

Cross-sensitization between inhalant allergens and food allergens: the extent, intensity, and age-related shifts

Jae Hoon Cho,¹ Jeffrey D. Suh,² Jin Kook Kim,¹ Marn Joon Park,^{3*} Ji Ho Choi^{4*}

Abstract

Background: Encountering individuals sensitized to both inhalant and food allergens is challenging in clinical practice. Despite its rarity, studies have documented cross-sensitization between these allergens. However, the extent, diversity, and age-related variations of this phenomenon remain unclear.

Objectives: Hence, our objective was to investigate a substantial quantity of allergy sensitivity test results in which both inhalant and food allergens were concurrently examined. The primary goal of our study is to calculate the cross-sensitization ratio, with a secondary objective of analyzing this phenomenon across four age groups.

Methods: A retrospective analysis was conducted on a multiple-antigen simultaneous test (MAST) obtained from a domestic laboratory medicine facility and comprising 55 food allergens and 49 inhalant allergens from 368,156 individuals aged 1 to 89. By calculating the cross-sensitization ratio, the degree of cross-sensitization between each food allergen and inhalant allergen was determined. Further subgroup analysis was conducted to ascertain the cross-sensitization ratio between the four subgroups categorized by age.

Results: The median cross-sensitization ratio between food and inhalant allergens was 5.14, indicating a significant level of cross-sensitization. The cross-sensitization ratio was greatest among pollen allergens and plant-derived food allergens, followed by between some animal aeroallergens and meat/fish/dairy/poultry food allergens. The degree of overall cross-sensitization was least prominent in adolescents, greater in adults and children, and most pronounced in the elderly.

Conclusions: Our findings reveal that various inhalant and dietary allergens have considerable cross-sensitivity, with the elderly having the highest degree of cross-sensitivity and adolescents the lowest.

Key words: Cross-sensitization, sensitization, food allergy, inhalant allergy, MAST, multiple-antigen simultaneous test

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Affiliations:

¹ Department of Otorhinolaryngology-Head and Neck Surgery, Konkuk University College of Medicine, Konkuk University Hospital, Seoul, Korea

² Department of Otorhinolaryngology-Head and Neck Surgery, Ronald Reagan UCLA Medical Center, University of California, Los Angeles, California, USA

³ Department of Otorhinolaryngology & Head and Neck Surgery Inha University Hospital, Inha University College of Medicine

⁴ Department of Otorhinolaryngology-Head and Neck Surgery, Soonchunhyang University Bucheon Hospital, Soonchunhyang University College of Medicine, Bucheon, Korea

*Contributed equally as to be the co-corresponding authors.

Corresponding author:

1. Marn Joon Park

Department of Otorhinolaryngology & Head and Neck Surgery
Inha University Hospital, Inha University College of Medicine
27 Inhang-ro, Jung-gu, 22322, Incheon, Republic of Korea
E-mail: parkmarnjoon@gmail.com

2. Ji Ho Choi

Department of Otorhinolaryngology-Head and Neck Surgery,
Soonchunhyang University Bucheon Hospital,
Soonchunhyang University College of Medicine, Bucheon, Korea
E-mail: handsomemd@hanmail.net

Introduction

In clinical practice, diagnosing various food or inhalant allergies often reveals simultaneous sensitization to multiple allergens, even in the absence of a history of allergic reactions to those allergens. Conversely, patients may exhibit reactions to both specific airborne allergens and related foods, a phenomenon known as ‘cross-sensitization.’¹⁻³ This complex interaction between various allergens and the immune response both underscores and emphasizes the need for a nuanced understanding of the pathophysiology of allergies.⁴

Pollen-related food syndrome exemplifies cross-sensitization, where sensitization to the major birch pollen allergen Bet v 1 leads to allergic reactions to homologous proteins in various fruits and vegetables, resulting in oral and pharyngeal itching and edema upon ingestion.^{5,6} Beyond pollens, house dust mites, molds, and animal allergens can also cause cross-sensitization, including bird-egg and pork-cat syndromes.^{1,3} Additionally, cross-reactions extend to house dust mites with shellfish and molds with food yeasts found in bakery products, showcasing the broad spectrum of cross-sensitization between different allergens.^{1,3}

Research on the link between specific inhalant allergens and dietary allergies has yielded inconsistent findings, possibly due to variations in ethnicity, geography, and diet, as well as the limited range of allergens and small sample sizes previously studied.⁷ These factors may hinder a thorough understanding of cross-sensitization. To address these discrepancies and accurately determine the nature and extent of cross-sensitization, a study with a substantial sample size covering a wide range of dietary and inhalant allergens is necessary.

Hence, the primary objective of our study is to calculate the cross-sensitization ratio, thus determining the degree of cross-sensitization between each food and inhalant allergen.

The secondary objectives include investigating differences in the pattern of cross-sensitization across age groups, leading to a subgroup analysis within each of the four age categories. Our study aims to fill this gap by examining cross-sensitization between 55 food allergens and 49 inhalant allergens using data from 344,678 individuals through multiple-antigen simultaneous tests (MAST), making it the most statistically robust investigation of its kind to date.

Materials and Methods

Study subjects

From January 2, 2018, to June 30, 2021, we undertook a retrospective analysis of serum MAST data from a cohort of 368,156 individuals for whom the MAST was ordered based on clinical suspicion of diverse allergic conditions. The MAST results were solely received from Seegene Inc., a domestic local laboratory medicine facility specializing in a variety of molecular diagnostic techniques located in Seoul, South Korea. This laboratory retrieves MAST blood samples from a total of 3,735 medical centers across South Korea, including tertiary, referral medical institutions, and private clinics. Along with the MAST results, demographic data was also gathered.

Food and Inhalant Allergen Sensitization on MAST: Data Collection and Curation

All the MAST utilized in this study includes a setlist of allergens, which the circulating serum specific IgE concentration of 104 different inhalant or food allergens are quantified, consisting of 49 inhalant and 55 food allergens prevalent in South Korea (**Table 1**). Participants aged less than 1 or above 90 years were excluded from the data analysis due to the high likelihood of input mistakes. Additionally, participants with missing data were also excluded.

Table 1. List of inhalant and food allergens included in the MAST.

Clusters	ID#	Allergen	Clusters	ID#	Allergen
Mites	1	House dust	Grains	1	Wheat
	2	Dermatophagoides pteronyssinus		2	Barley
	3	Dermatophagoides farinae		3	Corn
	4	Acarus siro		4	Rice
	5	Tyrophagus putrescentiae		5	Buckwheat
Molds	6	Penicillium notatum	Legumes	6	Sesame
	7	Cladosporium herbarum		7	Peanut
	8	Aspergillus fumigatus		8	Soy bean
	9	Candida albicans		9	Hazel nut
	10	Alternaria alternata		10	Almond
Grass	11	Bermuda grass	Nuts	11	Pine
	12	Sweet vernal grass		12	Sunflower
	13	Orchard grass		13	Walnut
	14	Reed		14	Sweet nut

Table 1. (Continued)

Clusters	ID#	Allergen	Clusters	ID#	Allergen	
Grass	15	Bent grass	Vegetables	15	Tomato	
	16	Timothy grass		16	Carrot	
	17	Cultivated rye		17	Potato	
Tree / Wood pollens	18	Alder		18	Garlic	
	19	Birch		19	Onion	
	20	Hazel		20	Celery	
	21	Oak	Fruits	21	Strawberry	
	22	Olive		22	Apple	
	23	Maple leaf sycamore		23	Kiwi	
	24	Willow		24	Mango	
	25	Cottonwood		25	Banana	
	26	White ash		26	Peach	
	27	White pine		27	Cucumber	
	28	Japanese cedar		28	Citrus mix	
	29	Acacia		29	Cacao	
Weeds	30	Ragweed		CCD antigen	30	CCD antigen
	31	Mugwort		Shellfish	31	Crab
	32	Ox-eye daisy	32		Shrimp	
	33	Dandelion	33		Blue mussel	
	34	Plantain	34		Oyster	
	35	Russian thistle	35		Clam	
	36	Goldenrod	36		Scallop	
	37	Pigweed	37		Lobster	
	38	Japanese hop	38		Pacific squid	
Animals/ Insects	39	Cat	Fish		39	Mackerel
	40	Horse		40	Plaice	
	41	Dog		41	Anchovy	
	42	Guinea pig		42	Alaska pollock	
	43	Mouse		43	Eel	
	44	Rat		44	Tuna	
	45	Sheep		45	Salmon	
	46	Rabbit		46	Codfish	
	47	Hamster	Poultry or eggs	47	Egg white	
	48	Cockroach		48	Chicken	
Others	49	Latex	Mammalian milk or meat	49	Milk	
				50	Cheese	
				51	Pork	
				52	Beef	
				53	Lamb meat	
			Others	54	Yeast	
				55	Silkworm pupa	

Abbreviations: CCD, cross-reactive carbohydrate determinants.

For all MAST samples, peripheral blood was collected, and the serum was analyzed using the PROTIA™ Allergy-Q 96M panel (ProteomeTech Inc., Seoul, Korea). The PROTIA™ Allergy-Q 96M panel employs an immunoblotting technique to quantitatively determine allergen-specific IgE concentrations in human serum or plasma, detecting 107 different allergens in a single process. Our study utilized a MAST incorporating a component-resolved diagnostics (CRD)-based multiplex specific IgE assay which the accuracy has been proven in the literature, providing validity that the simultaneously positive MAST result suggests cross-reactivity than co-sensitization between various aero- and food-allergens.⁸⁻¹⁰ The MAST results for each allergen were stratified into six levels, according to the specific IgE concentration: class 0 (0.00–0.34 IU/mL), class 1 (0.35–0.69 IU/mL), class 2 (0.70–3.49 IU/mL), class 3 (3.50–17.49 IU/mL), class 4 (17.50–49.99 IU/mL), class 5 (50.00–99.99 IU/mL), and class 6 (≥ 100 IU/mL). A positive result for each allergen was regarded as showing a class 2 or above, as described in the previous literatures.¹¹⁻¹³

Statistical Analysis

A descriptive statistical analysis was performed for the demographic variables. The significant differences in the percentage of each allergen sensitization between four age subgroups groups were determined by adopting the Chi-square test.

To assess the severity of cross-sensitization between inhalant allergens and food allergens, two measurements were taken: the cross-sensitization ratio, which is the ratio of observed frequency to anticipated frequency, and the chi-squared value. Initially, a cross table was constructed by arranging 49 inhalant allergens in columns and 55 food allergens in rows. The frequency of instances in which both inhalant and food allergens were positive at the same time was depicted in each intersecting cell, indicating the observed frequency. Subsequently, under the assumption that inhalant and food allergen sensitization take place separately, the anticipated frequency of each cell was computed using the following formula: the rate of positive food allergens multiplied by the rate of positive inhalant allergens, and then multiplied by the total number of subjects. The cross-sensitization ratio was determined by dividing each observed frequency by the anticipated frequency.

However, the clinical significance of two allergens exhibiting a high cross-sensitization ratio may not be considered significant in real-world practice if the prevalence of each allergen sensitization remains low. Therefore, to determine the clinical relevance of the allergen cross-sensitization, we further computed the Chi-squared value for each cell. The Chi-squared value reflects the degree of allergen cross-sensitization, considering the frequency of detection for each allergen. This provides statistical power to assess the likelihood of encountering cross-sensitization between a food allergen and an inhalant allergen in real-world clinical scenarios. The chi-squared value was computed using the following method: $(\text{observed frequency} - \text{predicted frequency})^2 / \text{expected frequency}$.

As per the formula, when both cross-sensitization and observed frequency are high, the chi-square value exhibits an exponential increase.

A heatmap was generated to visually represent the final results of the cross-sensitization ratio and the chi-squared values. No statistical inferences were made. The heatmap diagram and frequency calculations were executed utilizing Python (version 3.10.1, Python Software Foundation) and Microsoft Excel (version 2016, Microsoft Excel, Redmond, WA, USA).

In addition, a further breakdown analysis on the subgroups based on the individuals' age were conducted, since prior research demonstrated variations and shifts in sensitivity to food, or inhalant allergens based on age. The study subjects were stratified into four categories based on age: children (1–12 years old), adolescents (13–18 years old), adults (19–59 years old), and elderly individuals (above 60 years old). The positive rate for cross-sensitization of each food or inhalant allergen was computed in each of the four age groups.

Results

A final analysis was conducted on MAST results obtained from a total of 344,678 individuals during the specified study period, after excluding 18,889 cases for those aged less than 1 or above 90 and 4,589 cases with missing data from the MAST raw data of 368,156 individuals. The mean age of all subjects was 32.1 ± 22.7 years, which consisted of 158,328 male (46%) and 186,350 female (54%). Each subgroup is characterized by the following demographics: 100,378 children (mean age 5.2 ± 3.3 ; 55.4% male), 19,676 adolescents (mean age 15.5 ± 1.8 ; 52.0% male), 175,537 adults (mean age 38.9 ± 11.6 ; 41.0% male), and 49,087 elderly (mean age 68.4 ± 7.0 ; 41.8% male).

Sensitivity to various inhalant allergens on MAST

In all samples, sensitization to the house dust and all four types of mites exhibited significantly higher numbers of 25–30%, in comparison to the remaining allergens showed a sensitization rate below 10%, except for dog, cat, and cockroach aeroallergens (**Figure 1 & Table 2**). Of note, the sensitization rate for both dust mites and molds showed a significant difference according to age: an increased rate in the adolescent group compared to the child group declined in the adult group, followed by the lowest rates in the elderly group, regardless of the mite subtypes (all $p < 0.001$). The sensitization to various inhalant mold allergens was relatively low, showing an average sensitization rate between 1 and 3% (**Figure 1 & Table 2**). The mold sensitization showed a similar pattern with HDM, showing the highest rate in the adolescents; only sensitivity to *Alternaria alternata* showed such significance ($p = 0.043$). Among the seasonal inhalant allergens, the positive percentage of grass sensitization was relatively higher (between 6 and 7%), than the tree/wood pollens (between 3 and 5%), and weeds (between 3 and 5%). Although nonsignificant, the percentage of adolescents tested positive for birch and Japanese cedar allergens was notably high, whereas no age-related disparities in the sensitization

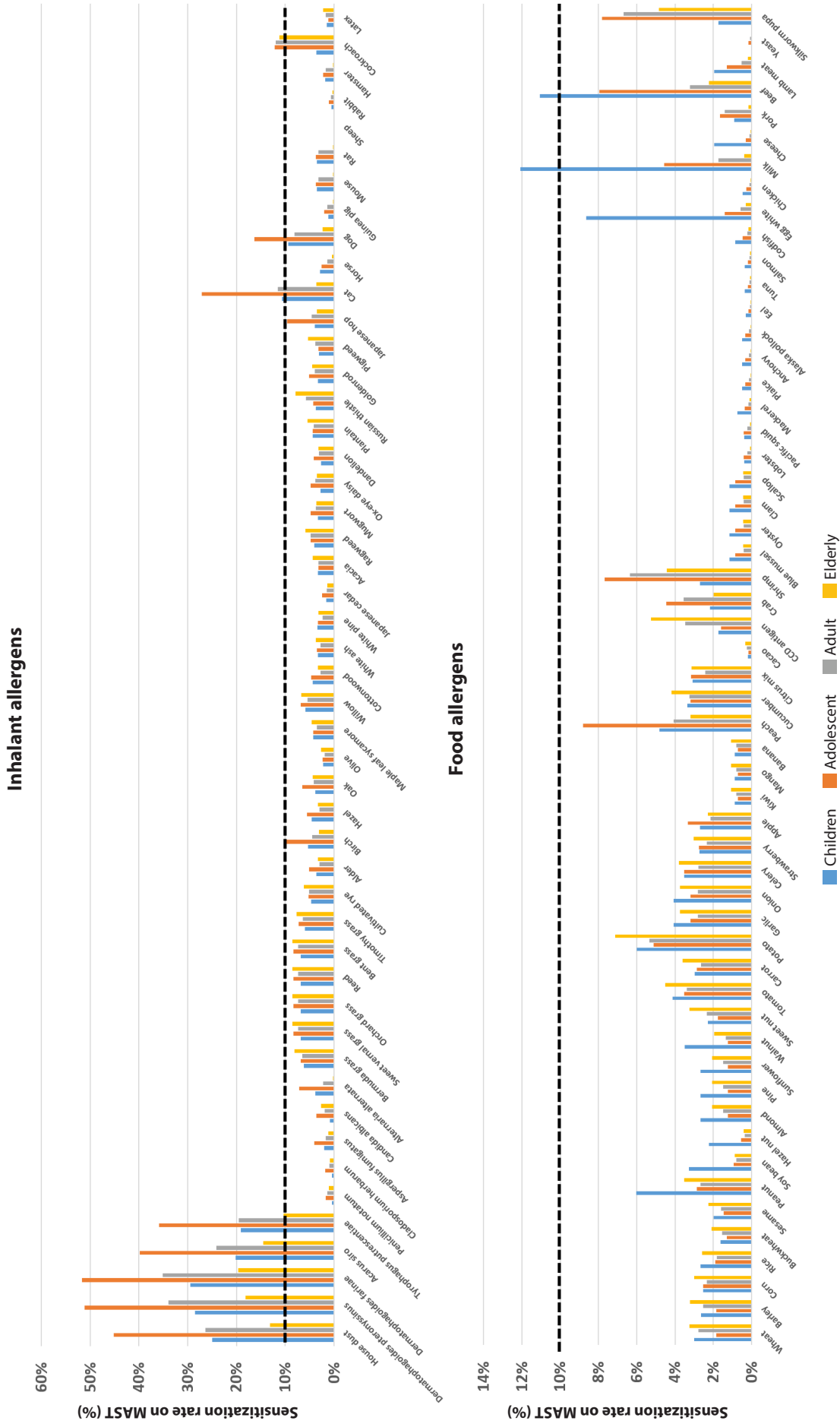


Figure 1. The incidence of allergen sensitization to individual foods and inhalant allergens. The MAST results, collected from 344,678 individuals in total, illustrate an array of 55 food allergens and 49 aeroallergens. The inhalant allergens with the highest sensitization rate, exceeding 10%, were dust mite allergens, followed by allergens from cats and dogs. Notably, this rate peaked among adolescents and was lowest among the elderly. In contrast, the food allergen sensitization rate remained below 10%, with the exception of the children's group, which was exclusively exposed to the allergens in milk and beef.

