244,052	1,969,078	146,268,832

Figure 1. Prevalence of allergic diseases in Korea

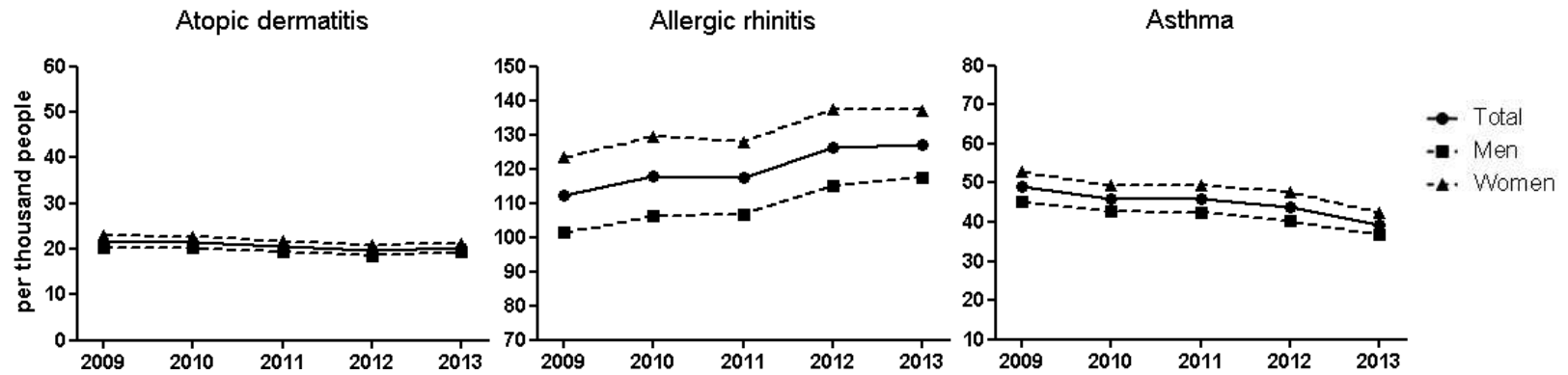
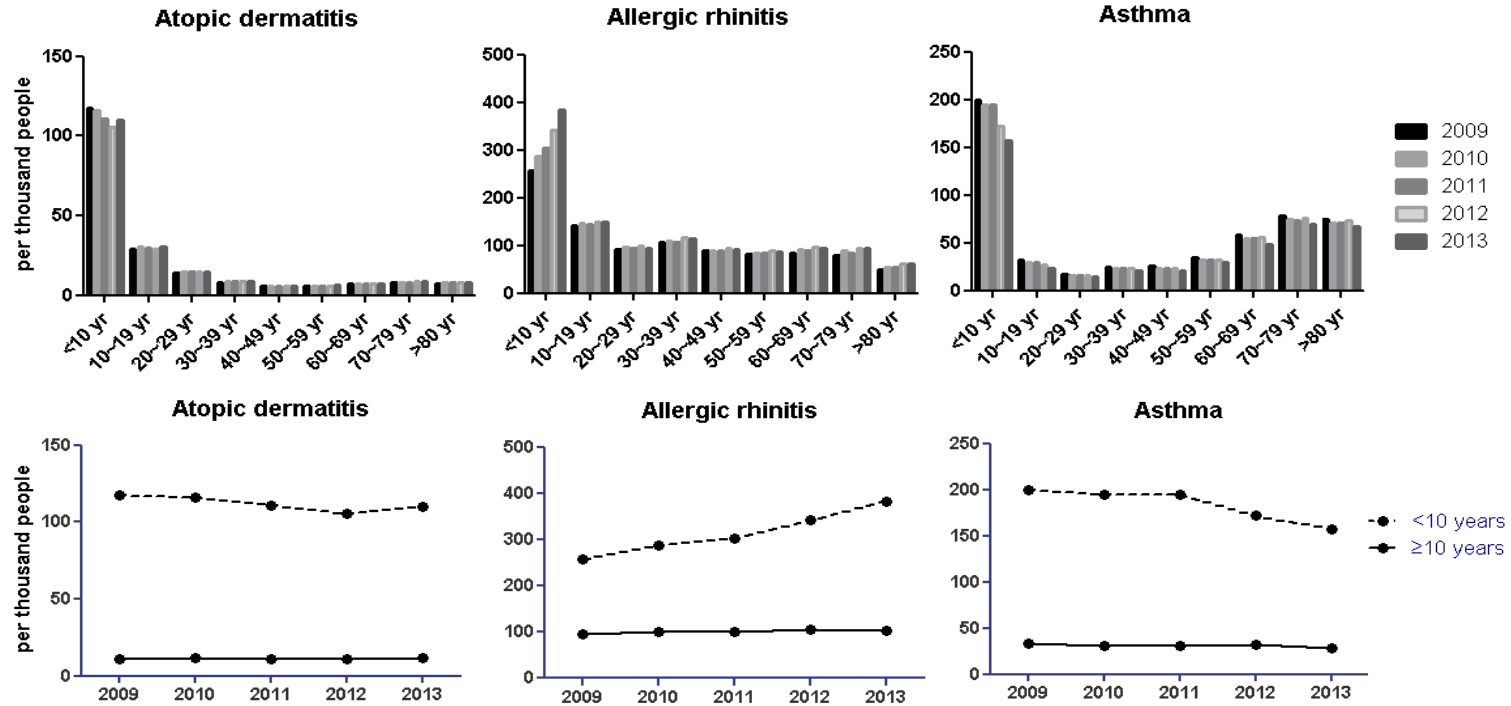