Table 2. Prevalence of inhalant allergen sensitization in each age subgroup. (Values presented in %)

Allergen Clusters	ID#	Inhalant Allergens	All individuals (n = 344,678)	Child (n = 100,378)	Adolescent (n = 19,676)	Adult (n = 175,537)	Elderly (n = 49,087)	P-value*
Mites	1	House dust	25.2	25.0	45.1	26.4	13.1	< 0.001
	2	Dermatophagoides pteronyssinus	31.1	28.5	51.2	33.9	18.2	< 0.001
	3	Dermatophagoides farinae	32.2	29.4	51.7	35.1	19.6	< 0.001
	4	Acarus siro	22.5	20.2	39.8	24.2	14.5	< 0.001
	5	Tyrophagus putrescentiae	19.1	19.2	35.9	19.6	10.3	< 0.001
Molds	6	Penicillium notatum	1.1	0.4	1.7	1.4	1.1	0.845
	7	Cladosporium herbarum	0.8	0.4	1.8	1.0	0.8	0.789
	8	Aspergillus fumigatus	1.9	2.0	4.0	1.8	1.1	0.545
	9	Candida albicans	1.8	0.9	3.7	1.9	2.6	0.599
	10	Alternaria alternata	2.7	3.8	7.2	2.2	0.2	0.043
Grass	11	Bermuda grass	6.7	6.2	6.9	6.5	8.2	0.948
	12	Sweet vernal grass	7.4	6.8	8.3	7.4	8.5	0.967
	13	Orchard grass	7.4	6.8	8.3	7.4	8.5	0.967
	14	Reed	7.4	6.8	8.3	7.4	8.5	0.967
	15	Bent grass	7.4	6.8	8.3	7.4	8.5	0.967
	16	Timothy grass	6.5	6.0	7.2	6.4	7.7	0.964
	17	Cultivated rye	5.2	4.7	5.3	5.1	6.2	0.971
Tree Pollens	18	Alder	3.3	3.6	5.2	3.0	3.3	0.851
	19	Birch	4.8	5.4	10.2	4.4	3.0	0.144
	20	Hazel	3.7	4.6	5.5	3.0	3.3	0.793
	21	Oak	4.3	3.9	6.5	4.2	4.3	0.813
	22	Olive	2.1	2.2	2.3	1.9	2.7	0.986
	23	Maple leaf sycamore	3.9	4.3	4.2	3.5	4.5	0.986
	24	Willow	5.8	5.8	6.9	5.4	6.8	0.963
	25	Cottonwood	3.4	4.4	4.7	2.8	3.3	0.882
	26	White ash	3.1	3.3	3.5	2.8	3.7	0.987
	27	White pine	2.9	3.5	3.3	2.4	3.2	0.972
	28	Japanese cedar	1.6	1.6	2.4	1.5	1.4	0.946
	29	Acacia	3.4	3.3	3.2	3.2	4.3	0.968
Weeds	30	Ragweed	4.7	4.0	4.8	4.8	5.9	0.941
	31	Mugwort	3.6	3.3	4.8	3.7	3.6	0.951
	32	Ox-eye daisy	3.6	2.8	4.8	3.9	3.5	0.901
	33	Dandelion	3.1	2.7	4.1	3.1	3.2	0.954
	34	Plantain	4.4	4.4	4.4	4.1	5.4	0.974
	35	Russian thistle	5.4	3.7	4.3	5.7	7.9	0.563
	36	Goldenrod	3.9	3.3	5.1	3.9	4.5	0.930
	37	Pigweed	3.8	3.0	3.2	3.9	5.3	0.831
	38	Japanese hop	4.6	4.0	9.6	4.6	3.5	0.199

Table 2. (Continued)

Allergen Clusters	ID#	Inhalant Allergens	All individuals (n = 344,678)	Child (n = 100,378)	Adolescent (n = 19,676)	Adult (n = 175,537)	Elderly (n = 49,087)	P-value*
Animals / Insects	39	Cat	11.1	10.6	27.1	11.6	3.6	<0.001
	40	Horse	1.7	2.9	2.5	1.3	0.4	0.524
	41	Dog	8.1	9.4	16.4	8.1	2.3	0.007
	42	Guinea pig	1.2	1.1	2.0	1.4	0.2	0.693
	43	Mouse	2.9	3.5	3.7	3.2	0.3	0.401
	44	Rat	2.9	3.5	3.7	3.2	0.3	0.401
	45	Sheep	0.1	0.1	0.1	0.1	0.0	0.992
	46	Rabbit	0.6	0.5	1.1	0.7	0.3	0.910
	47	Hamster	1.5	1.8	2.2	1.7	0.2	0.662
	48	Cockroach	9.4	3.7	12.2	11.9	11.2	0.132
Others	49	Latex	1.7	1.5	1.1	1.7	2.3	0.927

*P value calculated with Chi-squared test, comparing the significant differences in the percentage of each allergen sensitization.

to the remaining allergens were observed. Positive sensitization rates for animal allergens were exceptionally high among adolescents, particularly for cats (27.1%, $p < 0.001$) and dogs (16.4%, $p = 0.007$), respectively, while the sensitization rate to other allergens showed an average of 4%. Notably, cockroach sensitivity positivity was 3.7% in the child group and peaked at 12.2% in adolescence, which remained consistent throughout life in the elderly group.

Sensitivity to various food allergens on MAST

The sensitization rate to most food allergens was below 4%, showing a much lower rate compared to inhalant allergens (Figure 1 & Table 3). For inhalant allergens, the positive proportion was similar within the same categories. However, for food allergens, there was a significant variability in the sensitization rate among various food allergens, even within the same categories. Compared with the fact that

many inhalant allergens exhibited the highest sensitization rate in adolescence, the majority of food allergens, especially plant-based foods, exhibited a U-shaped sensitization pattern with increasing age, showing a high prevalence in children, followed by a decline in adolescents and adults, and then a subsequent rise in the senior population (Figure 1 & Table 3). The prevalence rates for shellfish and fish were very low (less than 1.2%), with the exception of a relatively high sensitivity rate for crab and shrimp (4.5 and 7.7%, respectively) in the adolescent period, which also exhibited a declining pattern with increasing age. Regarding the egg white, milk, and beef allergens, the sensitization rate was highest in the children group (2.9, 4.7, and 5.6%, respectively), showing a significantly gradual decrease in the sensitization rate along with increasing age ($p \leq 0.001$, $p < 0.001$, and $p = 0.028$, respectively). Although insignificant, the sensitization to cross-reactive carbohydrate determinants (CCD) rose with age.

Table 3. Prevalence of food allergen sensitization in each age subgroup. (Values presented in %)

Allergen Clusters	ID#	Food Allergens	All individuals (n = 344,678)	Child (n = 100,378)	Adolescent (n = 19,676)	Adult (n = 175,537)	Elderly (n = 49,087)	P-value
Grains	1	Wheat	2.9	3.0	1.8	2.8	3.2	0.932
	2	Barley	2.6	2.6	1.8	2.5	3.2	0.940
	3	Corn	2.5	2.5	2.5	2.3	3.0	0.991
	4	Rice	2.2	2.7	1.9	1.8	2.6	0.961
	5	Buckwheat	1.6	1.6	1.3	1.5	2.1	0.975
Beans	6	Sesame	1.8	2.0	1.5	1.6	2.2	0.980
	7	Peanut	3.8	6.0	2.9	2.7	3.5	0.591
	8	Soy bean	1.5	3.3	0.9	0.8	0.9	0.382

Table 3. (Continued)

Allergen Clusters	ID#	Food Allergens	All individuals (n = 344,678)	Child (n = 100,378)	Adolescent (n = 19,676)	Adult (n = 175,537)	Elderly (n = 49,087)	P-value
Nuts	9	Hazelnut	0.9	2.2	0.6	0.4	0.4	0.465
	10	Almond	1.9	2.7	1.2	1.5	2.1	0.868
	11	Pine	1.9	2.7	1.2	1.5	2.1	0.868
	12	Sunflower	1.9	2.7	1.2	1.5	2.1	0.868
	13	Walnut	2.0	3.5	1.2	1.3	1.9	0.626
	14	Sweetnut	2.4	2.3	1.8	2.3	3.2	0.933
Vegetables	15	Tomato	3.8	4.1	3.5	3.4	4.5	0.975
	16	Carrot	2.9	3.0	2.9	2.6	3.6	0.981
	17	Potato	5.7	6.0	5.1	5.3	7.1	0.931
	18	Garlic	3.3	4.1	3.2	2.8	3.8	0.959
	19	Onion	3.3	4.1	3.2	2.8	3.8	0.959
	20	Celery	3.2	3.5	3.5	2.8	3.8	0.983
Fruits	21	Strawberry	2.5	2.7	2.8	2.3	3.0	0.992
	22	Apple	2.4	2.7	3.3	2.1	2.3	0.954
	23	Kiwi	0.9	0.9	0.7	0.8	1.1	0.992
	24	Mango	0.9	0.9	0.7	0.8	1.1	0.992
	25	Banana	0.9	0.9	0.7	0.8	1.1	0.992
	26	Peach	4.4	4.8	8.8	4.1	3.2	0.296
	27	Cucumber	3.4	3.4	3.2	3.2	4.2	0.977
	28	Citrus mix	2.7	3.1	3.2	2.4	3.1	0.986
	29	Cacao	0.2	0.2	0.2	0.2	0.3	0.998
CCD antigen	30	CCD antigen	3.1	1.7	1.6	3.5	5.2	0.391
Shellfish	31	Crab	3.0	2.2	4.5	3.6	2.0	0.701
	32	Shrimp	5.1	2.7	7.7	6.3	4.4	0.413
	33	Blue mussel	0.6	1.1	0.8	0.4	0.4	0.915
	34	Oyster	0.6	1.1	0.8	0.4	0.4	0.915
	35	Clam	0.6	1.1	0.8	0.4	0.4	0.915
	36	Scallop	0.6	1.1	0.8	0.4	0.4	0.915
	37	Lobster	0.3	0.4	0.4	0.2	0.1	0.970
	38	Pacific squid	0.3	0.4	0.4	0.2	0.1	0.970
Fish	39	Mackerel	0.3	0.7	0.3	0.2	0.1	0.887
	40	Plaice	0.2	0.5	0.3	0.1	0.0	0.883
	41	Anchovy	0.2	0.5	0.3	0.1	0.0	0.883
	42	Alaska pollock	0.2	0.5	0.3	0.1	0.0	0.883
	43	Eel	0.2	0.3	0.2	0.1	0.1	0.984
	44	Tuna	0.2	0.4	0.2	0.1	0.1	0.960
	45	Salmon	0.2	0.4	0.2	0.1	0.1	0.960
	46	Codfish	0.4	0.8	0.5	0.2	0.2	0.900

Table 3. (Continued)

Allergen Clusters	ID#	Food Allergens	All individuals (n = 344,678)	Child (n = 100,378)	Adolescent (n = 19,676)	Adult (n = 175,537)	Elderly (n = 49,087)	P-value
Poultry or eggs	47	Egg white	2.9	8.6	1.4	0.6	0.3	<.001
	48	Chicken	0.2	0.5	0.3	0.1	0.1	0.932
Mammalian milk or meat	49	Milk	4.7	12.1	4.6	1.7	0.4	<.001
	50	Cheese	0.6	1.9	0.3	0.1	0.0	0.243
	51	Pork	1.1	0.9	1.6	1.4	0.2	0.765
	52	Beef	5.6	11.1	8.0	3.2	2.2	0.028
	53	Lamb meat	0.9	2.0	1.3	0.5	0.2	0.572
Others	54	Yeast	0.1	0.0	0.2	0.1	0.0	0.947
	55	Silkworm pupa	5.1	1.7	7.8	6.7	4.9	0.234

Abbreviations: CCD, cross-reactive carbohydrate determinants.

*P value calculated with Chi-squared test, comparing the significant differences in the percentage of each allergen sensitization.

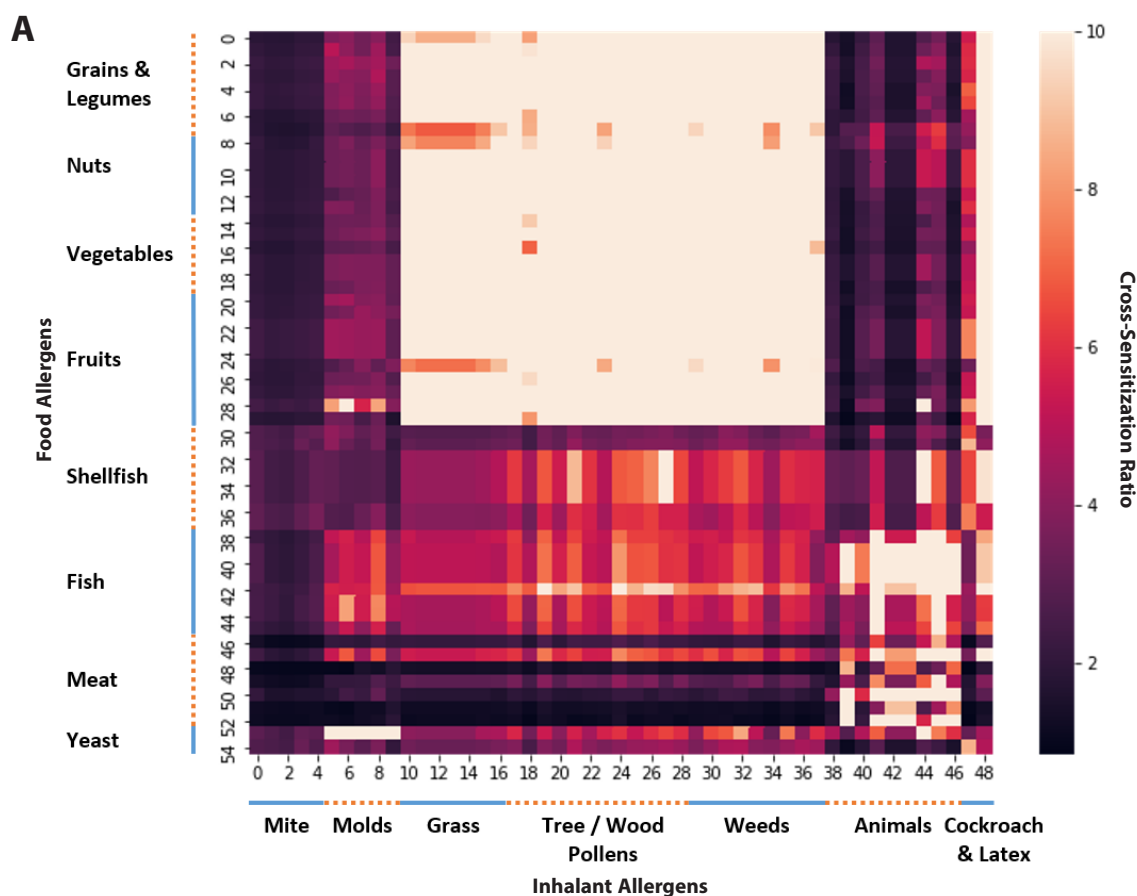


Figure 2. Heatmap diagram of cross-sensitivity ratio and chi-squared values between food and inhalant allergens.

Inhalant allergens are arranged in rows, and food allergens are grouped in columns. Table 1 lists the ID#s of the specific inhalant allergens, and Table 2 lists the food allergens ID#. (A) cross-sensitivity ratio between food and inhalant allergens. The bar on the right indicates the degree of cross-sensitivity, ranging from 0 to 10, and the higher the value, the brighter the color, as illustrated in the diagram. (B) Chi-squared value of cross-sensitivity between food and inhalant allergens. The bar on the right indicates the degree of cross-sensitivity, represented as a calculated Chi-squared value, ranging from 0 to 12,000. Taking into consideration the frequency of detection for each allergen, the Chi-squared value indicates the probability of allergen cross-sensitivity observed in the patients upon suspicion of various allergic diseases in South Korea.

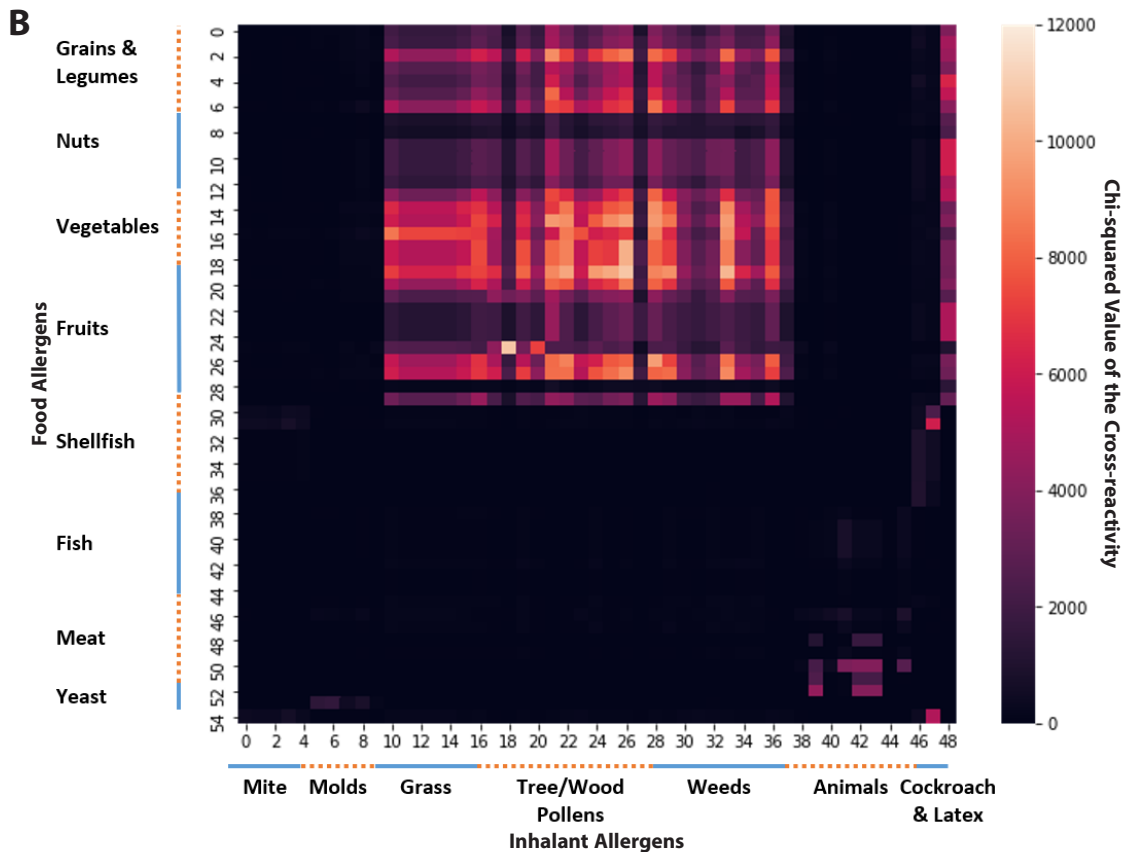


Figure 2. (Continued)

Cross-sensitization between allergens of various inhalants and foods

The magnitude of the cross-sensitization is visualized as in the heatmap (Figure 2A), visualizing the cross-sensitization of all 55 foods and 49 inhalant allergens in a single illustration. The greater the cross-sensitization, the brighter the color depicted on the heatmap. The median value of the overall whole food and inhalant allergens' cross-sensitization ratio was 5.14, indicating that the observed frequency of cross-sensitization exceeded the expected frequency by 5.14 times.

Remarkably, the cross-sensitization ratio between plant-based foods (grains, legumes, nuts, vegetables, and fruits) and seasonal pollen allergens (grass, tree/wood pollens, and weeds) was noticeably high (cross-sensitization ratio > 10) (Supplementary Material 1). Similarly, the fish and meat food allergens and animal inhalant allergens also exhibited a strong cross-sensitization ratio. However, a strong cross-sensitization was also noticed between the yeast food allergen and the inhalant mold allergen. Interestingly, inhalant latex allergens exhibited significant cross-sensitization with multiple allergens, including various plant-based foods, shellfish, fish, and meat.

The heatmap in Figure 2B illustrates the chi-squared value of the cross-sensitization between inhalant and dietary allergens. This value provides insight into the likelihood of encountering the cross-sensitization phenomenon in

practical settings, taking into account the individual allergen sensitization rates. Significant chi-squared values were identified in the correlation between allergens found in plant-based foods and those found in seasonal pollen allergens. Additionally, although relatively lower than the plant-based food and pollen aeroallergens, high correlations were noted between latex and plant dietary allergens, as well as between numerous animal inhalant allergens and some mammalian-meat food allergens. A high chi-squared value was observed between cockroach inhalant allergens with shrimp and silkworm pupae.

The results of the cross-sensitization subgroup analysis by age groups are depicted as in heatmap plot in Figure 3. All four groups exhibited similar cross-sensitization patterns, showing a strong cross-sensitization between plant-derived aeroallergens and food allergens and animal-derived aeroallergens and meat/fish food allergens. Noticeably, compared to children, the overall cross-sensitization intensity decreased more pronouncedly among adolescents, which subsequently became more intensified in the adult group, and peaked in the elderly group, showing the most degree of the cross-sensitization between those aeroallergens and food allergens. The cross-sensitization ratio exhibited a median value of 5.81 for children, 4.26 for adolescents, 5.42 for adults, and 6.38 for elderly, which aligns with the findings from the heatmap analysis.