Figure 2. Prevalence of allergic diseases divided by 10-year age groups



**Figure 3. Population structure of Korea and patients of allergic diseases**

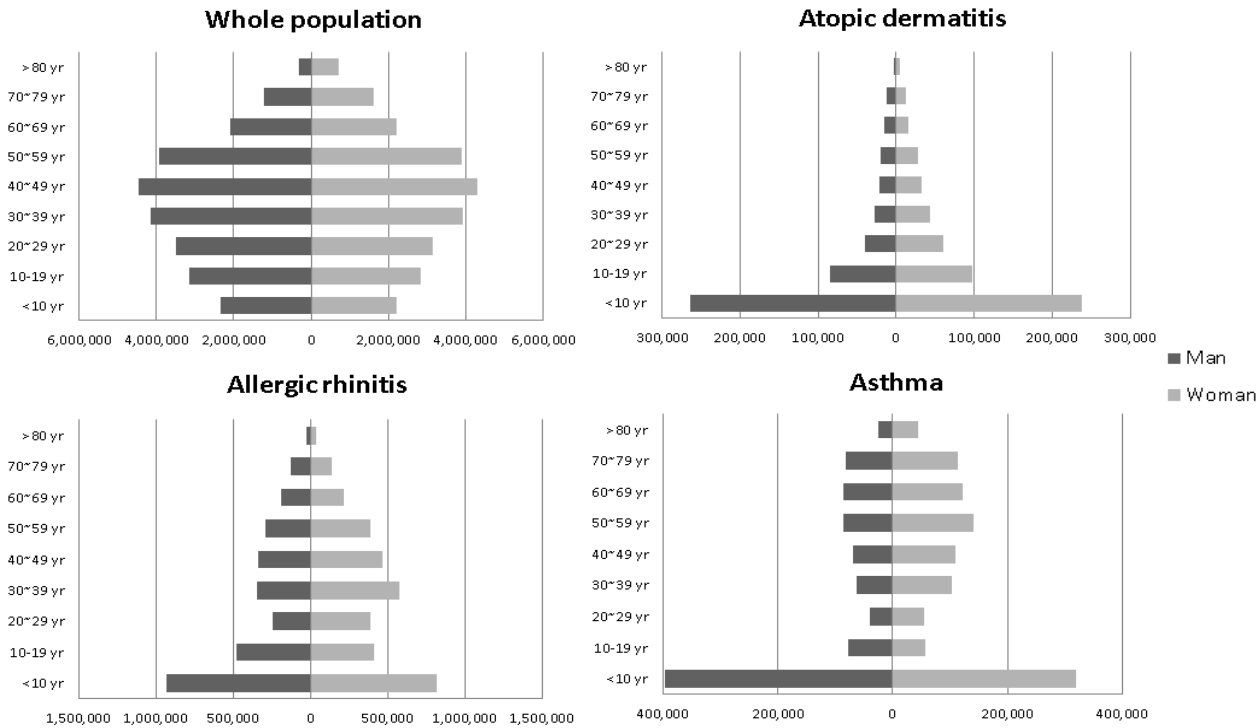


Figure 4. Asthma exacerbation (Disease classification code J46)