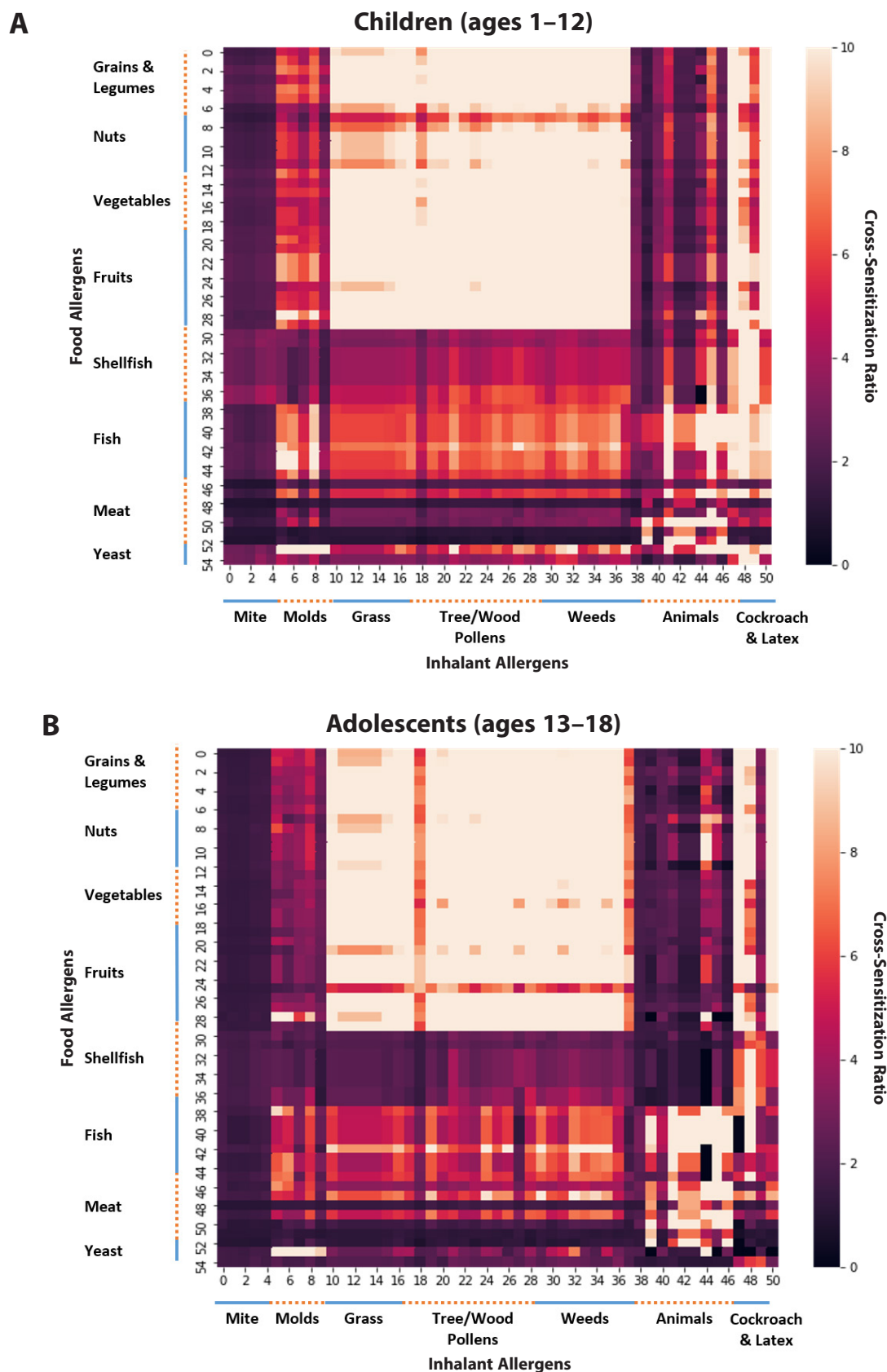


Figure 3. Heatmap diagram of cross-reactivity ratio according to each age group.

Inhalant allergens are arranged in rows, and food allergens are grouped in columns. Each ID# in Table 1 and Table 2 denotes a list of the specific inhalant allergens. The bar on the right indicates the degree of cross-sensitivity, ranging from 0 to 10, and the higher the value, the brighter the color, as illustrated in the diagram. (A) children (1–12 years old), (B) adolescents (13–18 years old), (C) adults (19–59 years old), and (D) elderly individuals (above 60 years old).

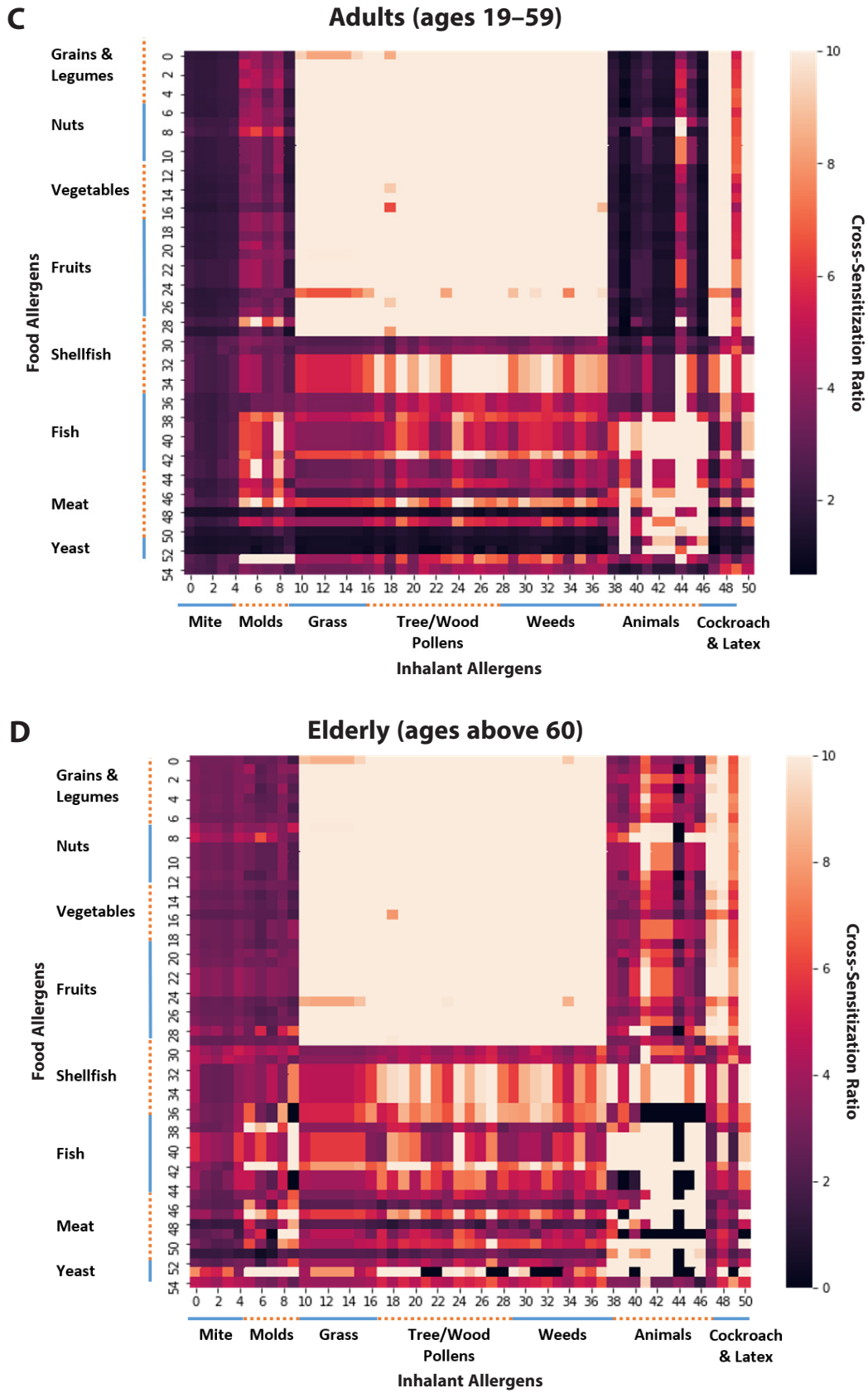


Figure 3. (Continued)

Discussion

“Cross-sensitization” denotes a phenomenon where Immunoglobulin E (IgE) antibodies, initially produced in response to a specific allergen, also possess the capacity to bind to structurally similar molecules in another allergen.³ In clinical practice, during the diagnostic evaluation of patients suspected of various allergic disorders, encountering a patient with positive IgE reactivity to two allergen extracts might indicate several scenarios; these include the possibility of unique sensitization to both allergens (co-sensitization) or that the allergens exhibit cross-reactivity, implying shared molecular structures that allow specific IgE antibodies targeting one allergen to also bind to another.¹⁴ Classic examples of cross-sensitization include pollen-related food syndrome (also known as oral allergy syndrome), and latex-fruit syndrome, which underscore the molecular cross-reactivity between airborne and food allergens.¹⁵⁻¹⁸ Consequently, individuals allergic to certain inhalant pollens may also exhibit symptoms of food allergies when consuming foods derived from plants with molecular characteristics similar to those of the sensitizing pollens.^{2,3,16} This elucidation of cross-sensitization not only highlights the complex interrelations between different allergens but also emphasizes the necessity for a comprehensive and nuanced approach in the diagnostic and therapeutic management of allergic diseases.

Nonetheless, previous investigations on allergen cross-sensitization have demonstrated discrepancies and inconsistent results between food allergens and aeroallergens across the globe.^{7,19} For instance, studies have shown varying degrees of cross-reactivity between birch pollen and apple allergens in different populations.^{20,21} Similarly, cross-sensitization between house dust mites and shellfish allergens has been reported with differing prevalence rates between Asian population and in Western population.²² These examples underscore the inconsistencies in cross-reactivity findings across different geographical and cultural contexts. Also, considering the fact that many prior investigations are derived from a relatively small number of test samples, and having a narrow range of various aero- and food allergens, thus raising the need for a further analysis with increased statistical power and a diverse range of allergens tested. The merits of our study are that we have analyzed the relevance of each aero- and food-allergen sensitization in the Korean population in all age groups, ranging children to elderly with a profuse number of 368,156 MAST results which consists of 49 aero- and 55 food-allergens. Moreover, we have further assessed the degree cross-sensitization in each food and aeroallergen, determining which allergens exhibit strong or a weak cross-sensitization, and whether this cross-sensitization changes according to the age.

To determine whether a co-sensitization or a cross-sensitization takes place among various aero- and food-allergens, we have utilized the concept of the “cross-sensitization ratio”, which is the ratio of observed cross-sensitization by the anticipated frequency. The anticipated frequency can be calculated by multiplying the frequency of each allergen by the total number of subjects, in the event that the two allergens exhibit co-sensitization. When the ratio between the expected and observed frequencies becomes closer to 1, it indicates that a “co-sensitization” takes place between the two allergens, rather than having a “cross-sensitization”. However, if the ratio is significantly larger than 1, it suggests a possibility of a “cross-sensitization”, rather than a “co-sensitization”. In our analysis, between the 49 aero- and 55 food-allergens, a median cross-sensitization value of 5.14 were shown, suggesting an overall cross-sensitization exists between food and aeroallergens at a substantial degree.

The most robust cross-sensitization was seen between pollen allergens and plant-derived food allergens, which is a well-recognized phenomenon in the previous literatures named as the “oral allergy syndrome” or “pollen-food allergy syndrome”.^{3,15,16,23} The MAST panel used in our study contains multiple inhalant pollen allergens and plant-derived food allergens commonly found and consumed in Korea, exhibiting some significant cross-sensitization ratio. This degree of this cross-sensitization was more pronounced for in various tree-pollens, compared to grasses or weeds. As for plant-derived food allergens, grains, legumes, nuts, vegetables, and fruits all similarly exhibited a comparable inclination. Additionally, a significant correlation was found between animal inhalant allergens, with the exception of cats, and meat allergies such as fish, chicken, hog, and lamb, indicating a possibility of an epitope between those animal-derived allergens. An exceptionally strong cross-sensitization was discovered between the yeast and various molds, especially a ratio of 94.4 was noticed with *Cladosporium herbarum*. The correlation between latex and all forms of plant-derived allergens were likewise high, with the highest ratio showing at 42.9.

Although the present investigation reaffirmed the existence of various pollen-related food syndrome and the latex-fruit syndrome, which have been extensively documented in previous studies on cross-sensitization.^{15,23} Nevertheless, our results could not definitively identify some phenomenon on the cross-sensitization between aero- and food-allergens in the prior literatures, such as the mite-shrimp syndrome and the pork-cat syndrome.²⁴⁻²⁷ In our results, a very weak cross-sensitization ratio of 2.5, and 4.2, respectively, both below the median overall cross-sensitization of 5.14 were noticeable, suggesting some further investigations to confirm the weak correlation between those allergens.

Regardless of the extent of cross-sensitization, if the occurrence rate of each allergen is low, the population of prospective patients is limited, resulting in a correspondingly low clinical importance. Therefore, to address this matter, the chi-squared values in the cross-sensitization ratio were additionally adopted in our study in respecting the prevalence of each allergen, thus further providing more relevance and significance of encountering such cross-sensitization in a real-world practice. By example, in cases with a high cross-sensitization ratio, if the prevalence is extremely low, that the chance of encountering such cross-sensitization phenomena in a real-world may be attenuated, giving less clinical significance to the cross-sensitization. According to our chi-squared value results, a strong association between cross-sensitization and pollen-related food syndrome persists in parallel to the cross-sensitization ratio. Especially, some noteworthy correlations were demonstrated between some animal-derived allergens and meat-derived allergens, and fruit allergens and latex, providing strong supporting evidence for the latex-fruit syndrome and cockroach-shrimp syndromes.^{17,28}

Age is a key factor in allergic reactions, with literature indicating that allergy severity can fluctuate with age. While allergic rhinitis or asthma prevalence may decrease with age, sensitization rates to allergens often remain consistent over a lifetime.²⁹⁻³³ Our study found the highest sensitization rates to indoor aeroallergens like dust mites, molds, and animal dander during adolescence, which generally decreased with age in the Korean population. However, seasonal pollen sensitization showed no clear age-related pattern. For the impact of age on the food allergy, Warren, et al. reported that food allergy increases with increasing age.³⁴ Interestingly, food allergy prevalence, particularly to milk, eggs, and beef, was notable in children, with a sensitization rate over 10%, and peanut sensitization at 6%. The sensitization rates to animal-based foods declined with age, possibly reflecting dietary shifts towards more varied fruits and seafoods in adulthood. Our research also observed variations in cross-sensitization across age groups, peaking in seniors. This suggests, without implying causality due to the study's cross-sectional nature, that aging may influence cross-sensitization, likely from prolonged allergen exposure.^{24,29,30,35} This is in line with recent findings of increasing food allergies in adults, presenting new directions for research on age's impact on allergic sensitization and cross-sensitization patterns.^{36,37}

Despite the new discoveries, our research does possess some constraints. Although all of our included subjects have undergone MAST assay in suspicion of an allergic disease suspected by a physician, we lacked detailed analysis of included individual's allergy symptoms, clinical presentations, or severity. Also, given the prevalence, the predominance of inhalant allergen-related conditions (like allergic rhinitis, bronchial asthma, and atopic dermatitis) in our Korean cohort suggests most samples likely came from patients with these conditions, rather than food allergies.

Third, although the MAST is effective for identifying inhalant allergen sensitivities, its performance in detecting food allergens is less conclusive than other diagnostic testing methods.^{10,38} Lastly, the cross-sectional design of this study limits our ability to track longitudinal changes in cross-sensitization patterns across different age groups.

Conclusion

Our results suggest an existence of a considerable degree of cross-sensitivity between food and inhalant allergens. Pollens and plant-derived foods exhibited the strongest correlation, followed by inhalant animal allergens and fish/meat/dairy/poultry food allergens. The degree of the cross-sensitization was least pronounced in adolescents, higher in adults and children, and highest in the elderly.

Acknowledgments

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Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical declaration

This study was exempted from ethical review by the Konkuk University Hospital Institutional Review Board (KUMC 2021-03-039) because it was an observational study conducted using data collected in the past, and all personal information of the participants, other than age and gender, was removed.

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Supplementary Material

Supplementary Material 1. The cross-sensitization ratio and chi-squared value of the cross-sensitization between 49 inhalant and 55 dietary allergens tested with MAST.

Figure 2A			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	1.9	1.8	1.8	2.0	2.0	3.8
	2	Barley	2.0	1.9	1.9	2.1	2.1	5.1
	3	Corn	2.2	2.0	2.0	2.2	2.3	4.5
	4	Rice	2.1	1.9	1.9	2.1	2.2	4.3
	5	Buckwheat	2.2	2.0	2.1	2.2	2.3	3.8
	6	Sesame	2.2	2.0	2.0	2.2	2.2	3.9
	7	Peanut	1.9	1.7	1.7	1.8	1.9	3.3
	8	Soy bean	1.9	1.6	1.6	1.6	1.9	3.1
	9	Hazel nut	2.1	1.8	1.7	1.8	2.1	3.4
	10	Almond	2.1	1.9	1.9	2.0	2.1	3.5
	11	Pine	2.1	1.9	1.9	2.0	2.1	3.5
	12	Sunflower	2.1	1.9	1.9	2.0	2.1	3.5
	13	Walnut	2.1	1.9	1.9	2.0	2.2	2.7
	14	Sweet nut	2.1	1.9	2.0	2.1	2.2	3.8
	15	Tomato	2.0	1.8	1.8	2.0	2.0	3.4
	16	Carrot	2.1	1.9	1.9	2.1	2.1	3.4
	17	Potato	1.9	1.8	1.8	2.0	2.0	3.1
	18	Garlic	2.1	1.9	1.9	2.0	2.1	3.7
	19	Onion	2.1	1.9	1.9	2.0	2.1	3.7
	20	Celery	2.0	1.9	1.9	2.1	2.1	3.3
	21	Strawberry	2.2	2.0	2.0	2.1	2.2	4.4
	22	Apple	2.1	2.0	2.0	2.1	2.2	3.5
	23	Kiwi	2.4	2.2	2.2	2.3	2.4	4.5
	24	Mango	2.4	2.2	2.2	2.3	2.4	4.5
	25	Banana	2.4	2.2	2.2	2.3	2.4	4.5
	26	Peach	2.1	1.9	1.9	2.0	2.1	2.7
	27	Cucumber	2.0	1.9	1.9	2.1	2.1	3.4
	28	Citrus mix	2.2	2.0	2.0	2.1	2.2	3.9
	29	Cacao	2.5	2.2	2.3	2.3	2.5	8.2
	30	CCD antigen	1.9	1.8	1.8	1.9	1.9	3.5
	31	Crab	2.8	2.6	2.4	3.1	3.2	4.2
	32	Shrimp	2.8	2.7	2.5	3.3	2.9	4.1
	33	Blue mussel	3.0	2.5	2.4	2.7	3.2	3.1
	34	Oyster	3.0	2.5	2.4	2.7	3.2	3.1
	35	Clam	3.0	2.5	2.4	2.7	3.2	3.1
	36	Scallop	3.0	2.5	2.4	2.7	3.2	3.1
	37	Lobster	3.1	2.7	2.6	3.1	3.6	2.8
	38	Pacific squid	3.1	2.7	2.6	3.1	3.6	2.8
	39	Mackerel	2.3	2.0	1.9	2.1	2.5	5.2
	40	Plaice	2.8	2.1	1.9	2.2	2.6	4.6
	41	Anchovy	2.8	2.1	1.9	2.2	2.6	4.6
	42	Alaska pollock	2.8	2.1	1.9	2.2	2.6	4.6
	43	Eel	2.5	2.3	2.1	2.3	2.8	5.7
	44	Tuna	2.5	2.3	2.1	2.5	2.9	5.5
	45	Salmon	2.5	2.3	2.1	2.5	2.9	5.5
	46	Codfish	2.2	2.0	1.9	2.2	2.5	4.0
	47	Egg white	1.3	1.1	1.0	1.1	1.2	2.1
	48	Chicken	2.4	1.9	1.7	1.9	2.3	5.3
	49	Milk	1.1	1.0	1.0	1.0	1.0	1.0
	50	Cheese	1.4	1.2	1.1	1.2	1.4	2.1
	51	Pork	2.1	1.5	1.5	1.6	1.7	1.9
	52	Beef	1.2	1.1	1.1	1.1	1.2	1.0
	53	Lamb meat	1.2	1.1	1.1	1.1	1.2	1.2
	54	Yeast	3.0	2.7	2.4	3.2	3.0	69.2
	55	Silkworm pupa	2.8	2.7	2.5	3.3	2.7	4.5