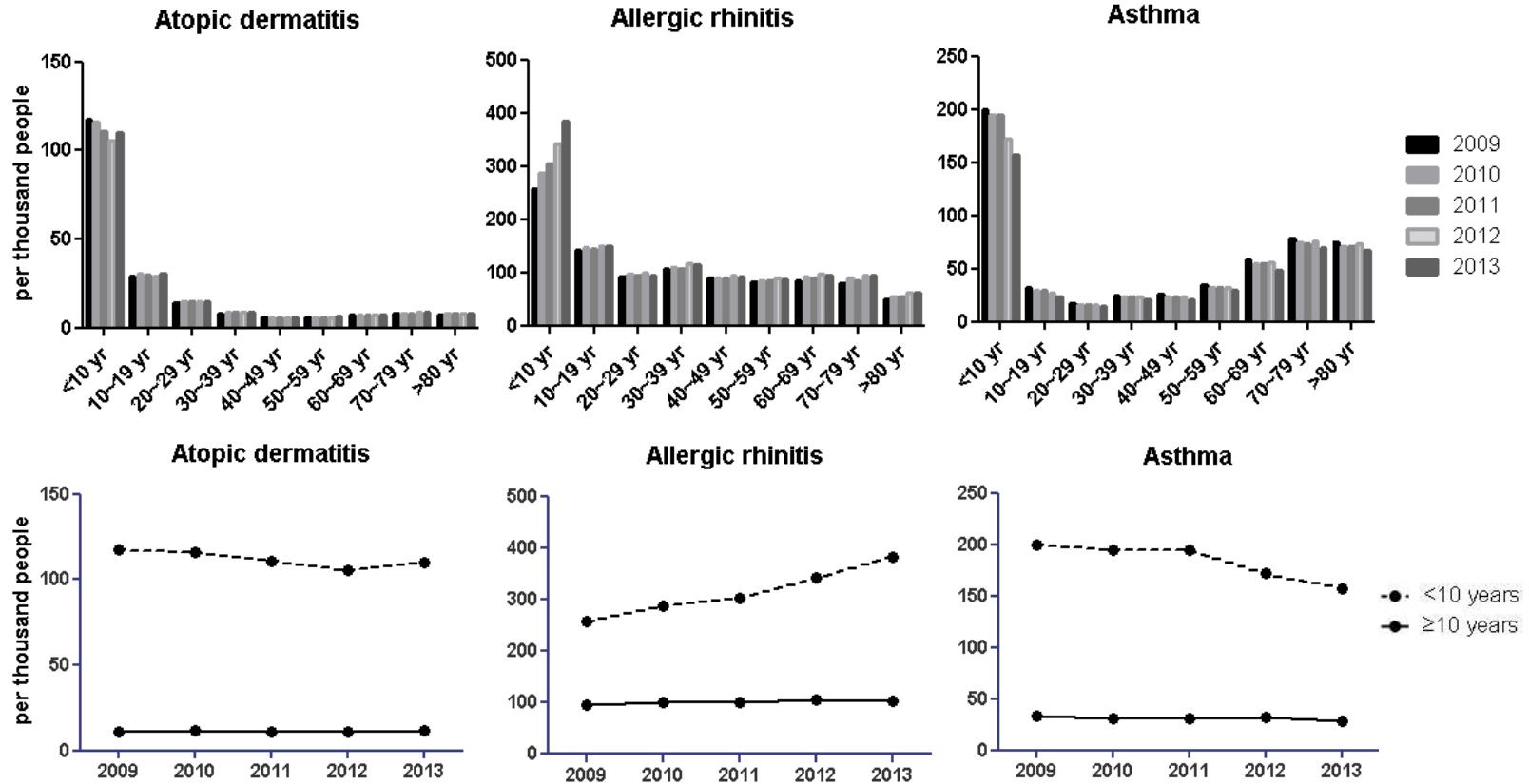
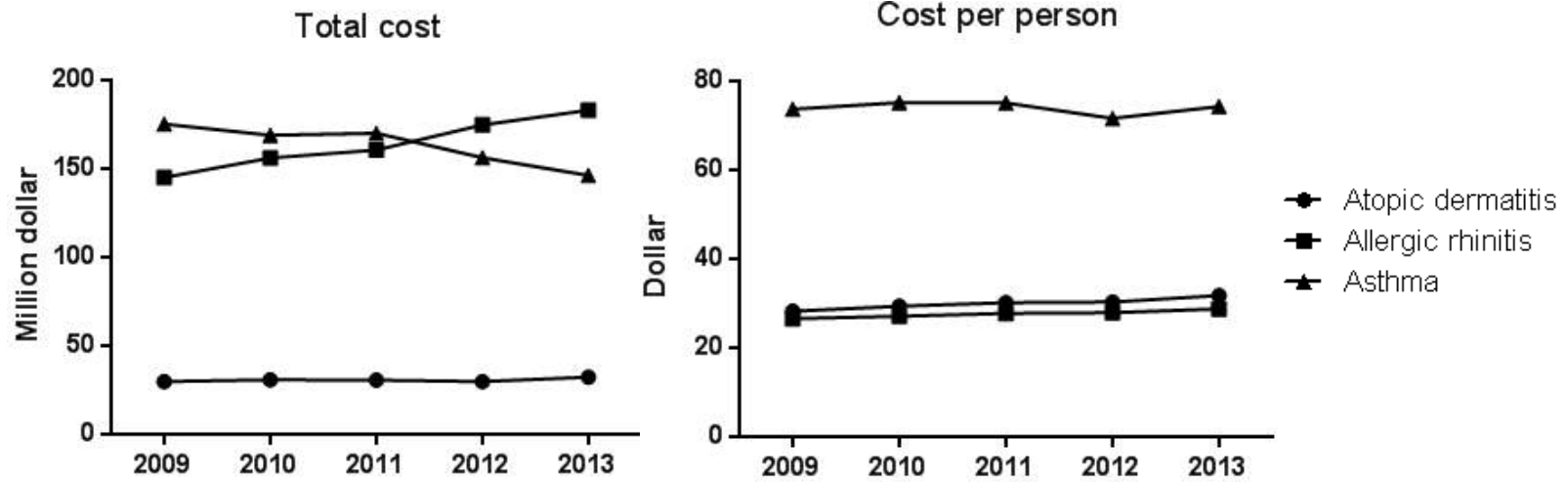




Figure 5. Total cost and cost per person paid to medical institutions by NHI



## Discussion

In many studies, the prevalence of chronic allergic diseases has been increasing for several decades, known as the so-called ‘allergy epidemic’ (1, 2). Especially in the Asia-Pacific region, the increasing tendency in three diseases seems to be obvious (4). However, the extent of the increase in allergic diseases must vary between countries. Some reports investigating children have already shown a decreasing or stationary prevalence of allergic diseases in Western developed countries despite the still increasing prevalence of allergic diseases in developing countries where the prevalence had been low in the past (3). Nevertheless, there are few reports on the changing trends in the prevalence of adult allergic diseases.

There are many variations in not only the methodologies used to survey prevalence but also in the definitions used to define allergic diseases in epidemiologic surveys. This heterogeneity makes it difficult to integrate previous studies to examine time courses and trends in prevalence change. The most important factor in analyzing the annual prevalence change of chronic allergic diseases is that a study must be done with standardized procedures and use the same methods every year. We used data from the HIRA which have very high consistency and quality because the data are gathered with the same disease definitions and methods at all times. Thus, the changing trend in the prevalence of allergic diseases must be meaningful using this data. Furthermore, the HIRA data cover almost the entire population of Korea. Therefore, our study represents nationwide trends, unlike several epidemiologic surveys concerning only a particular area. We analyzed the prevalence of atopic dermatitis, allergic rhinitis and asthma for the past five years. This study is the first of its kind to suggest that the prevalence of chronic allergic diseases in Korea might have plateaued or decreased.

To review previous literature, atopic dermatitis is a chronic, pruritic, inflammatory dermatosis that affects up to approximately 25% of children and 2-3% of adults (5). For children, eczema prevalence has been decreasing in some previously high-prevalence areas in the developed world in contrast to the increasing tendency in developing countries (6). In adults, the prevalence of atopic dermatitis is quite low ranging from 2-3%, and time trends seem to be stationary which have not been studied enough (7). In Korea, the overall prevalence of atopic dermatitis is assumed to be 16.9-17.9% in preschool children and 2.6-7.1% in over 10 year-olds by dermatologists' examination recently, which decreased significantly with age (8, 9). In our data, the prevalence of atopic dermatitis in the under and over 10 year-old group was 11.0% and 1.1%, respectively. The prevalence did not show severe changes in the past five years in both groups.