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	4.0	3.5	4.0	2.4	9.4	8.6
	2	Barley	4.1	3.5	4.4	2.5	11.3	10.2
	3	Corn	4.7	4.3	4.6	3.4	14.2	12.8
	4	Rice	4.1	4.0	4.8	2.9	13.0	11.7
	5	Buckwheat	4.1	3.8	4.4	2.9	14.2	12.8
	6	Sesame	4.2	3.7	4.2	2.8	14.1	12.7
	7	Peanut	3.5	3.4	3.7	2.7	11.0	10.0
	8	Soy bean	2.9	2.7	3.1	2.2	7.4	6.8
	9	Hazel nut	3.8	3.2	3.7	2.8	8.3	7.6
	10	Almond	3.5	3.4	4.1	2.5	12.0	10.8
	11	Pine	3.5	3.4	4.1	2.5	12.0	10.8
	12	Sunflower	3.5	3.4	4.1	2.5	12.0	10.8
	13	Walnut	3.1	3.2	3.8	2.6	11.0	10.0
	14	Sweet nut	3.8	3.3	3.8	2.5	14.5	13.1
	15	Tomato	3.4	3.4	3.7	2.8	13.6	12.4
	16	Carrot	3.6	3.8	4.0	3.1	14.5	13.1
	17	Potato	3.1	3.2	3.5	2.6	13.3	11.9
	18	Garlic	3.8	3.8	3.8	3.2	13.3	12.2
	19	Onion	3.8	3.8	3.8	3.2	13.3	12.2
	20	Celery	3.4	3.7	3.8	3.2	14.2	13.0
	21	Strawberry	4.6	3.9	4.0	3.1	14.1	12.8
	22	Apple	3.7	4.3	4.1	3.6	11.3	10.3
	23	Kiwi	4.4	4.3	4.4	3.1	14.2	12.8
	24	Mango	4.4	4.3	4.4	3.1	14.2	12.8
	25	Banana	4.4	4.3	4.4	3.1	14.2	12.8
	26	Peach	3.2	3.9	3.2	3.8	7.7	7.2
	27	Cucumber	3.4	3.5	3.8	2.8	14.0	12.6
	28	Citrus mix	4.0	3.9	4.0	3.3	14.1	12.9
	29	Cacao	11.1	5.7	8.3	3.9	13.4	12.0
	30	CCD antigen	3.4	2.6	3.3	1.6	14.2	12.9
	31	Crab	3.8	3.1	3.5	2.4	2.9	2.8
	32	Shrimp	3.3	2.9	3.5	2.1	3.2	3.1
	33	Blue mussel	2.9	2.8	2.9	2.3	4.4	4.3
	34	Oyster	2.9	2.8	2.9	2.3	4.4	4.3
	35	Clam	2.9	2.8	2.9	2.3	4.4	4.3
	36	Scallop	2.9	2.8	2.9	2.3	4.4	4.3
	37	Lobster	2.8	3.3	3.9	2.6	4.1	3.9
	38	Pacific squid	2.8	3.3	3.9	2.6	4.1	3.9
	39	Mackerel	5.6	5.0	6.4	3.9	5.3	4.9
	40	Plaice	5.5	5.3	6.8	4.2	5.1	5.1
	41	Anchovy	5.5	5.3	6.8	4.2	5.1	5.1
	42	Alaska pollock	5.5	5.3	6.8	4.2	5.1	5.1
	43	Eel	5.5	5.6	6.8	4.4	6.6	6.7
	44	Tuna	8.3	5.5	7.7	5.0	4.7	4.6
	45	Salmon	8.3	5.5	7.7	5.0	4.7	4.6
	46	Codfish	5.3	4.1	5.6	3.3	4.7	4.6
	47	Egg white	2.1	1.9	2.4	2.1	2.2	2.1
	48	Chicken	6.8	4.4	6.6	3.7	5.5	5.3
	49	Milk	0.9	1.5	1.3	1.8	1.4	1.4
	50	Cheese	2.1	2.1	2.8	2.3	3.1	3.0
	51	Pork	2.4	2.2	3.2	2.1	1.8	1.8
	52	Beef	1.0	1.3	1.2	1.6	1.2	1.2
	53	Lamb meat	1.1	1.3	1.4	1.9	1.1	1.2
	54	Yeast	94.4	41.7	47.1	27.6	4.1	4.0
	55	Silkworm pupa	3.7	3.0	3.7	2.1	3.5	3.3

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			13 Orchard grass	14 Reed	15 Bent grass	16 Timothy grass	17 Cultivated rye	18 Alder
Food Allergens	1	Wheat	8.6	8.6	8.6	9.6	11.8	16.6
	2	Barley	10.2	10.2	10.2	11.6	14.3	19.2
	3	Corn	12.8	12.8	12.8	14.6	18.0	25.0
	4	Rice	11.7	11.7	11.7	13.2	15.9	21.6
	5	Buckwheat	12.8	12.8	12.8	14.5	18.4	27.7
	6	Sesame	12.7	12.7	12.7	14.4	18.2	26.1
	7	Peanut	10.0	10.0	10.0	11.2	13.6	17.9
	8	Soy bean	6.8	6.8	6.8	7.5	9.1	12.7
	9	Hazel nut	7.6	7.6	7.6	8.4	10.0	14.6
	10	Almond	10.8	10.8	10.8	12.2	15.2	22.1
	11	Pine	10.8	10.8	10.8	12.2	15.2	22.1
	12	Sunflower	10.8	10.8	10.8	12.2	15.2	22.1
	13	Walnut	10.0	10.0	10.0	11.2	13.7	20.1
	14	Sweet nut	13.1	13.1	13.1	14.9	18.7	22.9
	15	Tomato	12.4	12.4	12.4	13.8	16.5	18.8
	16	Carrot	13.1	13.1	13.1	14.8	18.3	23.8
	17	Potato	11.9	11.9	11.9	12.8	13.8	13.4
	18	Garlic	12.2	12.2	12.2	13.7	16.8	19.5
	19	Onion	12.2	12.2	12.2	13.7	16.8	19.5
	20	Celery	13.0	13.0	13.0	14.6	17.6	22.7
	21	Strawberry	12.8	12.8	12.8	14.5	17.9	22.6
	22	Apple	10.3	10.3	10.3	11.5	13.8	22.0
	23	Kiwi	12.8	12.8	12.8	14.6	18.3	27.9
	24	Mango	12.8	12.8	12.8	14.6	18.3	27.9
	25	Banana	12.8	12.8	12.8	14.6	18.3	27.9
	26	Peach	7.2	7.2	7.2	7.8	8.9	14.8
	27	Cucumber	12.6	12.6	12.6	14.3	17.5	20.6
	28	Citrus mix	12.9	12.9	12.9	14.5	17.7	23.3
	29	Cacao	12.0	12.0	12.0	13.7	17.2	26.4
	30	CCD antigen	12.9	12.9	12.9	14.6	18.1	17.2
	31	Crab	2.8	2.8	2.8	2.8	3.0	3.2
	32	Shrimp	3.1	3.1	3.1	3.1	3.3	3.4
	33	Blue mussel	4.3	4.3	4.3	4.4	4.9	6.2
	34	Oyster	4.3	4.3	4.3	4.4	4.9	6.2
	35	Clam	4.3	4.3	4.3	4.4	4.9	6.2
	36	Scallop	4.3	4.3	4.3	4.4	4.9	6.2
	37	Lobster	3.9	3.9	3.9	3.9	4.1	4.8
	38	Pacific squid	3.9	3.9	3.9	3.9	4.1	4.8
	39	Mackerel	4.9	4.9	4.9	5.2	5.4	6.2
	40	Plaice	5.1	5.1	5.1	5.1	4.9	6.1
	41	Anchovy	5.1	5.1	5.1	5.1	4.9	6.1
	42	Alaska pollock	5.1	5.1	5.1	5.1	4.9	6.1
	43	Eel	6.7	6.7	6.7	6.8	6.7	7.8
	44	Tuna	4.6	4.6	4.6	4.7	5.0	6.5
	45	Salmon	4.6	4.6	4.6	4.7	5.0	6.5
	46	Codfish	4.6	4.6	4.6	4.7	4.7	5.7
	47	Egg white	2.1	2.1	2.1	2.2	2.2	2.4
	48	Chicken	5.3	5.3	5.3	5.6	5.7	6.1
	49	Milk	1.4	1.4	1.4	1.4	1.4	1.5
	50	Cheese	3.0	3.0	3.0	3.0	3.1	3.6
	51	Pork	1.8	1.8	1.8	1.8	1.6	2.0
	52	Beef	1.2	1.2	1.2	1.2	1.2	1.4
	53	Lamb meat	1.2	1.2	1.2	1.2	1.2	1.2
	54	Yeast	4.0	4.0	4.0	4.6	4.7	5.8
	55	Silkworm pupa	3.3	3.3	3.3	3.4	3.6	3.9

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	8.2	15.1	13.0	23.5	15.0	10.7
	2	Barley	9.8	18.2	15.9	27.5	18.1	12.8
	3	Corn	12.1	23.3	19.5	33.8	23.0	15.9
	4	Rice	10.7	20.0	16.2	29.0	20.5	14.6
	5	Buckwheat	13.7	24.7	21.1	39.3	23.9	16.3
	6	Sesame	12.9	23.6	19.9	37.8	23.5	16.2
	7	Peanut	8.5	16.4	13.6	23.2	17.4	12.4
	8	Soy bean	8.6	12.5	10.1	18.5	11.3	8.3
	9	Hazel nut	9.5	13.8	11.1	20.8	12.9	9.4
	10	Almond	12.0	20.7	17.5	31.6	19.6	13.6
	11	Pine	12.0	20.7	17.5	31.6	19.6	13.6
	12	Sunflower	12.0	20.7	17.5	31.6	19.6	13.6
	13	Walnut	10.4	18.4	15.3	27.7	17.8	12.5
	14	Sweet nut	11.5	21.6	19.1	31.3	23.0	16.5
	15	Tomato	9.2	18.2	15.1	23.9	20.0	14.9
	16	Carrot	11.0	22.2	18.1	31.2	23.6	16.3
	17	Potato	7.0	13.4	10.7	16.4	15.6	13.0
	18	Garlic	10.3	20.9	16.3	26.4	20.6	14.9
	19	Onion	10.3	20.9	16.3	26.4	20.6	14.9
	20	Celery	11.2	22.1	17.9	29.1	22.8	15.9
	21	Strawberry	12.1	22.5	18.5	31.4	22.7	16.0
	22	Apple	14.4	19.6	16.7	28.7	18.1	12.8
	23	Kiwi	18.1	25.7	21.9	43.0	23.8	16.3
	24	Mango	18.1	25.7	21.9	43.0	23.8	16.3
	25	Banana	18.1	25.7	21.9	43.0	23.8	16.3
	26	Peach	17.3	12.9	14.9	16.4	11.2	8.4
	27	Cucumber	9.5	19.3	15.9	26.4	21.9	15.7
	28	Citrus mix	11.9	22.6	18.6	30.7	22.4	15.8
	29	Cacao	17.5	24.2	20.8	40.8	22.5	15.4
	30	CCD antigen	8.0	16.4	15.1	23.4	19.5	15.1
	31	Crab	2.5	3.5	3.1	3.8	3.3	3.3
	32	Shrimp	2.5	3.5	3.2	4.2	3.6	3.4
	33	Blue mussel	4.6	6.8	5.5	8.8	6.1	5.0
	34	Oyster	4.6	6.8	5.5	8.8	6.1	5.0
	35	Clam	4.6	6.8	5.5	8.8	6.1	5.0
	36	Scallop	4.6	6.8	5.5	8.8	6.1	5.0
	37	Lobster	3.5	5.6	4.4	6.0	5.6	4.6
	38	Pacific squid	3.5	5.6	4.4	6.0	5.6	4.6
	39	Mackerel	4.1	7.0	5.2	6.4	5.5	5.2
	40	Plaice	4.9	7.3	5.6	6.9	5.3	5.0
	41	Anchovy	4.9	7.3	5.6	6.9	5.3	5.0
	42	Alaska pollock	4.9	7.3	5.6	6.9	5.3	5.0
	43	Eel	6.8	10.6	8.3	9.0	6.9	6.6
	44	Tuna	4.2	7.0	4.7	6.6	5.4	5.1
	45	Salmon	4.2	7.0	4.7	6.6	5.4	5.1
	46	Codfish	3.8	6.4	4.6	5.8	5.4	4.9
	47	Egg white	1.7	2.7	2.0	2.5	2.4	2.4
	48	Chicken	4.4	7.4	5.8	6.4	5.5	5.5
	49	Milk	1.2	1.7	1.3	1.5	1.6	1.5
	50	Cheese	2.5	4.0	2.9	3.6	3.5	3.2
	51	Pork	1.8	2.1	1.8	1.7	1.8	1.9
	52	Beef	1.1	1.4	1.3	1.2	1.3	1.3
	53	Lamb meat	0.9	1.3	1.2	1.0	1.1	1.2
	54	Yeast	3.5	5.4	4.0	5.6	4.6	5.6
	55	Silkworm pupa	2.6	3.8	3.5	4.8	4.0	3.7

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	16.1	18.0	18.8	15.5	16.7	12.5
	2	Barley	19.1	21.4	22.7	20.0	20.0	15.3
	3	Corn	24.5	27.3	28.8	22.3	25.5	19.4
	4	Rice	21.2	23.8	25.1	19.5	23.0	16.7
	5	Buckwheat	26.3	29.8	31.8	26.6	27.3	19.7
	6	Sesame	25.1	28.3	29.7	25.3	26.4	19.2
	7	Peanut	17.4	19.6	20.5	14.9	19.0	14.1
	8	Soy bean	13.0	13.5	14.9	17.7	12.4	9.4
	9	Hazel nut	14.4	15.3	16.7	21.2	14.3	10.5
	10	Almond	21.9	24.2	26.2	23.9	22.2	16.2
	11	Pine	21.9	24.2	26.2	23.9	22.2	16.2
	12	Sunflower	21.9	24.2	26.2	23.9	22.2	16.2
	13	Walnut	19.6	21.8	23.4	20.0	20.1	14.5
	14	Sweet nut	22.6	26.0	27.7	21.9	25.5	19.7
	15	Tomato	18.9	21.3	22.2	15.9	21.7	17.1
	16	Carrot	23.6	26.7	27.7	20.0	25.9	19.5
	17	Potato	13.9	15.3	15.8	10.9	16.5	13.3
	18	Garlic	21.2	22.3	25.3	19.2	21.4	17.3
	19	Onion	21.2	22.3	25.3	19.2	21.4	17.3
	20	Celery	23.5	25.6	27.1	19.3	24.3	19.0
	21	Strawberry	23.4	25.0	27.7	22.7	24.4	18.9
	22	Apple	20.3	22.0	23.5	20.7	20.1	14.8
	23	Kiwi	27.3	29.8	32.5	40.7	27.3	19.8
	24	Mango	27.3	29.8	32.5	40.7	27.3	19.8
	25	Banana	27.3	29.8	32.5	40.7	27.3	19.8
	26	Peach	12.7	12.9	13.9	12.4	11.9	9.5
	27	Cucumber	20.3	23.3	24.0	16.7	23.9	18.2
	28	Citrus mix	23.5	25.3	27.5	21.5	24.0	19.0
	29	Cacao	25.6	28.3	30.9	45.3	25.9	18.5
	30	CCD antigen	17.2	20.4	20.3	15.9	21.5	18.0
	31	Crab	3.5	3.5	3.6	3.8	3.4	3.2
	32	Shrimp	3.7	3.9	3.9	3.9	3.8	3.4
	33	Blue mussel	6.8	7.0	7.7	10.3	6.5	5.2
	34	Oyster	6.8	7.0	7.7	10.3	6.5	5.2
	35	Clam	6.8	7.0	7.7	10.3	6.5	5.2
	36	Scallop	6.8	7.0	7.7	10.3	6.5	5.2
	37	Lobster	6.0	6.0	6.3	5.6	5.6	4.7
	38	Pacific squid	6.0	6.0	6.3	5.6	5.6	4.7
	39	Mackerel	7.3	6.3	6.3	6.1	5.9	5.5
	40	Plaice	8.0	6.7	6.8	6.0	6.1	5.2
	41	Anchovy	8.0	6.7	6.8	6.0	6.1	5.2
	42	Alaska pollock	8.0	6.7	6.8	6.0	6.1	5.2
	43	Eel	10.3	8.6	9.6	9.5	7.9	7.0
	44	Tuna	7.1	6.2	6.2	5.0	6.0	5.5
	45	Salmon	7.1	6.2	6.2	5.0	6.0	5.5
	46	Codfish	6.8	6.0	6.2	5.3	5.6	4.9
	47	Egg white	2.7	2.4	2.7	2.3	2.3	2.1
	48	Chicken	7.7	7.0	6.8	6.1	6.5	6.0
	49	Milk	1.9	1.5	1.6	1.4	1.5	1.4
	50	Cheese	4.1	3.5	3.8	2.8	3.6	2.9
	51	Pork	2.2	2.2	1.9	2.2	2.1	1.9
	52	Beef	1.5	1.3	1.4	1.3	1.3	1.2
	53	Lamb meat	1.5	1.1	1.2	1.2	1.1	1.2
	54	Yeast	6.0	5.3	6.0	6.4	5.9	4.1
	55	Silkworm pupa	4.0	4.3	4.4	4.5	4.3	3.7

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			31 Mugwort	32 Ox-eye daisy	33 Dandelion	34 Plantain	35 Russian thistle	36 Goldenrod
Food Allergens	1	Wheat	14.0	12.6	16.5	13.6	10.4	13.9
	2	Barley	17.9	16.6	20.0	16.5	12.7	17.0
	3	Corn	21.0	18.8	23.6	21.1	15.4	20.2
	4	Rice	18.1	15.8	20.7	18.9	14.0	17.8
	5	Buckwheat	23.2	20.9	28.7	21.3	15.9	22.6
	6	Sesame	22.1	19.6	25.8	21.1	15.4	21.0
	7	Peanut	14.9	12.8	16.4	15.8	11.2	14.4
	8	Soy bean	11.5	11.5	13.5	10.5	7.8	11.0
	9	Hazel nut	13.0	12.7	15.0	11.7	8.2	12.0
	10	Almond	19.7	18.5	23.7	17.8	13.4	18.8
	11	Pine	19.7	18.5	23.7	17.8	13.4	18.8
	12	Sunflower	19.7	18.5	23.7	17.8	13.4	18.8
	13	Walnut	17.3	15.6	20.4	16.1	12.1	16.9
	14	Sweet nut	20.9	19.1	23.3	21.6	16.0	20.0
	15	Tomato	16.2	13.7	16.6	19.1	14.3	15.9
	16	Carrot	19.0	16.2	21.4	21.4	15.7	19.2
	17	Potato	11.7	10.0	11.7	15.7	13.7	11.6
	18	Garlic	17.6	15.4	18.6	19.2	13.9	16.6
	19	Onion	17.6	15.4	18.6	19.2	13.9	16.6
	20	Celery	18.6	15.8	19.8	20.9	15.5	18.9
	21	Strawberry	19.6	17.4	21.0	20.7	14.9	18.4
	22	Apple	17.9	15.6	20.0	16.3	12.3	16.9
	23	Kiwi	25.3	24.6	29.1	21.3	16.5	22.9
	24	Mango	25.3	24.6	29.1	21.3	16.5	22.9
	25	Banana	25.3	24.6	29.1	21.3	16.5	22.9
	26	Peach	11.0	10.0	11.5	10.3	8.0	10.3
	27	Cucumber	17.4	14.9	18.3	20.2	14.9	17.2
	28	Citrus mix	19.8	17.4	20.9	20.7	14.8	18.8
	29	Cacao	24.4	24.4	28.7	20.0	16.1	22.4
	30	CCD antigen	16.2	14.6	17.0	19.5	16.9	16.5
	31	Crab	3.3	4.0	3.8	3.3	3.0	3.6
	32	Shrimp	3.7	4.2	4.2	3.6	3.5	3.9
	33	Blue mussel	5.8	6.3	6.8	5.7	4.5	6.0
	34	Oyster	5.8	6.3	6.8	5.7	4.5	6.0
	35	Clam	5.8	6.3	6.8	5.7	4.5	6.0
	36	Scallop	5.8	6.3	6.8	5.7	4.5	6.0
	37	Lobster	4.5	5.1	5.9	5.0	4.0	5.1
	38	Pacific squid	4.5	5.1	5.9	5.0	4.0	5.1
	39	Mackerel	5.6	5.3	6.1	5.9	4.7	6.0
	40	Plaice	5.5	5.8	6.7	6.2	4.8	6.2
	41	Anchovy	5.5	5.8	6.7	6.2	4.8	6.2
	42	Alaska pollock	5.5	5.8	6.7	6.2	4.8	6.2
	43	Eel	7.0	8.1	8.7	8.9	6.1	8.0
	44	Tuna	4.9	5.4	6.6	5.7	3.9	5.9
	45	Salmon	4.9	5.4	6.6	5.7	3.9	5.8
	46	Codfish	4.8	4.8	5.9	5.5	4.2	5.4
	47	Egg white	2.0	2.0	2.3	2.3	1.7	2.2
	48	Chicken	6.6	5.7	6.6	6.5	5.0	6.4
	49	Milk	1.3	1.4	1.4	1.4	1.2	1.4
	50	Cheese	2.8	2.7	3.3	3.7	2.6	3.3
	51	Pork	2.0	2.4	2.3	1.9	2.0	2.3
	52	Beef	1.3	1.2	1.3	1.3	1.1	1.3
	53	Lamb meat	1.2	1.3	1.1	1.1	1.0	1.2
	54	Yeast	6.5	6.8	8.4	5.1	3.3	7.4
	55	Silkworm pupa	4.2	4.8	4.8	3.9	3.8	4.3

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens					
			37 Pigweed	38 Japanese hop	39 Cat	40 Horse	41 Dog	42 Guinea pig
Food Allergens	1	Wheat	15.1	11.1	1.8	1.4	2.1	3.0
	2	Barley	18.6	13.0	2.1	1.3	2.3	3.2
	3	Corn	22.7	16.3	2.4	1.6	2.5	3.5
	4	Rice	20.4	13.6	2.3	1.5	2.6	3.2
	5	Buckwheat	24.3	18.1	2.3	1.2	2.6	3.1
	6	Sesame	23.3	17.4	2.2	1.3	2.5	2.9
	7	Peanut	16.8	11.0	2.0	1.8	2.4	3.1
	8	Soy bean	11.2	9.1	2.0	2.9	2.9	5.3
	9	Hazel nut	12.6	10.1	2.3	2.6	3.4	5.3
	10	Almond	19.9	14.7	2.1	1.9	2.6	4.1
	11	Pine	19.9	14.7	2.1	1.9	2.6	4.1
	12	Sunflower	19.9	14.7	2.1	1.9	2.6	4.1
	13	Walnut	18.0	12.6	2.0	1.5	2.6	3.1
	14	Sweet nut	23.9	15.5	2.1	1.4	2.2	2.8
	15	Tomato	19.9	12.2	2.1	1.4	2.2	2.7
	16	Carrot	22.8	14.8	2.2	1.3	2.4	2.7
	17	Potato	15.9	8.8	2.0	1.3	2.1	2.4
	18	Garlic	19.7	13.6	2.2	1.7	2.3	2.9
	19	Onion	19.7	13.6	2.2	1.7	2.3	2.9
	20	Celery	21.7	14.4	2.3	1.3	2.4	2.6
	21	Strawberry	21.7	15.9	2.3	1.5	2.4	2.7
	22	Apple	17.6	14.1	2.5	1.2	2.7	3.1
	23	Kiwi	24.2	20.3	2.4	1.3	2.9	3.6
	24	Mango	24.2	20.3	2.4	1.3	2.9	3.6
	25	Banana	24.2	20.3	2.4	1.3	2.9	3.6
	26	Peach	10.5	9.9	2.8	1.3	2.7	2.6
	27	Cucumber	21.6	13.1	2.1	1.2	2.2	2.4
	28	Citrus mix	21.4	15.7	2.4	1.5	2.4	3.0
	29	Cacao	23.3	19.2	2.4	1.2	3.6	3.8
	30	CCD antigen	21.8	11.6	1.6	1.0	1.6	1.9
	31	Crab	3.7	4.6	2.4	1.6	2.1	5.1
	32	Shrimp	4.1	4.1	2.1	1.3	1.9	3.4
	33	Blue mussel	5.7	5.7	3.3	3.1	3.3	5.2
	34	Oyster	5.7	5.7	3.3	3.1	3.3	5.2
	35	Clam	5.7	5.7	3.3	3.1	3.3	5.2
	36	Scallop	5.7	5.7	3.3	3.1	3.3	5.2
	37	Lobster	5.2	5.5	2.8	2.5	2.6	5.5
	38	Pacific squid	5.2	5.5	2.8	2.5	2.6	5.5
	39	Mackerel	5.7	4.2	3.0	4.5	4.2	14.5
	40	Plaice	5.6	3.9	5.0	11.0	7.4	29.7
	41	Anchovy	5.6	3.9	5.0	11.0	7.4	29.7
	42	Alaska pollock	5.6	3.9	5.0	11.0	7.4	29.7
	43	Eel	7.4	5.1	4.1	8.6	5.1	24.8
	44	Tuna	5.7	4.6	3.1	4.4	4.0	15.3
	45	Salmon	5.6	4.6	3.1	4.4	4.0	15.3
	46	Codfish	5.0	4.3	2.9	4.7	3.7	12.5
	47	Egg white	2.1	1.7	2.0	4.3	3.1	6.4
	48	Chicken	5.6	4.4	3.7	7.4	5.7	22.1
	49	Milk	1.3	1.2	1.3	8.7	1.8	3.2
	50	Cheese	3.2	2.1	1.7	4.3	2.6	7.8
	51	Pork	1.9	1.7	4.2	21.8	5.9	30.9
	52	Beef	1.1	1.2	1.6	12.5	1.9	3.9
	53	Lamb meat	1.0	1.1	1.8	39.3	2.1	11.4
	54	Yeast	4.0	5.9	4.7	2.9	4.8	6.9
	55	Silkworm pupa	4.6	4.5	2.0	1.1	1.8	2.9

Supplementary Material 1. (Continued)

Figure 2A			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	1.7	1.7	2.8	3.5	1.8	5.5	23.6
	2	Barley	1.6	1.6	3.4	4.0	1.6	5.9	28.4
	3	Corn	1.8	1.8	4.8	4.5	1.9	5.9	31.1
	4	Rice	1.7	1.7	3.2	3.9	1.8	5.7	30.0
	5	Buckwheat	1.5	1.5	3.8	3.7	1.5	6.9	42.1
	6	Sesame	1.5	1.5	4.4	3.4	1.7	6.5	37.0
	7	Peanut	1.7	1.7	3.2	4.1	1.8	4.6	21.4
	8	Soy bean	2.6	2.6	5.5	6.3	3.1	4.2	21.4
	9	Hazel nut	2.3	2.3	4.8	5.9	3.0	3.9	24.0
	10	Almond	2.0	2.0	5.3	5.0	2.2	6.0	35.5
	11	Pine	2.0	2.0	5.3	5.0	2.2	6.0	35.5
	12	Sunflower	2.0	2.0	5.3	5.0	2.2	6.0	35.5
	13	Walnut	1.7	1.7	3.5	3.4	1.7	5.3	32.3
	14	Sweet nut	1.6	1.6	3.8	3.5	1.5	6.0	30.4
	15	Tomato	1.6	1.6	2.7	3.4	1.6	4.8	21.6
	16	Carrot	1.5	1.5	3.5	3.5	1.6	5.6	27.2
	17	Potato	1.5	1.5	3.1	3.1	1.6	4.2	14.5
	18	Garlic	1.7	1.7	4.5	3.5	1.7	5.0	23.9
	19	Onion	1.7	1.7	4.5	3.5	1.7	5.0	23.9
	20	Celery	1.4	1.4	2.8	3.2	1.5	5.3	25.2
	21	Strawberry	1.6	1.6	3.8	3.5	1.6	5.5	27.9
	22	Apple	1.5	1.5	3.5	3.7	1.6	5.3	29.0
	23	Kiwi	1.8	1.8	5.2	3.9	2.0	7.7	49.2
	24	Mango	1.8	1.8	5.2	3.9	2.0	7.7	49.2
	25	Banana	1.8	1.8	5.2	3.9	2.0	7.7	49.2
	26	Peach	1.4	1.4	3.3	2.9	1.6	3.4	14.9
	27	Cucumber	1.4	1.4	2.5	3.1	1.4	5.3	23.5
	28	Citrus mix	1.7	1.7	3.2	3.7	1.7	5.3	27.4
	29	Cacao	1.6	1.6	13.2	3.6	1.9	8.1	51.7
	30	CCD antigen	1.2	1.2	3.3	2.4	1.1	5.7	22.3
	31	Crab	2.1	2.1	4.1	3.8	2.2	6.6	3.7
	32	Shrimp	1.7	1.7	3.8	2.8	1.7	8.7	4.1
	33	Blue mussel	2.7	2.7	11.0	6.8	3.2	6.4	9.8
	34	Oyster	2.7	2.7	11.0	6.8	3.2	6.4	9.8
	35	Clam	2.7	2.7	11.0	6.8	3.2	6.4	9.8
	36	Scallop	2.7	2.7	11.0	6.8	3.2	6.4	9.8
	37	Lobster	2.5	2.5	5.1	6.3	2.8	7.5	5.5
	38	Pacific squid	2.5	2.5	5.1	6.3	2.8	7.5	5.5
	39	Mackerel	5.4	5.4	14.7	21.0	6.3	3.5	8.4
	40	Plaice	10.8	10.8	26.9	37.3	16.7	3.4	9.1
	41	Anchovy	10.8	10.8	26.9	37.3	16.7	3.4	9.1
	42	Alaska pollock	10.8	10.8	26.9	37.3	16.7	3.4	9.1
	43	Eel	9.0	9.0	32.7	36.8	10.9	4.4	13.4
	44	Tuna	4.7	4.7	7.3	17.8	5.6	4.2	6.3
	45	Salmon	4.7	4.7	7.3	17.8	5.6	4.2	6.2
	46	Codfish	5.1	5.1	6.4	19.4	6.4	3.7	7.1
	47	Egg white	3.4	3.4	5.3	8.6	4.8	1.1	2.8
	48	Chicken	8.2	8.2	20.8	34.3	10.4	3.6	10.0
	49	Milk	7.2	7.2	2.6	3.4	7.0	0.8	1.9
	50	Cheese	3.7	3.7	6.9	11.5	4.8	1.7	3.8
	51	Pork	24.1	24.1	10.4	34.2	33.2	1.8	3.0
	52	Beef	9.0	9.0	2.7	4.5	7.9	1.0	1.3
	53	Lamb meat	26.2	26.1	5.7	10.4	27.9	0.9	1.5
	54	Yeast	4.1	4.1	42.0	7.5	6.0	3.2	4.6
	55	Silkworm pupa	1.6	1.6	2.8	2.3	1.5	8.6	4.9

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	1896.9	2024.9	1978.2	2034.1	1730.9	844.5
	2	Barley	2447.5	2273.0	2314.7	2328.1	2094.9	1639.7
	3	Corn	3212.7	2783.5	3003.7	2868.9	2752.9	1126.2
	4	Rice	2201.1	2014.9	2112.8	2083.6	2004.2	917.9
	5	Buckwheat	2030.7	1818.4	2082.8	1867.0	1760.8	485.3
	6	Sesame	2149.7	1841.2	2060.5	1909.5	1813.2	555.4
	7	Peanut	2532.9	2167.8	2186.8	2109.4	2124.1	766.3
	8	Soy bean	1040.8	695.7	645.0	474.7	743.4	255.9
	9	Hazel nut	967.0	635.9	578.8	496.3	799.2	198.6
	10	Almond	1858.6	1577.3	1682.9	1463.6	1510.3	433.3
	11	Pine	1858.6	1577.3	1682.9	1463.6	1510.3	433.3
	12	Sunflower	1858.6	1577.3	1682.9	1463.6	1510.3	433.3
	13	Walnut	2119.1	1767.5	1906.7	1702.8	1798.0	232.7
	14	Sweet nut	2625.7	2314.7	2547.3	2286.2	2214.5	731.6
	15	Tomato	3137.6	2813.4	2956.1	2866.9	2620.1	791.9
	16	Carrot	2915.6	2628.8	2880.9	2787.0	2500.0	632.9
	17	Potato	3831.6	3706.2	3768.3	4125.5	3472.6	922.4
	18	Garlic	3289.8	2875.9	2991.2	2739.7	2740.8	926.3
	19	Onion	3289.8	2875.9	2991.2	2739.7	2740.8	926.3
	20	Celery	3030.4	2752.9	2983.7	2914.2	2628.9	649.9
	21	Strawberry	2998.5	2551.2	2760.9	2605.5	2545.3	1129.9
	22	Apple	2682.2	2420.0	2614.1	2480.3	2314.5	553.4
	23	Kiwi	1469.7	1233.3	1444.7	1098.2	1172.0	398.1
	24	Mango	1469.7	1233.3	1444.7	1098.2	1172.0	398.1
	25	Banana	1469.7	1233.3	1444.7	1098.2	1172.0	398.1
	26	Peach	4439.7	3912.4	4217.4	3755.8	3756.7	512.4
	27	Cucumber	3049.3	2861.3	3072.8	3100.2	2687.9	730.8
	28	Citrus mix	3210.5	2743.7	2951.9	2783.8	2695.7	866.4
	29	Cacao	444.7	375.7	473.9	287.1	331.4	463.4
	30	CCD antigen	2097.7	2151.5	2323.0	2134.3	1738.1	744.9
	31	Crab	8499.3	8422.8	7044.7	10218.9	10042.0	1150.6
	32	Shrimp	14196.0	15839.2	13245.1	21287.2	12288.5	1880.9
	33	Blue mussel	2168.9	1519.3	1321.0	1517.0	2085.9	109.4
	34	Oyster	2168.9	1519.3	1321.0	1517.0	2085.9	109.4
	35	Clam	2168.9	1519.3	1321.0	1517.0	2085.9	109.4
	36	Scallop	2168.9	1519.3	1321.0	1517.0	2085.9	109.4
	37	Lobster	1006.8	815.7	742.6	897.7	1169.9	33.5
	38	Pacific squid	1006.8	815.7	742.6	897.7	1169.9	33.5
	39	Mackerel	473.0	384.3	280.1	325.5	476.9	220.1
	40	Plaice	623.4	286.0	225.4	257.3	406.9	112.6
	41	Anchovy	623.4	286.0	225.4	257.3	406.9	112.6
	42	Alaska pollock	623.4	286.0	225.4	257.3	406.9	112.6
	43	Eel	292.6	280.7	205.0	200.5	331.5	123.7
	44	Tuna	379.9	323.3	227.5	323.7	422.9	139.8
	45	Salmon	378.5	322.0	226.5	322.6	421.5	139.5
	46	Codfish	562.1	442.5	335.3	450.2	615.5	143.9
	47	Egg white	311.4	20.0	6.6	9.7	66.3	137.8
	48	Chicken	344.6	183.3	127.4	140.1	238.7	151.9
	49	Milk	11.0	0.1	2.0	4.4	0.7	0.0
	50	Cheese	73.6	30.4	15.3	16.8	56.9	28.9
	51	Pork	1159.5	339.2	342.7	350.6	327.6	30.9
	52	Beef	230.2	99.3	77.6	87.6	129.3	0.5
	53	Lamb meat	30.5	8.2	5.2	5.2	17.4	1.4
	54	Yeast	187.2	168.7	122.5	191.0	144.9	9272.3
	55	Silkworm pupa	13734.7	14947.9	12925.4	21178.7	10229.8	2294.4

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	758.2	1129.3	1587.9	538.8	46934.6	42320.3
	2	Barley	752.2	1071.5	1943.0	568.7	64901.4	58042.7
	3	Corn	980.2	1731.2	2000.1	1387.8	100939.2	90210.2
	4	Rice	594.2	1227.9	1995.2	749.5	72249.8	64715.5
	5	Buckwheat	455.6	821.0	1151.9	565.0	65720.6	58167.4
	6	Sesame	526.0	863.7	1144.1	540.2	71327.1	63445.5
	7	Peanut	691.7	1369.6	1676.2	1033.0	87632.1	78581.4
	8	Soy bean	162.7	291.3	405.3	214.4	14548.1	13531.7
	9	Hazel nut	205.3	295.8	409.9	291.2	11409.9	10500.9
	10	Almond	355.1	682.5	1117.7	418.9	53312.1	47786.7
	11	Pine	355.1	682.5	1117.7	418.9	53312.1	47786.7
	12	Sunflower	355.1	682.5	1117.7	418.9	53312.1	47786.7
	13	Walnut	271.0	664.2	1005.3	511.2	47940.2	42686.3
	14	Sweet nut	556.4	861.4	1160.8	513.8	103208.2	91243.9
	15	Tomato	649.2	1392.7	1772.9	1156.9	138847.3	126142.7
	16	Carrot	586.4	1428.4	1641.5	1141.4	121098.6	109459.0
	17	Potato	718.3	1766.3	2174.0	1346.8	202056.4	179280.1
	18	Garlic	778.0	1671.2	1630.8	1508.4	117112.2	108981.2
	19	Onion	778.0	1671.2	1630.8	1508.4	117112.2	108981.2
	20	Celery	544.4	1553.7	1576.0	1418.4	129814.0	119026.0
	21	Strawberry	967.5	1406.7	1450.6	1092.9	102581.0	93210.4
	22	Apple	500.7	1705.4	1436.8	1503.6	59362.5	53581.4
	23	Kiwi	296.8	610.3	609.1	341.1	34797.5	30897.9
	24	Mango	296.8	610.3	609.1	341.1	34797.5	30897.9
	25	Banana	296.8	610.3	609.1	341.1	34797.5	30897.9
	26	Peach	611.2	2403.5	1292.1	3214.9	46341.7	44643.4
	27	Cucumber	584.6	1365.6	1732.1	1078.3	133216.2	119446.7
	28	Citrus mix	727.3	1478.3	1509.0	1335.5	110288.8	100276.1
	29	Cacao	700.4	331.7	786.8	184.0	8379.0	7352.6
	30	CCD antigen	546.3	499.0	1069.4	107.3	126610.4	114138.4
	31	Crab	684.4	885.9	1166.5	557.3	2468.2	2552.8
	32	Shrimp	800.2	1176.7	2048.3	566.0	5650.8	5576.8
	33	Blue mussel	66.2	136.9	150.4	97.5	1675.0	1796.5
	34	Oyster	66.2	136.9	150.4	97.5	1675.0	1796.5
	35	Clam	66.2	136.9	150.4	97.5	1675.0	1796.5
	36	Scallop	66.2	136.9	150.4	97.5	1675.0	1796.5
	37	Lobster	23.8	86.9	140.3	62.7	566.3	582.1
	38	Pacific squid	23.8	86.9	140.3	62.7	566.3	582.1
	39	Mackerel	204.3	335.6	611.0	260.2	1433.3	1325.7
	40	Plaice	137.1	268.8	475.6	221.3	915.0	1007.4
	41	Anchovy	137.1	268.8	475.6	221.3	915.0	1007.4
	42	Alaska pollock	137.1	268.8	475.6	221.3	915.0	1007.4
	43	Eel	89.4	205.4	310.8	161.7	1088.0	1267.1
	44	Tuna	281.2	240.1	514.2	265.6	572.9	618.3
	45	Salmon	280.6	239.6	513.2	264.9	571.5	616.8
	46	Codfish	224.9	260.9	551.7	196.7	1329.3	1372.2
	47	Egg white	99.2	166.7	352.1	325.7	933.9	952.8
	48	Chicken	207.0	162.8	409.3	144.0	989.4	1023.2
	49	Milk	0.5	74.1	28.1	264.0	160.6	157.6
	50	Cheese	21.7	51.5	131.1	104.7	657.5	678.3
	51	Pork	67.4	109.0	327.6	128.8	181.4	172.4
	52	Beef	0.1	23.3	14.7	213.5	52.1	67.2
	53	Lamb meat	0.1	4.3	7.7	65.4	2.7	6.2
	54	Yeast	13402.5	5643.7	6989.4	3463.1	116.9	119.7
	55	Silkworm pupa	1045.1	1258.5	2342.9	531.7	7160.6	6928.4