The prevalence of allergic rhinitis also is increasing in areas with low or medium levels of prevalence in the past, but it seems to be plateauing or even decreasing in high prevalence areas (10). The ISAAC studies provide extensive data on allergic rhinitis in children. Excluding highly-deviated countries, the worldwide prevalence of allergic rhinitis is assumed to be 3-24% in 6-7 year-old children and 4-28% in 13-14 year-old adolescents (3). On the other hand, there is no worldwide epidemiologic study in adults, and the results of prevalence surveys of some countries tend to be very diverse, ranging from 3% to 34.5%, due to their various definitions (10). In Korea, according to the most recent survey, the prevalence of allergic rhinitis was reported as 34.5% in preschool children and 16.2% in adults (8, 11). In our study, the prevalence of allergic rhinitis was 38.4% and 10.3% in the under and over 10-year olds. Allergic rhinitis in the under 10 year-old group was the only disease group that steeply increased throughout our entire study

Asthma is one of the most common diseases in the world. The prevalence of

asthma increases with urbanization, industrialization and lifestyle change (12). However, there are several reports that show international differences in asthma prevalence have reduced in recent years; asthma prevalence is increasing in Asia, Africa and South America while decreasing in English speaking countries and Western European countries (1, 13-15). Between phase I and II of the ISSAC study with an interval of 5-10 years, the mean symptom prevalence of wheezing in the last one year increased slightly from 13.2% to 13.7% worldwide but a marked decrease was observed in English speaking countries in the case of children and adolescents (14). Although there are only a few studies that show the changing trend of asthma prevalence in adults, some investigators report no increase in asthma prevalence based on the symptoms in a young adult cohort (16, 17). In Korea, the prevalence of asthma during childhood seems to be 5-8%, and there was a decrease in the 6-7 year group and a plateau in the 13-14 year group during a five year interval (3). In the last survey performed in 2008, the prevalence of adult asthma in Korea was estimated to be 2% (18), and there is no study mentioning the changing trend in prevalence. In our data, the prevalence of asthma was 15.4 and 2.8% in the under and over 10 year old group, respectively. Both had a decreasing prevalence during the past five years, and the changing trend in asthma prevalence in Korea seems to have plateaued like Western countries.

A notable finding in this study is the asthma prevalence in the elderly. In our data, the asthma prevalence becomes higher with age in the more than fifties groups, and the prevalence in the over 60 year-old group was 5.8%, which showed little change for the past five years. In the literature, the prevalence of asthma in the over 65 year olds is about 4-13% worldwide and 3.7-8.2% in Korea, and it has, in contrast to other allergic diseases, been increasing for the past few years due to enhanced longevity. In addition, asthma mortality is still high in older adults (18-21), and the high prevalence and increasing trend of asthma exacerbation shown in our

data can be explained in this context. Although most countries in the Asia-Pacific area have shown a high aging tendency and Korea is one of them based on previous studies (18, 22, 23), our study is the first report that shows a decrease in asthma prevalence in older age and the elderly for the past five years, and it is must be meaningful.

In our data, total costs paid to medical institutions by the NHI program was 32.2, 183.1 and 146.3 million dollars for atopic dermatitis, allergic rhinitis and asthma, respectively. Each benefit was ranked 158th, 26th and 34th by 3-digit code classification (24). Medical costs per person for the past five years have changed little. Therefore, the change in total cost for the three diseases shows a similar pattern to the prevalence change in past five years, and it shows a similar result when divided by the 10-year age groups. In other literature about asthma, the proportion of cost reimbursed by the NHI is for about 22.5% of the total expenditure, and costs for outpatient medication and complementary medicine account for 12.2% and 64.7%, respectively, in 2003 (25). Regarding that, we can assume that the total cost for asthma in Korea could reach 650 million dollars in 2013 although the cost evaluation in our study includes only the expenditure paid to medical institutions. We could not make an assumption on the total costs for atopic dermatitis and allergic rhinitis because there are no reports concerning that.