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			13	14	15	16	17	18
			Orchard grass	Reed	Bent grass	Timothy grass	Cultivated rye	Alder
Food Allergens	1	Wheat	42320.3	42320.3	42320.3	47940.5	59456.8	80792.1
	2	Barley	58042.7	58042.7	58042.7	66610.2	83022.3	100293.0
	3	Corn	90210.2	90210.2	90210.2	104070.6	128974.8	166821.4
	4	Rice	64715.5	64715.5	64715.5	73255.5	86611.3	107316.4
	5	Buckwheat	58167.4	58167.4	58167.4	67416.1	87516.4	133720.1
	6	Sesame	63445.5	63445.5	63445.5	73166.8	94597.1	129906.9
	7	Peanut	78581.4	78581.4	78581.4	89214.5	106067.5	123878.7
	8	Soy bean	13531.7	13531.7	13531.7	14890.7	17866.6	24210.7
	9	Hazel nut	10500.9	10500.9	10500.9	11506.4	13343.4	19733.3
	10	Almond	47786.7	47786.7	47786.7	54320.0	68033.5	97988.8
	11	Pine	47786.7	47786.7	47786.7	54320.0	68033.5	97988.8
	12	Sunflower	47786.7	47786.7	47786.7	54320.0	68033.5	97988.8
	13	Walnut	42686.3	42686.3	42686.3	48286.3	59097.1	86627.3
	14	Sweet nut	91243.9	91243.9	91243.9	105570.4	135774.7	134802.5
	15	Tomato	126142.7	126142.7	126142.7	140671.0	160318.6	138687.8
	16	Carrot	109459.0	109459.0	109459.0	125049.2	153116.5	173608.3
	17	Potato	179280.1	179280.1	179280.1	182523.8	169457.7	102823.5
	18	Garlic	108981.2	108981.2	108981.2	121403.5	148697.6	131250.5
	19	Onion	108981.2	108981.2	108981.2	121403.5	148697.6	131250.5
	20	Celery	119026.0	119026.0	119026.0	133869.2	155820.9	173866.5
	21	Strawberry	93210.4	93210.4	93210.4	105967.5	130876.4	139382.5
	22	Apple	53581.4	53581.4	53581.4	59913.3	70069.0	122298.1
	23	Kiwi	30897.9	30897.9	30897.9	35707.8	45862.0	71649.6
	24	Mango	30897.9	30897.9	30897.9	35707.8	45862.0	71649.6
	25	Banana	30897.9	30897.9	30897.9	35707.8	45862.0	71649.6
	26	Peach	44643.4	44643.4	44643.4	47202.3	49474.8	97278.9
	27	Cucumber	119446.7	119446.7	119446.7	137244.8	165735.0	151767.3
	28	Citrus mix	100276.1	100276.1	100276.1	113818.5	137144.5	158595.6
	29	Cacao	7352.6	7352.6	7352.6	8568.1	10994.1	17437.2
	30	CCD antigen	114138.4	114138.4	114138.4	130964.2	162070.5	94793.0
	31	Crab	2552.8	2552.8	2552.8	2282.1	2238.1	1631.8
	32	Shrimp	5576.8	5576.8	5576.8	5132.7	4895.0	3517.1
	33	Blue mussel	1796.5	1796.5	1796.5	1720.3	1747.6	1991.7
	34	Oyster	1796.5	1796.5	1796.5	1720.3	1747.6	1991.7
	35	Clam	1796.5	1796.5	1796.5	1720.3	1747.6	1991.7
	36	Scallop	1796.5	1796.5	1796.5	1720.3	1747.6	1991.7
	37	Lobster	582.1	582.1	582.1	501.9	440.1	425.2
	38	Pacific squid	582.1	582.1	582.1	501.9	440.1	425.2
	39	Mackerel	1325.7	1325.7	1325.7	1307.2	1123.8	1035.9
	40	Plaice	1007.4	1007.4	1007.4	861.6	611.1	691.8
	41	Anchovy	1007.4	1007.4	1007.4	861.6	611.1	691.8
	42	Alaska pollock	1007.4	1007.4	1007.4	861.6	611.1	691.8
	43	Eel	1267.1	1267.1	1267.1	1120.5	868.4	782.3
	44	Tuna	618.3	618.3	618.3	577.3	532.2	648.6
	45	Salmon	616.8	616.8	616.8	575.9	530.9	647.2
	46	Codfish	1372.2	1372.2	1372.2	1291.4	990.3	1057.6
	47	Egg white	952.8	952.8	952.8	915.5	746.8	694.1
	48	Chicken	1023.2	1023.2	1023.2	1039.4	839.2	641.6
	49	Milk	157.6	157.6	157.6	162.9	112.1	154.5
	50	Cheese	678.3	678.3	678.3	597.9	490.0	492.6
	51	Pork	172.4	172.4	172.4	161.4	72.4	119.9
	52	Beef	67.2	67.2	67.2	60.0	61.8	90.4
	53	Lamb meat	6.2	6.2	6.2	8.7	3.8	4.9
	54	Yeast	119.7	119.7	119.7	155.1	127.8	137.4
	55	Silkworm pupa	6928.4	6928.4	6928.4	6540.3	6306.9	4801.2

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	25064.1	71739.6	60415.6	107935.9	76103.1	54001.5
	2	Barley	34268.8	98918.0	86326.2	137509.5	104593.0	74534.0
	3	Corn	51864.4	158028.7	125739.1	200738.9	165469.9	112768.8
	4	Rice	34446.0	99422.9	74425.1	127240.8	113438.2	81490.5
	5	Buckwheat	43498.9	115683.0	96197.2	177286.8	116247.3	76498.5
	6	Sesame	42753.7	116089.5	94599.3	180491.8	123562.5	83285.9
	7	Peanut	35378.1	113445.8	87976.7	138329.4	138231.3	99578.1
	8	Soy bean	14713.0	25504.6	18754.8	35106.3	22365.4	16523.2
	9	Hazel nut	11009.7	19116.6	13862.3	26817.4	17706.2	13028.5
	10	Almond	38668.2	93946.9	76172.7	133237.5	90512.9	61429.9
	11	Pine	38668.2	93946.9	76172.7	133237.5	90512.9	61429.9
	12	Sunflower	38668.2	93946.9	76172.7	133237.5	90512.9	61429.9
	13	Walnut	30055.8	78450.6	61293.2	109098.4	79417.0	54812.6
	14	Sweet nut	44703.7	130594.6	117158.6	165738.7	160027.5	117474.7
	15	Tomato	42380.2	141922.0	109940.6	146729.2	186565.0	148240.3
	16	Carrot	48040.7	164812.5	123552.6	195578.4	200901.1	136366.0
	17	Potato	34543.2	113635.0	80855.2	102882.5	168391.7	168931.7
	18	Garlic	48785.6	167399.4	114345.8	159668.5	174002.7	130540.3
	19	Onion	48785.6	167399.4	114345.8	159668.5	174002.7	130540.3
	20	Celery	55590.8	180048.2	133988.4	187736.5	207101.3	143171.6
	21	Strawberry	53098.7	151286.0	116061.1	177839.6	165424.1	117705.0
	22	Apple	72349.1	105570.7	87104.8	136952.5	96338.5	67730.6
	23	Kiwi	41825.8	66435.6	54972.3	112513.2	60947.6	40269.0
	24	Mango	41825.8	66435.6	54972.3	112513.2	60947.6	40269.0
	25	Banana	41825.8	66435.6	54972.3	112513.2	60947.6	40269.0
	26	Peach	196985.7	79603.9	126140.1	78919.4	62928.5	49806.2
	27	Cucumber	41768.8	144589.3	112200.2	164269.3	203798.3	148300.1
	28	Citrus mix	54852.2	163659.1	125631.6	181345.9	173094.6	122159.8
	29	Cacao	10648.3	16032.0	13510.8	27635.9	14747.0	9812.2
	30	CCD antigen	25828.7	94300.8	91136.5	116548.3	146226.4	125908.1
	31	Crab	1070.1	2356.5	1984.9	1752.5	2155.2	3129.5
	32	Shrimp	1888.5	4202.1	3644.2	3980.6	4633.2	6177.9
	33	Blue mussel	1418.7	2723.0	1893.0	2904.1	2275.1	2031.8
	34	Oyster	1418.7	2723.0	1893.0	2904.1	2275.1	2031.8
	35	Clam	1418.7	2723.0	1893.0	2904.1	2275.1	2031.8
	36	Scallop	1418.7	2723.0	1893.0	2904.1	2275.1	2031.8
	37	Lobster	269.8	691.8	453.8	482.3	743.7	669.0
	38	Pacific squid	269.8	691.8	453.8	482.3	743.7	669.0
	39	Mackerel	537.8	1492.1	859.0	722.7	902.8	1159.0
	40	Plaice	572.6	1147.7	721.8	594.8	577.7	749.9
	41	Anchovy	572.6	1147.7	721.8	594.8	577.7	749.9
	42	Alaska pollock	572.6	1147.7	721.8	594.8	577.7	749.9
	43	Eel	845.6	1741.9	1173.4	714.8	706.4	951.3
	44	Tuna	323.0	844.9	373.5	429.4	486.1	611.0
	45	Salmon	322.2	843.1	372.6	428.5	484.9	609.6
	46	Codfish	544.1	1507.1	793.2	716.1	1072.2	1289.0
	47	Egg white	254.0	1040.2	390.1	463.5	787.0	1153.3
	48	Chicken	413.8	1111.4	726.9	458.4	591.3	886.3
	49	Milk	33.1	322.1	77.0	79.2	194.5	250.9
	50	Cheese	245.5	729.2	345.7	314.8	529.4	648.5
	51	Pork	111.8	167.2	94.0	44.2	109.1	183.7
	52	Beef	12.7	144.0	54.0	25.1	66.9	109.5
	53	Lamb meat	1.1	11.3	5.6	0.1	0.9	5.7
	54	Yeast	55.7	128.6	69.7	83.3	92.5	228.8
	55	Silkworm pupa	2132.7	5185.4	4588.1	5435.1	6221.3	7527.2

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	77613.7	89507.4	89959.0	31901.7	83806.8	63100.5
	2	Barley	102837.0	118075.7	123070.4	50607.0	112597.4	88664.9
	3	Corn	164704.1	187645.0	190636.7	60106.1	177625.2	140307.5
	4	Rice	106049.5	122622.2	124843.7	39735.1	125400.3	88957.9
	5	Buckwheat	123462.4	145259.0	151680.3	56696.7	133105.3	93725.1
	6	Sesame	124464.9	144242.3	145942.2	56275.2	137060.9	98498.9
	7	Peanut	121387.5	141279.1	141276.6	38840.9	145168.7	107450.9
	8	Soy bean	26429.2	25938.8	29108.7	22752.1	23680.7	18103.3
	9	Hazel nut	19675.4	20213.4	22387.5	20048.6	19129.9	13770.2
	10	Almond	99274.0	110586.2	119889.3	53051.9	101351.2	72313.3
	11	Pine	99274.0	110586.2	119889.3	53051.9	101351.2	72313.3
	12	Sunflower	99274.0	110586.2	119889.3	53051.9	101351.2	72313.3
	13	Walnut	84986.0	95814.2	101783.3	39245.2	88260.0	61859.1
	14	Sweet nut	134688.5	164118.5	171402.7	56359.4	171849.8	140412.5
	15	Tomato	143850.6	168399.2	167775.2	44859.0	191856.1	162479.0
	16	Carrot	175355.7	205674.6	202770.1	55405.0	210706.3	162610.0
	17	Potato	115294.0	128802.8	124690.3	30452.4	165345.1	144936.8
	18	Garlic	162146.5	163138.6	194265.7	58671.8	163419.2	147018.1
	19	Onion	162146.5	163138.6	194265.7	58671.8	163419.2	147018.1
	20	Celery	192781.6	209546.8	215591.7	57037.5	205795.7	170865.4
	21	Strawberry	154176.0	161014.4	182134.4	64551.6	166836.3	136989.3
	22	Apple	106616.2	114667.1	120260.8	49805.9	103679.8	75375.1
	23	Kiwi	70659.6	76930.7	84057.0	71746.1	69829.8	50030.8
	24	Mango	70659.6	76930.7	84057.0	71746.1	69829.8	50030.8
	25	Banana	70659.6	76930.7	84057.0	71746.1	69829.8	50030.8
	26	Peach	72416.3	68321.0	73424.3	30935.5	62814.4	53555.1
	27	Cucumber	151554.8	184748.4	178493.1	44833.5	211584.3	166647.4
	28	Citrus mix	166575.7	175635.6	191861.2	61915.4	172427.4	147863.7
	29	Cacao	16886.2	18863.0	20652.6	24460.6	17228.0	11841.0
	30	CCD antigen	97607.6	126853.5	115390.7	37006.4	155444.3	149962.9
	31	Crab	2286.2	2024.3	2080.4	1252.8	2108.6	2464.8
	32	Shrimp	4294.4	4506.7	4302.7	2306.0	4877.5	4848.4
	33	Blue mussel	2571.3	2489.7	2830.2	2964.6	2281.6	1842.1
	34	Oyster	2571.3	2489.7	2830.2	2964.6	2281.6	1842.1
	35	Clam	2571.3	2489.7	2830.2	2964.6	2281.6	1842.1
	36	Scallop	2571.3	2489.7	2830.2	2964.6	2281.6	1842.1
	37	Lobster	784.7	705.4	722.5	297.3	657.5	588.5
	38	Pacific squid	784.7	705.4	722.5	297.3	657.5	588.5
	39	Mackerel	1554.8	1011.8	929.7	454.1	941.2	1102.0
	40	Plaice	1353.6	801.2	758.6	311.8	708.6	657.6
	41	Anchovy	1353.6	801.2	758.6	311.8	708.6	657.6
	42	Alaska pollock	1353.6	801.2	758.6	311.8	708.6	657.6
	43	Eel	1541.6	939.9	1086.0	568.9	838.5	897.4
	44	Tuna	803.0	539.7	489.0	158.7	543.9	620.5
	45	Salmon	801.4	538.5	487.9	158.3	542.7	619.1
	46	Codfish	1626.6	1118.5	1104.8	411.4	1048.7	1029.4
	47	Egg white	1053.2	577.0	812.0	253.3	621.3	567.4
	48	Chicken	1149.1	816.4	696.7	294.1	766.7	870.8
	49	Milk	448.8	143.1	183.0	31.2	126.3	117.6
	50	Cheese	761.8	425.0	487.0	110.7	506.8	373.0
	51	Pork	183.3	163.3	84.6	80.5	153.1	137.4
	52	Beef	155.4	49.8	70.8	21.8	60.7	48.5
	53	Lamb meat	29.9	1.4	5.0	2.7	0.6	5.4
	54	Yeast	160.1	103.6	127.7	82.3	151.8	85.5
	55	Silkworm pupa	5526.9	6013.5	5735.3	3360.1	6638.5	6288.4

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			31	32	33	34	35	36
			Mugwort	Ox-eye daisy	Dandelion	Plantain	Russian thistle	Goldenrod
Food Allergens	1	Wheat	61253.8	47839.3	73458.4	69323.3	47576.6	64689.0
	2	Barley	95297.8	79071.8	100550.0	96585.5	67074.3	91535.7
	3	Corn	126577.7	97066.8	135827.1	153754.6	96540.5	125197.8
	4	Rice	80303.1	59097.0	90191.3	107123.1	68516.4	83581.4
	5	Buckwheat	101039.1	78811.8	132138.7	102307.8	67079.6	102230.0
	6	Sesame	100161.7	76201.2	117002.2	110411.0	68944.1	97025.5
	7	Peanut	92414.2	64844.4	95393.5	125546.1	72557.3	92549.3
	8	Soy bean	21470.7	20878.1	25318.0	21108.4	13367.4	20669.3
	9	Hazel nut	16734.7	15419.3	19143.2	15963.5	8848.8	15222.1
	10	Almond	83934.2	72109.2	104223.1	81779.5	54338.2	81678.7
	11	Pine	83934.2	72109.2	104223.1	81779.5	54338.2	81678.7
	12	Sunflower	83934.2	72109.2	104223.1	81779.5	54338.2	81678.7
	13	Walnut	68574.2	54063.4	81838.4	71282.5	46978.1	70315.8
	14	Sweet nut	120614.9	98004.3	127943.8	156726.8	101182.6	119313.8
	15	Tomato	110088.9	75434.1	97646.6	189074.2	123820.0	114015.4
	16	Carrot	117319.3	81761.2	127441.1	184093.8	115279.9	130065.3
	17	Potato	82843.8	57672.2	70996.6	190012.8	172876.2	89076.5
	18	Garlic	115360.1	85130.8	110200.8	169282.3	103024.3	109526.0
	19	Onion	115360.1	85130.8	110200.8	169282.3	103024.3	109526.0
	20	Celery	124795.2	86168.7	119622.8	193566.3	124617.4	139422.1
	21	Strawberry	112529.4	85433.7	109881.0	152227.0	92505.2	105654.5
	22	Apple	85941.4	62723.6	92022.1	85724.7	57370.1	82040.4
	23	Kiwi	63669.8	58509.5	71797.2	54058.1	38102.9	55689.1
	24	Mango	63669.8	58509.5	71797.2	54058.1	38102.9	55689.1
	25	Banana	63669.8	58509.5	71797.2	54058.1	38102.9	55689.1
	26	Peach	55790.0	44614.7	52189.9	58758.9	39997.8	52037.0
	27	Cucumber	116512.6	81806.8	108675.9	191688.8	122262.9	121689.8
	28	Citrus mix	122138.0	91796.9	115591.8	163274.8	98079.5	117777.2
	29	Cacao	16230.2	15744.8	19169.8	12965.5	9938.3	14553.6
	30	CCD antigen	91097.7	70724.8	85226.6	162723.0	147733.3	102098.1
	31	Crab	2048.3	3345.8	2553.2	2430.4	2215.1	2680.2
	32	Shrimp	4819.2	6602.2	5703.0	5223.7	5849.3	5860.0
	33	Blue mussel	1835.7	2191.5	2310.9	2197.7	1426.0	2154.9
	34	Oyster	1835.7	2191.5	2310.9	2197.7	1426.0	2154.9
	35	Clam	1835.7	2191.5	2310.9	2197.7	1426.0	2154.9
	36	Scallop	1835.7	2191.5	2310.9	2197.7	1426.0	2154.9
	37	Lobster	398.1	527.6	653.2	647.2	432.2	602.2
	38	Pacific squid	398.1	527.6	653.2	647.2	432.2	602.2
	39	Mackerel	878.6	754.8	920.7	1213.8	826.6	1110.7
	40	Plaice	592.9	641.2	797.6	943.1	615.6	850.7
	41	Anchovy	592.9	641.2	797.6	943.1	615.6	850.7
	42	Alaska pollock	592.9	641.2	797.6	943.1	615.6	850.7
	43	Eel	673.1	919.4	930.2	1417.2	732.9	984.4
	44	Tuna	344.2	431.7	619.0	626.2	288.7	583.9
	45	Salmon	343.3	430.7	617.7	624.8	287.9	582.6
	46	Codfish	754.5	742.9	1036.8	1299.4	784.0	1100.3
	47	Egg white	389.9	369.1	524.6	746.6	237.8	576.4
	48	Chicken	842.4	586.0	718.7	982.5	627.0	846.2
	49	Milk	55.8	76.5	66.8	142.1	22.8	79.9
	50	Cheese	254.0	238.3	366.2	694.4	323.3	478.1
	51	Pork	146.7	251.7	204.0	152.3	187.3	238.8
	52	Beef	44.6	35.6	54.0	61.6	7.4	57.7
	53	Lamb meat	5.4	7.3	0.6	1.5	0.1	3.9
	54	Yeast	199.0	216.8	306.0	135.0	50.2	294.2
	55	Silkworm pupa	6426.8	8831.3	7911.0	6639.8	7611.0	7406.4