As mentioned above, chronic allergic diseases have rapidly increased for the past several decades worldwide with urbanization and industrialization (2, 10, 26). However, there are several studies suggesting that the prevalence of chronic allergic diseases has decreased or plateaued recently in some countries, especially in children and young adults (1, 3, 6, 14, 16, 17). There are some hypotheses explaining the cause of this phenomenon, including the hygiene hypothesis (27). In addition, there are many possible risk factors for allergic diseases such as allergen

levels in the air, diet change, smoking, vaccination level, exposure to pets, socioeconomic status, etc. However these risk factors as well as a single hypothesis cannot fully explain the phenomenon. Therefore, it is more comprehensible to explain the changing trends with a whole environmental change of a specific society. For example with the ISSAC trial, discordance in prevalence in the 6-7 and 13-14 year age-groups was explained with the collapse of the communist system of Europe in the 1990s (3). In this sense, the rapid transition of Korean society can be a clue explaining our data. Korea experienced extremely rapid urbanization and industrialization from the 1960s to 1990s. The urbanization rate in Korea was over 80% in 1995, and it is now approximately 90%, the second after Luxembourg among OECD countries. After the 2000s, the urbanization and industrialization of Korea was almost completed, and Korea has been experiencing post-industrialization up to now (28, 29). Korea is now one of the most well-developed country and known for highly prevalent allergic diseases among the Asia-Pacific region (4, 13), and the environment and lifestyle of Korea have become similar with those of western countries. If the rapidly increasing prevalence of chronic allergic diseases up until recently in Korea reflects the rapid urbanization and industrialization before the 2000s, the plateaued prevalence of chronic allergic diseases shown in our data can be explained by the stabilization and post-industrialization of Korean society after the 2000s, which is similar to the pattern of several western countries.

Our data have some limitations. First, the diagnoses of chronic allergic diseases by each doctor cannot be perfectly uniform in the actual clinical field. There are several factors to diagnosis allergic disease and order of priority among them might be different between doctors. However, there was no major change in diagnosis three diseases in same period and the coherence in diagnoses by all doctors must be maintained. Second, there is a gap between the disease prevalence

and the patient who goes to clinic. Several surveys report that only 25-74% of patients with asthma symptom visit clinic or hospital and get asthma treatment (30, 31). Therefore the prevalence in our data might be underestimated. Nevertheless, it is obvious that the conditions of our data in each year are same and therefore, time trends of prevalence of chronic allergic disease we analyzed are still valid. Third, the data we used are for insurance claim, not for epidemiologic study. As the result, it can be biased with change in policy. In 2012, the NIH designated several disease codes including asthma (J45) as 'mild disease', and the coverage rate of medicine from NIH was lowered. Furthermore, there are some cases that the NIH does not pay for the more expensive medications such as combination devices of inhaled corticosteroid and long acting beta-2 agonist. Therefore, some doctors might report asthmatic patient's disease code as Status asthmaticus (J46), as if the patient has more severe disease, to report increased severity of patient and guarantee more insurance coverage.

Actually, there are many difficulties in studying the epidemiology of allergic diseases because of their heterogeneity and non-standardized diagnoses. Furthermore, most epidemiologic studies generally focus on specific areas, not nationwide. In fact, this study has some limitations because the data from the HIRA was for insurance claims, not for epidemiologic studies. Nevertheless, our data were collected with uniform method in same conditions for a nationwide population for the past five years and that could be very valuable. We conclude that the prevalence of chronic allergic diseases in Korea might have plateaued recently in the past few years like several Western countries. Though we cannot fully explain the cause in detail, we can assume that the rapid transition and stabilization of Korean society could have an effect on the prevalence of chronic allergic diseases. Additionally, a well-planned epidemiologic study with a large population and uniform method on chronic allergic diseases in adult is needed in the future to determine the precise

status of allergic diseases and overcome the 'allergic epidemic'.