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens					
			37	38	39	40	41	42
			Pigweed	Japanese hop	Cat	Horse	Dog	Guinea pig
Food Allergens	1	Wheat	74927.0	46040.6	663.2	26.5	1041.3	491.8
	2	Barley	107076.8	59420.8	1148.1	18.5	1344.0	537.0
	3	Corn	155300.7	92108.7	1852.2	53.2	1636.7	651.1
	4	Rice	108779.5	54623.8	1327.0	38.4	1625.9	440.3
	5	Buckwheat	116337.5	74332.3	1003.9	5.4	1167.6	293.8
	6	Sesame	117293.8	75884.0	939.5	8.8	1141.3	277.1
	7	Peanut	124296.7	59885.7	1391.3	135.0	2174.4	671.3
	8	Soy bean	20976.4	15869.7	532.8	317.5	1578.6	1150.5
	9	Hazel nut	16339.1	11891.7	578.2	143.3	1548.9	701.2
	10	Almond	89734.5	56715.1	960.5	86.5	1451.6	747.8
	11	Pine	89734.5	56715.1	960.5	86.5	1451.6	747.8
	12	Sunflower	89734.5	56715.1	960.5	86.5	1451.6	747.8
	13	Walnut	78416.2	43240.3	829.7	28.0	1501.4	372.7
	14	Sweet nut	166951.8	79743.3	1106.7	21.1	977.9	309.9
	15	Tomato	177734.9	73962.3	1734.6	45.0	1588.4	446.8
	16	Carrot	180235.0	86860.1	1623.2	19.0	1494.7	361.0
	17	Potato	168841.0	55991.6	2313.2	32.3	2067.7	479.1
	18	Garlic	154278.2	82663.6	1953.8	84.6	1634.9	517.5
	19	Onion	154278.2	82663.6	1953.8	84.6	1634.9	517.5
	20	Celery	181014.0	90230.3	1934.1	15.8	1771.0	346.3
	21	Strawberry	145431.9	90121.7	1636.3	41.7	1329.5	306.5
	22	Apple	87578.3	64830.1	2027.1	8.0	2069.0	429.6
	23	Kiwi	60784.3	50375.7	611.9	4.6	876.7	233.1
	24	Mango	60784.3	50375.7	611.9	4.6	876.7	233.1
	25	Banana	60784.3	50375.7	611.9	4.6	876.7	233.1
	26	Peach	52566.8	55807.0	5271.3	25.0	3743.6	442.2
	27	Cucumber	190575.4	79260.7	1727.3	6.1	1419.9	295.4
	28	Citrus mix	151809.8	94320.3	1930.8	38.7	1620.7	467.2
	29	Cacao	15367.7	12172.5	182.2	0.3	435.9	77.3
	30	CCD antigen	177607.2	55700.0	488.5	0.2	351.0	97.9
	31	Crab	2802.2	6007.2	2113.2	68.1	1037.4	2032.9
	32	Shrimp	6532.1	7834.7	2232.3	26.1	1050.1	1182.5
	33	Blue mussel	1906.3	2206.1	1251.3	166.9	949.3	468.3
	34	Oyster	1906.3	2206.1	1251.3	166.9	949.3	468.3
	35	Clam	1906.3	2206.1	1251.3	166.9	949.3	468.3
	36	Scallop	1906.3	2206.1	1251.3	166.9	949.3	468.3
	37	Lobster	602.6	837.0	325.3	33.0	178.9	217.5
	38	Pacific squid	602.6	837.0	325.3	33.0	178.9	217.5
	39	Mackerel	958.9	542.3	504.9	245.5	943.1	2467.5
	40	Plaice	644.3	298.1	1379.4	1364.3	2682.2	7783.1
	41	Anchovy	644.3	298.1	1379.4	1364.3	2682.2	7783.1
	42	Alaska pollock	644.3	298.1	1379.4	1364.3	2682.2	7783.1
	43	Eel	790.2	399.2	555.4	512.1	722.2	3474.1
	44	Tuna	520.6	378.4	316.5	127.6	475.0	1534.8
	45	Salmon	519.4	377.4	315.5	127.3	473.7	1532.0
	46	Codfish	887.5	712.9	545.1	342.6	850.1	2237.0
	47	Egg white	434.4	234.5	1025.0	1873.5	3805.7	3483.2
	48	Chicken	593.9	378.8	595.7	512.7	1306.9	3916.9
	49	Milk	39.1	19.6	175.4	16404.6	818.3	944.5
	50	Cheese	411.1	122.4	115.9	419.8	467.9	1224.1
	51	Pork	124.2	81.7	4384.4	28408.5	7464.4	40764.6
	52	Beef	13.5	35.2	872.5	44336.7	1253.8	1980.2
	53	Lamb meat	0.1	1.0	212.9	80585.9	342.4	4161.9
	54	Yeast	63.8	199.8	283.9	11.0	219.3	75.7
	55	Silkworm pupa	8856.8	9513.4	2108.1	4.5	893.7	783.4

Supplementary Material 1. (Continued)

Figure 2B			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	123.3	123.4	20.5	361.4	97.4	18805.0	84620.5
	2	Barley	106.5	106.5	33.1	470.7	59.7	20456.0	114505.7
	3	Corn	145.9	145.9	80.7	634.1	100.4	19958.6	130739.5
	4	Rice	116.3	116.3	24.8	374.2	77.3	15918.7	106307.0
	5	Buckwheat	48.5	48.6	29.1	241.3	21.7	18780.9	158236.5
	6	Sesame	50.7	50.7	48.0	206.4	47.0	17598.6	134247.5
	7	Peanut	198.2	198.2	39.9	716.8	134.4	15676.3	91299.7
	8	Soy bean	383.2	383.3	69.5	862.8	354.8	5305.3	36815.8
	9	Hazel nut	158.4	158.4	30.2	456.8	191.3	2472.5	28059.2
	10	Almond	179.8	179.8	81.1	631.9	152.7	15383.5	131117.5
	11	Pine	179.8	179.8	81.1	631.9	152.7	15383.5	131117.5
	12	Sunflower	179.8	179.8	81.1	631.9	152.7	15383.5	131117.5
	13	Walnut	90.1	90.1	27.9	237.6	57.2	12576.7	115810.4
	14	Sweet nut	96.1	96.1	43.9	311.4	27.8	19569.8	121303.9
	15	Tomato	119.9	120.0	24.6	444.9	65.9	18247.4	92240.3
	16	Carrot	84.6	84.6	41.7	357.0	57.6	19672.7	114813.5
	17	Potato	120.4	120.5	59.5	529.7	95.6	19483.6	60755.3
	18	Garlic	171.4	171.4	93.0	439.6	97.5	17462.1	101346.1
	19	Onion	171.4	171.4	93.0	439.6	97.5	17462.1	101346.1
	20	Celery	61.5	61.5	22.7	303.9	40.0	19023.6	108253.3
	21	Strawberry	109.0	109.1	44.8	330.9	45.8	17079.3	107876.5
	22	Apple	55.7	55.8	34.0	354.4	52.9	14464.1	108872.4
	23	Kiwi	59.8	59.9	33.6	147.6	41.7	12512.7	114950.2
	24	Mango	59.8	59.9	33.6	147.6	41.7	12512.7	114950.2
	25	Banana	59.8	59.9	33.6	147.6	41.7	12512.7	114950.2
	26	Peach	57.2	57.3	52.4	323.4	76.4	8183.2	49899.4
	27	Cucumber	61.4	61.4	16.4	309.9	31.1	20580.9	100392.3
	28	Citrus mix	141.9	142.0	30.4	408.2	65.2	17113.6	110929.1
	29	Cacao	7.3	7.3	79.0	31.5	10.2	3847.8	34865.8
	30	CCD antigen	19.7	19.7	36.0	126.8	0.6	22796.4	81961.9
	31	Crab	358.9	359.0	66.4	487.0	236.0	30859.2	1228.3
	32	Shrimp	290.8	291.0	90.7	325.8	147.5	100345.0	2904.6
	33	Blue mussel	190.9	191.0	145.4	441.7	172.3	6226.0	2851.9
	34	Oyster	190.9	191.0	145.4	441.7	172.3	6226.0	2851.9
	35	Clam	190.9	191.0	145.4	441.7	172.3	6226.0	2851.9
	36	Scallop	190.9	191.0	145.4	441.7	172.3	6226.0	2851.9
	37	Lobster	62.5	62.5	9.9	145.7	44.5	3604.9	298.2
	38	Pacific squid	62.5	62.5	9.9	145.7	44.5	3604.9	298.2
	39	Mackerel	656.8	656.9	140.6	2689.1	508.4	684.4	1038.3
	40	Plaice	2242.1	2242.3	349.8	6150.9	3057.8	446.9	873.1
	41	Anchovy	2242.1	2242.3	349.8	6150.9	3057.8	446.9	873.1
	42	Alaska pollock	2242.1	2242.3	349.8	6150.9	3057.8	446.9	873.1
	43	Eel	969.5	969.6	338.5	3868.3	779.1	553.1	1317.8
	44	Tuna	253.0	253.0	16.2	1047.8	207.2	622.2	291.2
	45	Salmon	252.4	252.4	16.2	1045.9	206.8	620.6	290.5
	46	Codfish	699.8	699.9	27.5	2821.4	645.4	993.4	895.8
	47	Egg white	1765.9	1766.2	122.1	3443.9	2283.4	10.5	536.8
	48	Chicken	1105.6	1105.8	188.6	4788.7	1009.7	455.6	997.4
	49	Milk	18275.3	18265.3	28.3	542.3	9257.9	39.0	229.5
	50	Cheese	481.4	481.5	50.0	1432.5	502.9	102.5	299.5
	51	Pork	59970.6	59977.0	220.1	24763.0	61799.2	245.5	254.9
	52	Beef	36301.6	36290.1	35.7	1417.2	14434.1	3.5	33.9
	53	Lamb meat	59546.0	59502.0	46.8	1669.6	36262.6	5.3	13.0
	54	Yeast	51.8	51.8	200.0	44.9	70.6	82.2	39.4
	55	Silkworm pupa	200.0	200.1	36.7	166.8	72.2	96656.6	4386.9

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	1.7	1.6	1.6	1.7	1.8	5.2
	2	Barley	2.0	1.8	1.7	2.0	2.0	6.9
	3	Corn	2.5	2.2	2.2	2.5	2.6	7.5
	4	Rice	2.1	2.0	1.9	2.1	2.2	4.8
	5	Buckwheat	2.4	2.2	2.2	2.5	2.5	7.2
	6	Sesame	2.4	2.2	2.1	2.4	2.5	6.7
	7	Peanut	1.7	1.6	1.6	1.7	1.7	4.1
	8	Soy bean	1.5	1.4	1.3	1.3	1.5	4.5
	9	Hazel nut	1.8	1.7	1.6	1.7	1.9	5.5
	10	Almond	2.0	1.8	1.7	1.9	2.0	6.0
	11	Pine	2.0	1.8	1.7	1.9	2.0	6.0
	12	Sunflower	2.0	1.8	1.7	1.9	2.0	6.0
	13	Walnut	2.1	1.9	1.9	2.1	2.2	4.7
	14	Sweet nut	2.4	2.2	2.1	2.4	2.5	7.4
	15	Tomato	2.1	2.0	1.9	2.1	2.2	5.3
	16	Carrot	2.3	2.1	2.1	2.4	2.4	5.8
	17	Potato	2.1	2.0	2.0	2.2	2.2	4.5
	18	Garlic	2.1	1.9	1.9	2.1	2.1	5.6
	19	Onion	2.1	1.9	1.9	2.1	2.1	5.6
	20	Celery	2.2	2.1	2.1	2.3	2.3	5.2
	21	Strawberry	2.3	2.1	2.1	2.3	2.4	7.0
	22	Apple	2.2	2.1	2.1	2.3	2.3	5.7
	23	Kiwi	2.5	2.2	2.2	2.5	2.5	8.5
	24	Mango	2.5	2.2	2.2	2.5	2.5	8.5
	25	Banana	2.5	2.2	2.2	2.5	2.5	8.5
	26	Peach	2.2	2.1	2.1	2.3	2.3	4.0
	27	Cucumber	2.2	2.1	2.1	2.3	2.3	5.6
	28	Citrus mix	2.3	2.1	2.1	2.3	2.4	5.9
	29	Cacao	2.2	1.9	2.0	2.0	2.1	14.9
	30	CCD antigen	2.2	2.1	2.0	2.2	2.3	7.8
	31	Crab	2.9	2.9	2.7	3.3	3.5	3.3
	32	Shrimp	2.9	3.0	2.8	3.6	3.4	3.1
	33	Blue mussel	2.9	2.7	2.5	3.1	3.3	3.0
	34	Oyster	2.9	2.7	2.5	3.1	3.3	3.0
	35	Clam	2.9	2.7	2.5	3.1	3.3	3.0
	36	Scallop	2.9	2.7	2.5	3.1	3.3	3.0
	37	Lobster	3.7	3.4	3.3	4.1	4.5	3.4
	38	Pacific squid	3.7	3.4	3.3	4.1	4.5	3.4
	39	Mackerel	2.1	2.0	1.8	2.1	2.3	6.8
	40	Plaice	2.5	2.1	1.9	2.1	2.4	7.1
	41	Anchovy	2.5	2.1	1.9	2.1	2.4	7.1
	42	Alaska pollock	2.5	2.1	1.9	2.1	2.4	7.1
	43	Eel	2.4	2.4	2.1	2.4	2.6	9.4
	44	Tuna	2.4	2.3	2.1	2.5	2.7	10.4
	45	Salmon	2.4	2.3	2.1	2.5	2.7	10.4
	46	Codfish	2.2	2.1	1.9	2.2	2.4	5.9
	47	Egg white	1.1	1.0	0.9	0.9	1.0	2.8
	48	Chicken	2.0	1.6	1.4	1.6	1.8	6.7
	49	Milk	0.9	0.9	0.9	0.9	0.9	1.5
	50	Cheese	1.2	1.2	1.1	1.1	1.2	4.1
	51	Pork	2.1	1.4	1.4	1.5	1.5	3.2
	52	Beef	1.0	1.0	1.0	1.0	1.0	1.4
	53	Lamb meat	0.9	0.9	0.9	0.9	0.9	1.7
	54	Yeast	2.8	2.8	2.6	3.2	2.7	144.9
	55	Silkworm pupa	3.0	2.9	2.8	3.7	3.0	4.6

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	4.8	4.1	5.8	3.0	9.8	9.0
	2	Barley	5.7	4.1	6.8	3.2	10.9	10.1
	3	Corn	6.9	5.8	7.2	4.7	15.4	13.9
	4	Rice	5.4	4.6	6.8	3.3	12.7	11.6
	5	Buckwheat	7.4	6.0	7.4	4.5	14.7	13.3
	6	Sesame	6.6	5.2	6.9	3.9	14.3	12.9
	7	Peanut	3.9	3.0	4.4	2.5	8.8	8.1
	8	Soy bean	3.4	2.1	4.2	1.8	5.4	5.1
	9	Hazel nut	4.4	2.6	5.1	2.2	7.1	6.6
	10	Almond	5.3	3.9	5.8	2.9	9.5	8.8
	11	Pine	5.3	3.9	5.8	2.9	9.5	8.8
	12	Sunflower	5.3	3.9	5.8	2.9	9.5	8.8
	13	Walnut	4.4	3.4	5.2	2.7	8.2	7.5
	14	Sweet nut	6.2	5.0	6.5	4.0	14.9	13.5
	15	Tomato	5.1	4.3	5.2	3.6	13.6	12.5
	16	Carrot	5.6	5.6	6.0	4.5	15.7	14.3
	17	Potato	4.2	4.3	5.1	3.4	13.2	12.0
	18	Garlic	5.6	4.3	5.0	3.6	12.5	11.8
	19	Onion	5.6	4.3	5.0	3.6	12.5	11.8
	20	Celery	5.0	5.1	5.7	4.2	15.1	14.0
	21	Strawberry	6.5	5.0	5.8	4.2	15.1	13.9
	22	Apple	5.3	5.4	6.0	4.0	12.5	11.5
	23	Kiwi	7.5	6.3	8.3	4.7	14.8	13.4
	24	Mango	7.5	6.3	8.3	4.7	14.8	13.4
	25	Banana	7.5	6.3	8.3	4.7	14.8	13.4
	26	Peach	4.6	4.8	4.8	4.0	9.3	8.7
	27	Cucumber	5.3	5.0	6.0	4.1	15.4	14.1
	28	Citrus mix	5.5	5.0	5.9	4.2	15.1	13.9
	29	Cacao	15.9	7.4	10.8	5.2	14.7	13.0
	30	CCD antigen	6.0	4.6	5.9	3.6	14.7	13.7
	31	Crab	3.2	2.3	3.9	1.8	3.4	3.3
	32	Shrimp	3.1	2.6	4.0	1.9	3.2	3.1
	33	Blue mussel	2.1	2.4	3.6	1.7	3.9	3.9
	34	Oyster	2.1	2.4	3.6	1.7	3.9	3.9
	35	Clam	2.1	2.4	3.6	1.7	3.9	3.9
	36	Scallop	2.1	2.4	3.6	1.7	3.9	3.9
	37	Lobster	1.8	2.9	4.7	1.9	4.8	4.7
	38	Pacific squid	1.8	2.9	4.7	1.9	4.8	4.7
	39	Mackerel	6.4	3.9	9.2	2.7	5.8	5.5
	40	Plaice	7.7	5.3	9.0	2.9	6.1	6.1
	41	Anchovy	7.7	5.3	9.0	2.9	6.1	6.1
	42	Alaska pollock	7.7	5.3	9.0	2.9	6.1	6.1
	43	Eel	7.6	6.0	10.9	3.8	7.0	7.1
	44	Tuna	11.9	5.8	13.0	4.2	6.0	6.0
	45	Salmon	11.9	5.8	13.0	4.2	6.0	6.0
	46	Codfish	8.0	4.2	9.1	2.7	5.6	5.5
	47	Egg white	2.2	1.4	2.7	1.2	2.3	2.2
	48	Chicken	7.4	3.0	6.4	2.2	5.4	5.3
	49	Milk	1.1	1.2	1.6	1.1	1.5	1.5
	50	Cheese	2.9	1.6	4.1	1.4	3.1	3.1
	51	Pork	4.9	2.6	5.7	2.0	3.0	2.9
	52	Beef	0.9	1.1	1.2	1.1	1.2	1.2
	53	Lamb meat	1.2	1.0	1.3	1.2	1.1	1.1
	54	Yeast	136.2	37.3	68.7	16.1	4.7	4.2
	55	Silkworm pupa	3.7	3.2	4.7	2.2	3.3	3.2