## References

1. Eder W, Ege MJ, von Mutius E. The asthma epidemic. *The New England journal of medicine*. 2006;355(21):2226-35.
2. EAACI. *Global Atlas Of Allergy* 2014.
3. Asher MI, Montefort S, Björkstén B, Lai CKW, Strachan DP, Weiland SK, 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. *The Lancet*. 2006;368(9537):733-43.
4. Song WJ, Kang MG, Chang YS, Cho SH. Epidemiology of adult asthma in Asia: toward a better understanding. *Asia Pacific allergy*. 2014;4(2):75-85.
5. Eichenfield LF, Tom WL, Chamlin SL, Feldman SR, Hanifin JM, Simpson EL, et al. Guidelines of care for the management of atopic dermatitis: section 1. Diagnosis and assessment of atopic dermatitis. *Journal of the American Academy of Dermatology*. 2014;70(2):338-51.
6. Williams H, Stewart A, von Mutius E, Cookson W, Anderson HR, International Study of A, et al. Is eczema really on the increase worldwide? *The Journal of allergy and clinical immunology*. 2008;121(4):947-54 e15.
7. Deckers IA, McLean S, Linssen S, Mommers M, van Schayck CP, Sheikh A. Investigating international time trends in the incidence and prevalence of atopic eczema 1990-2010: a systematic review of epidemiological studies. *PloS one*. 2012;7(7):e39803.
8. Kim HY, Kwon EB, Baek JH, Shin YH, Yum HY, Jee HM, et al. Prevalence and comorbidity of allergic diseases in preschool children. *Korean journal of pediatrics*. 2013;56(8):338-42.
9. Kim MJ, Kang TW, Cho EA, Kim HS, Min JA, Park H, et al. Prevalence of atopic dermatitis among Korean adults visiting health service center of the Catholic Medical Center in Seoul Metropolitan Area, Korea. *Journal of Korean medical science*. 2010;25(12):1828-30.
10. Bousquet J, Khaltayev N, Cruz AA, Denburg J, Fokkens WJ, Togias A, et al.

Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update (in collaboration with the World Health Organization, GA(2)LEN and AllerGen). *Allergy*. 2008;63 Suppl 86:8-160.

11. Rhee CS, Wee JH, Ahn JC, Lee WH, Tan KL, Ahn S, et al. Prevalence, risk factors and comorbidities of allergic rhinitis in South Korea: The Fifth Korea National Health and Nutrition Examination Survey. *American journal of rhinology & allergy*. 2014;28(2):107-14.

12. Masoli M, Fabian D, Holt S, Beasley R, Global Initiative for Asthma P. The global burden of asthma: executive summary of the GINA Dissemination Committee report. *Allergy*. 2004;59(5):469-78.

13. Wong GW, Leung TF, Ko FW. Changing prevalence of allergic diseases in the Asia-pacific region. *Allergy, asthma & immunology research*. 2013;5(5):251-7.

14. Pearce N, Ait-Khaled N, Beasley R, Mallol J, Keil U, Mitchell E, 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(9):758-66.

15. Zollner IK, Weiland SK, Piechotowski I, Gabrio T, von Mutius E, Link B, et al. No increase in the prevalence of asthma, allergies, and atopic sensitisation among children in Germany: 1992-2001. *Thorax*. 2005;60(7):545-8.

16. Chinn S, Jarvis D, Burney P, Luczynska C, Ackermann-Liebrich U, Anto JM, et al. Increase in diagnosed asthma but not in symptoms in the European Community Respiratory Health Survey. *Thorax*. 2004;59(8):646-51.

17. Aubier M, Neukirch F, Annesi-Maesano I. Epidemiology of asthma and allergies. The prevalence of allergies increases worldwide, and asthma has reached his highest-ever prevalence in Europe: why? *Bulletin de l'Academie nationale de medecine*. 2005;189(7):1419-34; discussion 34.

18. Kim SY, Jung JY, Park MS, Kang YA, Kim EY, Kim SK, et al. Increased prevalence of self-reported asthma among Korean adults: an analysis of KNHANES I and IV data. *Lung*. 2013;191(3):281-8.

19. Park HS, Choi GS, Cho JS, Kim YY. Epidemiology and current status of

- allergic rhinitis, asthma, and associated allergic diseases in Korea: ARIA Asia-Pacific workshop report. *Asian Pacific journal of allergy and immunology* / launched by the Allergy and Immunology Society of Thailand. 2009;27(2-3):167-71.
20. Gibson PG, McDonald VM, Marks GB. Asthma in older adults. *Lancet*. 2010;376(9743):803-13.
21. Madeo J, Li Z, Frieri M. Asthma in the geriatric population. *Allergy and asthma proceedings : the official journal of regional and state allergy societies*. 2013;34(5):427-33.
22. Ko FW, Lai CK, Woo J, Ho SC, Ho CW, Goggins W, et al. 12-year change in prevalence of respiratory symptoms in elderly Chinese living in Hong Kong. *Respiratory medicine*. 2006;100(9):1598-607.
23. Fukutomi Y, Taniguchi M, Watanabe J, Nakamura H, Komase Y, Ohta K, et al. Time trend in the prevalence of adult asthma in Japan: findings from population-based surveys in Fujieda City in 1985, 1999, and 2006. *Allergology international : official journal of the Japanese Society of Allergology*. 2011;60(4):443-8.
24. National Health Insurance Statistical Yearbook: National Health Insurance Service, Health Insurance Review & Assessment Service; 2012.
25. Kim CY, Park HW, Ko SK, Chang SI, Moon HB, Kim YY, et al. The financial burden of asthma: a nationwide comprehensive survey conducted in the republic of Korea. *Allergy, asthma & immunology research*. 2011;3(1):34-8.
26. Asthma GIf. *Global Strategy for Asthma Management and Prevention* 2008.
27. Matricardi PM, Bouygue GR, Tripodi S. Inner-city asthma and the hygiene hypothesis. *Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology*. 2002;89(6 Suppl 1):69-74.
28. OECD(2012). *OECD Urban Policy Reviews, Korea 2012*: OECD Publishing; 2012.

29. Brezzi, Monica, al e. Redefining urban areas in OECD countries: OECD Publishing; 2012.
30. Korea Institute for Health and Social Affairs (KIHASA). Prevalence of Allergic Diseases among Korean School-age Children: A Nationwide Cross-Sectional Questionnaire Study. Korean J Med. 2001;60:196-205.
31. Suh M, Kim HH, Sohn MH, Kim KE, Kim C, Shin DC. Prevalence of allergic diseases among Korean school-age children: a nationwide cross-sectional questionnaire study. Journal of Korean medical science. 2011;26(3):332-8.

## 국 문 초 록

# 건강보험 심사평가원 자료를 통하여 분석한 만성 알레르기질환의 유병율 추이

김 병 근

서울대학교 대학원

의학과 면역학전공

**서론:** 최근 수십 년 동안 만성 알레르기질환의 유병률은 증가하여왔다. 하지만 일부 선진국에서는 최근 알레르기질환의 발생이 감소한다는 보고가 있다. 본 연구는 한국에서 천식을 비롯한 알레르기질환 유병률의 최근 변화를 알아보고자 한다.

**방법:** 한국에서 전체 국민을 대상으로 하는 국민건강보험공단 및 건강보험심사평가원의 자료를 사용하였다. 상기 자료에서 아토피 피부염, 알레르기비염, 천식의 진단 및 진료비 통계 및 그 추이를 2009년에서 2013년까지 분석하였다.

**결과:** 아토피 피부염, 알레르기 비염 및 천식의 2013년 천명당 유병률은 각각 20.3, 127.3, 39.4 이었다. 10세 단위로 나누었을 때 세 질환의 유병률은 10세 미만 군에서 가장 높았다. 아토피 피부염과 알레르기 비염의 유병률은 10세 이후 지속적으로 감소하였으나 천식의 경우 30-39세 군에서 증가하기 시작하였고, 70-79세 군에서 두 번째 고점을 보였다. 2009년에서 2013년까지 알레르기 비염은 모든 연령 군에서 지속적으로 증가하였고 그 증가는 특히 10세 미만 군에서 두드러졌다. 반면 천식과 아토피 피부염의 유병률은 동 기간 동안 증가하지 않았고 십세 미만 군에서는 오히려 감소하였다.

**결론:** 우리는 한국의 만성 알레르기질환의 유병률을 전체 국민 대상의 건강보험자료를 이용하여 분석하였다. 최근 5년동안 알레르기 비염의 유병률은 증가하였으나 천식과 아토피 피부염의 유병률은 증가 추세를 보이지 않았다. 이러한 결과는 최근 한국의 만성 알레르기질환의 유병률이 정체기에 도달하였을 가능성을 시사한다.

**주요어:** 유병률, 천식, 알레르기 비염, 아토피 피부염

**학번:** 2010-21846