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			13 Orchard grass	14 Reed	15 Bent grass	16 Timothy grass	17 Cultivated rye	18 Alder
Food Allergens	1	Wheat	9.0	9.0	9.0	9.9	12.1	14.5
	2	Barley	10.1	10.1	10.1	11.2	13.6	16.1
	3	Corn	13.9	13.9	13.9	15.8	19.6	23.3
	4	Rice	11.6	11.6	11.6	12.8	15.1	18.0
	5	Buckwheat	13.3	13.3	13.3	15.1	19.2	24.1
	6	Sesame	12.9	12.9	12.9	14.5	18.3	22.2
	7	Peanut	8.1	8.1	8.1	8.9	10.3	11.2
	8	Soy bean	5.1	5.1	5.1	5.4	6.2	6.8
	9	Hazel nut	6.6	6.6	6.6	7.1	8.2	9.5
	10	Almond	8.8	8.8	8.8	9.7	11.7	14.0
	11	Pine	8.8	8.8	8.8	9.7	11.7	14.0
	12	Sunflower	8.8	8.8	8.8	9.7	11.7	14.0
	13	Walnut	7.5	7.5	7.5	8.2	9.5	11.4
	14	Sweet nut	13.5	13.5	13.5	15.3	19.3	21.1
	15	Tomato	12.5	12.5	12.5	13.7	15.9	16.9
	16	Carrot	14.3	14.3	14.3	16.1	19.5	22.6
	17	Potato	12.0	12.0	12.0	12.7	13.6	13.2
	18	Garlic	11.8	11.8	11.8	12.9	15.5	15.6
	19	Onion	11.8	11.8	11.8	12.9	15.5	15.6
	20	Celery	14.0	14.0	14.0	15.5	18.2	20.7
	21	Strawberry	13.9	13.9	13.9	15.5	19.1	20.4
	22	Apple	11.5	11.5	11.5	12.6	14.9	20.2
	23	Kiwi	13.4	13.4	13.4	15.2	19.3	24.4
	24	Mango	13.4	13.4	13.4	15.2	19.3	24.4
	25	Banana	13.4	13.4	13.4	15.2	19.3	24.4
	26	Peach	8.7	8.7	8.7	9.3	10.4	14.3
	27	Cucumber	14.1	14.1	14.1	15.8	19.1	20.4
	28	Citrus mix	13.9	13.9	13.9	15.5	18.7	21.0
	29	Cacao	13.0	13.0	13.0	14.8	18.9	24.0
	30	CCD antigen	13.7	13.7	13.7	15.4	19.5	18.6
	31	Crab	3.3	3.3	3.3	3.3	3.6	3.6
	32	Shrimp	3.1	3.1	3.1	3.1	3.2	3.4
	33	Blue mussel	3.9	3.9	3.9	3.9	4.0	4.2
	34	Oyster	3.9	3.9	3.9	3.9	4.0	4.2
	35	Clam	3.9	3.9	3.9	3.9	4.0	4.2
	36	Scallop	3.9	3.9	3.9	3.9	4.0	4.2
	37	Lobster	4.7	4.7	4.7	4.6	4.8	5.1
	38	Pacific squid	4.7	4.7	4.7	4.6	4.8	5.1
	39	Mackerel	5.5	5.5	5.5	5.6	5.9	6.0
	40	Plaice	6.1	6.1	6.1	6.0	5.9	6.8
	41	Anchovy	6.1	6.1	6.1	6.0	5.9	6.8
	42	Alaska pollock	6.1	6.1	6.1	6.0	5.9	6.8
	43	Eel	7.1	7.1	7.1	7.0	7.3	7.5
	44	Tuna	6.0	6.0	6.0	6.0	6.4	7.4
	45	Salmon	6.0	6.0	6.0	6.0	6.3	7.4
	46	Codfish	5.5	5.5	5.5	5.5	5.7	5.8
	47	Egg white	2.2	2.2	2.2	2.2	2.3	2.1
	48	Chicken	5.3	5.3	5.3	5.7	5.9	5.4
	49	Milk	1.5	1.5	1.5	1.5	1.6	1.5
	50	Cheese	3.1	3.1	3.1	3.0	3.1	3.0
	51	Pork	2.9	2.9	2.9	2.9	2.7	3.0
	52	Beef	1.2	1.2	1.2	1.2	1.3	1.2
	53	Lamb meat	1.1	1.1	1.1	1.2	1.1	0.9
	54	Yeast	4.2	4.2	4.2	5.4	7.6	6.2
	55	Silkworm pupa	3.2	3.2	3.2	3.3	3.4	3.4

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	7.7	11.6	12.0	20.5	12.9	10.1
	2	Barley	9.1	13.4	13.9	22.8	14.6	11.3
	3	Corn	12.7	19.1	19.1	31.5	20.9	15.8
	4	Rice	9.5	14.8	13.9	23.7	16.8	13.1
	5	Buckwheat	13.1	18.8	20.4	35.3	20.7	15.5
	6	Sesame	12.0	17.6	18.0	32.2	19.7	15.0
	7	Peanut	6.1	9.5	8.7	14.1	11.1	9.0
	8	Soy bean	4.3	6.0	6.0	9.3	6.3	5.4
	9	Hazel nut	5.6	8.0	8.3	13.1	8.6	7.2
	10	Almond	8.2	11.6	12.4	20.0	12.6	9.8
	11	Pine	8.2	11.6	12.4	20.0	12.6	9.8
	12	Sunflower	8.2	11.6	12.4	20.0	12.6	9.8
	13	Walnut	6.5	9.4	9.4	15.0	10.3	8.3
	14	Sweet nut	12.1	17.4	18.5	28.5	20.1	15.6
	15	Tomato	9.6	15.0	13.8	21.1	17.1	13.7
	16	Carrot	12.0	19.4	17.6	30.1	21.8	16.3
	17	Potato	8.1	12.3	10.7	15.7	14.6	12.6
	18	Garlic	9.6	15.8	13.7	21.0	16.5	12.9
	19	Onion	9.6	15.8	13.7	21.0	16.5	12.9
	20	Celery	11.9	19.1	17.0	26.4	20.5	15.6
	21	Strawberry	12.3	18.7	17.9	28.3	20.5	15.9
	22	Apple	14.5	15.9	17.2	26.1	16.7	13.0
	23	Kiwi	15.6	19.5	22.3	38.2	20.7	15.5
	24	Mango	15.6	19.5	22.3	38.2	20.7	15.5
	25	Banana	15.6	19.5	22.3	38.2	20.7	15.5
	26	Peach	16.5	11.8	16.3	15.8	11.4	9.3
	27	Cucumber	10.8	17.3	15.8	25.9	20.9	15.9
	28	Citrus mix	12.0	18.6	17.8	26.8	20.1	15.4
	29	Cacao	15.8	19.0	22.9	39.1	20.2	15.2
	30	CCD antigen	11.0	16.1	17.5	26.5	18.6	14.8
	31	Crab	2.5	3.8	3.3	4.4	3.8	3.5
	32	Shrimp	2.6	3.5	3.1	4.1	3.5	3.3
	33	Blue mussel	3.0	4.2	3.9	5.3	4.3	3.9
	34	Oyster	3.0	4.2	3.9	5.3	4.3	3.9
	35	Clam	3.0	4.2	3.9	5.3	4.3	3.9
	36	Scallop	3.0	4.2	3.9	5.3	4.3	3.9
	37	Lobster	3.4	5.5	4.6	6.5	6.2	5.0
	38	Pacific squid	3.4	5.5	4.6	6.5	6.2	5.0
	39	Mackerel	3.7	5.7	5.1	6.9	5.7	5.4
	40	Plaice	4.3	6.1	6.0	7.8	5.9	5.8
	41	Anchovy	4.3	6.1	6.0	7.8	5.9	5.8
	42	Alaska pollock	4.3	6.1	6.0	7.8	5.9	5.8
	43	Eel	5.3	7.5	7.3	9.3	7.1	6.8
	44	Tuna	4.5	6.8	5.5	8.1	6.4	6.3
	45	Salmon	4.5	6.8	5.5	8.0	6.3	6.2
	46	Codfish	3.6	5.6	5.0	6.4	5.5	5.5
	47	Egg white	1.4	2.1	1.9	2.3	2.2	2.2
	48	Chicken	3.3	5.1	4.9	6.1	5.1	5.2
	49	Milk	1.0	1.5	1.4	1.5	1.5	1.5
	50	Cheese	1.9	2.8	2.7	3.2	3.0	3.1
	51	Pork	2.4	2.8	2.5	3.0	2.7	2.8
	52	Beef	0.9	1.2	1.2	1.2	1.2	1.2
	53	Lamb meat	0.7	0.9	1.0	0.9	1.0	1.1
	54	Yeast	3.6	5.6	5.0	10.1	5.2	6.1
	55	Silkworm pupa	2.8	3.6	3.2	4.3	3.7	3.4

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	12.2	15.8	14.8	14.1	15.5	13.5
	2	Barley	13.6	17.8	16.8	19.4	17.5	15.3
	3	Corn	19.6	25.5	24.1	22.8	25.1	22.4
	4	Rice	15.3	19.6	18.7	17.0	20.2	16.5
	5	Buckwheat	19.5	26.6	24.7	25.3	26.1	21.9
	6	Sesame	18.2	24.2	22.6	22.7	24.5	20.3
	7	Peanut	9.8	12.2	11.7	9.9	12.9	10.9
	8	Soy bean	6.1	7.3	7.1	7.7	7.3	6.6
	9	Hazel nut	8.2	10.3	9.7	11.3	10.3	9.0
	10	Almond	12.0	15.6	14.7	16.2	15.3	13.0
	11	Pine	12.0	15.6	14.7	16.2	15.3	13.0
	12	Sunflower	12.0	15.6	14.7	16.2	15.3	13.0
	13	Walnut	9.8	12.4	11.7	11.8	12.4	10.4
	14	Sweet nut	17.6	23.3	22.9	22.3	23.9	21.2
	15	Tomato	15.2	18.7	18.3	15.6	19.6	17.3
	16	Carrot	20.0	25.7	24.6	20.5	25.3	21.9
	17	Potato	12.5	14.5	14.5	11.4	15.7	13.5
	18	Garlic	15.5	18.0	19.2	17.4	18.0	16.6
	19	Onion	15.5	18.0	19.2	17.4	18.0	16.6
	20	Celery	19.9	23.6	23.5	19.2	22.5	20.8
	21	Strawberry	19.1	22.6	23.6	22.3	23.3	21.1
	22	Apple	16.0	20.6	19.3	19.4	19.9	16.7
	23	Kiwi	20.3	26.6	25.1	36.2	26.0	22.1
	24	Mango	20.3	26.6	25.1	36.2	26.0	22.1
	25	Banana	20.3	26.6	25.1	36.2	26.0	22.1
	26	Peach	11.4	13.2	12.9	12.2	12.8	11.6
	27	Cucumber	17.7	22.6	21.9	17.7	23.4	20.4
	28	Citrus mix	18.8	22.9	23.0	20.8	22.6	21.2
	29	Cacao	19.5	26.6	25.0	38.2	26.0	21.7
	30	CCD antigen	16.3	21.2	20.0	22.9	21.9	20.7
	31	Crab	3.7	4.1	4.1	4.3	4.2	3.8
	32	Shrimp	3.5	3.7	3.7	4.2	3.8	3.4
	33	Blue mussel	4.2	4.8	4.7	5.5	4.7	4.4
	34	Oyster	4.2	4.8	4.7	5.5	4.7	4.4
	35	Clam	4.2	4.8	4.7	5.5	4.7	4.4
	36	Scallop	4.2	4.8	4.7	5.5	4.7	4.4
	37	Lobster	6.0	6.6	6.3	6.4	6.2	5.4
	38	Pacific squid	6.0	6.6	6.3	6.4	6.2	5.4
	39	Mackerel	5.6	6.1	5.8	6.2	6.3	6.2
	40	Plaice	6.5	7.4	6.4	7.3	7.3	6.6
	41	Anchovy	6.5	7.4	6.4	7.3	7.3	6.6
	42	Alaska pollock	6.5	7.4	6.4	7.3	7.3	6.6
	43	Eel	7.1	8.1	7.8	10.3	8.3	7.8
	44	Tuna	6.7	7.3	6.6	6.6	7.3	7.1
	45	Salmon	6.7	7.2	6.6	6.5	7.2	7.1
	46	Codfish	5.7	6.1	5.9	5.8	6.2	5.9
	47	Egg white	2.1	2.1	2.2	2.1	2.3	2.3
	48	Chicken	4.8	5.8	5.5	5.6	6.1	5.9
	49	Milk	1.5	1.5	1.5	1.2	1.6	1.6
	50	Cheese	2.9	3.0	2.9	2.4	3.4	3.0
	51	Pork	2.8	3.2	2.6	3.1	3.3	3.0
	52	Beef	1.2	1.1	1.2	1.0	1.2	1.3
	53	Lamb meat	1.1	0.9	1.0	0.7	1.0	1.2
	54	Yeast	5.9	6.9	5.6	8.3	7.7	5.6
	55	Silkworm pupa	3.7	3.8	4.0	4.7	3.8	3.5

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			31 Mugwort	32 Ox-eye daisy	33 Dandelion	34 Plantain	35 Russian thistle	36 Goldenrod
Food Allergens	1	Wheat	13.8	12.2	15.8	12.9	11.6	13.5
	2	Barley	16.9	15.8	18.8	14.5	13.2	15.7
	3	Corn	22.3	20.2	23.8	21.1	18.1	20.1
	4	Rice	16.6	14.4	18.4	16.7	14.4	16.0
	5	Buckwheat	24.0	22.4	29.6	20.4	18.1	22.7
	6	Sesame	21.6	19.3	24.4	19.5	16.5	19.6
	7	Peanut	10.7	9.2	10.7	11.1	8.8	9.5
	8	Soy bean	6.9	7.4	8.1	6.6	6.1	7.1
	9	Hazel nut	9.8	10.4	11.4	8.7	8.0	9.8
	10	Almond	14.6	14.6	17.5	12.7	11.7	14.2
	11	Pine	14.6	14.6	17.5	12.7	11.7	14.2
	12	Sunflower	14.6	14.6	17.5	12.7	11.7	14.2
	13	Walnut	11.3	10.6	12.8	10.3	9.5	11.4
	14	Sweet nut	21.8	20.8	24.1	20.4	17.0	19.2
	15	Tomato	16.0	13.4	15.4	17.4	14.3	14.2
	16	Carrot	20.3	17.1	21.1	21.5	18.2	19.2
	17	Potato	12.2	10.3	11.6	14.7	13.0	11.2
	18	Garlic	15.6	13.8	15.7	16.6	13.4	13.5
	19	Onion	15.6	13.8	15.7	16.6	13.4	13.5
	20	Celery	19.0	16.1	18.8	20.5	18.0	18.5
	21	Strawberry	19.8	18.2	20.2	20.3	16.7	17.1
	22	Apple	18.4	16.2	19.8	16.4	15.4	17.6
	23	Kiwi	25.8	26.6	29.3	20.5	20.2	23.9
	24	Mango	25.8	26.6	29.3	20.5	20.2	23.9
	25	Banana	25.8	26.6	29.3	20.5	20.2	23.9
	26	Peach	12.0	11.2	12.2	11.5	10.8	11.4
	27	Cucumber	19.2	16.1	18.9	20.4	16.8	17.4
	28	Citrus mix	19.7	17.4	19.8	20.3	16.8	17.9
	29	Cacao	27.0	30.6	31.7	20.0	21.9	25.7
	30	CCD antigen	19.5	19.4	20.8	19.3	21.4	18.8
	31	Crab	3.8	4.2	4.3	3.8	3.6	4.0
	32	Shrimp	3.8	4.3	4.4	3.6	3.3	3.7
	33	Blue mussel	4.0	4.7	4.8	4.5	4.4	4.7
	34	Oyster	4.0	4.7	4.8	4.5	4.4	4.7
	35	Clam	4.0	4.7	4.8	4.5	4.4	4.7
	36	Scallop	4.0	4.7	4.8	4.5	4.4	4.7
	37	Lobster	4.4	5.7	6.0	5.5	5.3	5.7
	38	Pacific squid	4.4	5.7	6.0	5.5	5.3	5.7
	39	Mackerel	5.9	6.1	6.9	6.2	6.0	6.3
	40	Plaice	6.0	7.3	7.8	6.9	6.9	7.2
	41	Anchovy	6.0	7.3	7.8	6.9	6.9	7.2
	42	Alaska pollock	6.0	7.3	7.8	6.9	6.9	7.2
	43	Eel	7.2	8.7	9.3	8.6	7.0	8.1
	44	Tuna	5.6	6.6	8.0	7.1	5.8	7.2
	45	Salmon	5.6	6.5	8.0	7.1	5.8	7.1
	46	Codfish	5.4	5.8	6.7	6.1	5.8	6.1
	47	Egg white	2.0	2.1	2.3	2.2	2.2	2.2
	48	Chicken	5.9	5.5	6.0	6.0	5.5	5.7
	49	Milk	1.4	1.5	1.5	1.5	1.6	1.5
	50	Cheese	2.7	3.0	3.1	3.4	3.3	3.4
	51	Pork	3.1	3.3	3.3	3.1	3.7	3.5
	52	Beef	1.2	1.2	1.2	1.2	1.2	1.2
	53	Lamb meat	1.0	1.1	1.0	1.0	1.0	1.0
	54	Yeast	6.9	9.4	10.7	5.2	6.1	8.8
	55	Silkworm pupa	4.6	5.6	5.4	3.7	3.4	4.1

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens					
			37 Pigweed	38 Japanese hop	39 Cat	40 Horse	41 Dog	42 Guinea pig
Food Allergens	1	Wheat	16.3	10.8	2.3	1.6	3.0	5.1
	2	Barley	19.1	12.2	2.7	1.5	3.3	5.5
	3	Corn	25.8	17.9	3.3	1.6	3.3	4.9
	4	Rice	20.4	12.7	3.0	1.7	3.4	4.8
	5	Buckwheat	28.1	18.8	3.3	1.4	3.6	4.9
	6	Sesame	25.0	17.1	3.1	1.5	3.3	4.8
	7	Peanut	13.0	8.0	2.1	1.6	2.7	3.8
	8	Soy bean	7.8	5.4	1.7	2.1	2.6	5.6
	9	Hazel nut	11.1	7.6	2.2	1.9	2.9	6.2
	10	Almond	16.7	11.0	2.5	1.8	3.1	5.6
	11	Pine	16.7	11.0	2.5	1.8	3.1	5.6
	12	Sunflower	16.7	11.0	2.5	1.8	3.1	5.6
	13	Walnut	13.5	8.2	2.3	1.3	2.8	4.2
	14	Sweet nut	26.2	16.6	3.1	1.6	3.2	4.8
	15	Tomato	19.3	12.8	2.8	1.5	2.9	4.0
	16	Carrot	25.2	16.6	3.2	1.3	3.2	3.9
	17	Potato	15.5	9.9	2.9	1.3	2.9	3.6
	18	Garlic	18.2	13.1	2.8	1.7	2.9	4.2
	19	Onion	18.2	13.1	2.8	1.7	2.9	4.2
	20	Celery	22.7	15.6	3.1	1.3	3.1	3.8
	21	Strawberry	23.1	17.3	3.2	1.6	3.1	4.0
	22	Apple	20.4	14.5	3.1	1.1	3.2	3.9
	23	Kiwi	27.8	21.4	3.4	1.5	3.6	6.0
	24	Mango	27.8	21.4	3.4	1.5	3.6	6.0
	25	Banana	27.8	21.4	3.4	1.5	3.6	6.0
	26	Peach	13.0	10.8	3.1	1.0	2.9	2.9
	27	Cucumber	24.0	14.8	3.1	1.2	3.1	3.5
	28	Citrus mix	23.0	16.5	3.2	1.5	3.1	4.5
	29	Cacao	28.8	20.9	3.2	1.8	3.5	6.4
	30	CCD antigen	25.2	15.6	2.9	1.4	3.0	3.7
	31	Crab	4.1	4.1	2.4	1.4	2.5	4.7
	32	Shrimp	3.9	3.9	2.4	1.3	2.3	4.0
	33	Blue mussel	4.7	4.5	3.0	2.1	2.8	6.1
	34	Oyster	4.7	4.5	3.0	2.1	2.8	6.1
	35	Clam	4.7	4.5	3.0	2.1	2.8	6.1
	36	Scallop	4.7	4.5	3.0	2.1	2.8	6.1
	37	Lobster	6.4	6.6	2.9	1.8	2.7	8.0
	38	Pacific squid	6.4	6.6	2.9	1.8	2.7	8.0
	39	Mackerel	7.0	4.7	2.5	2.8	3.4	13.0
	40	Plaice	8.2	4.7	4.1	5.4	5.7	25.2
	41	Anchovy	8.2	4.7	4.1	5.4	5.7	25.2
	42	Alaska pollock	8.2	4.7	4.1	5.4	5.7	25.2
	43	Eel	9.6	5.7	3.5	4.5	4.1	20.7
	44	Tuna	7.9	5.3	2.9	2.6	3.8	14.0
	45	Salmon	7.9	5.2	2.9	2.5	3.8	14.0
	46	Codfish	6.7	4.6	2.6	3.0	3.4	12.5
	47	Egg white	2.5	1.6	1.3	2.0	2.1	4.2
	48	Chicken	6.3	4.2	2.7	4.2	4.2	18.0
	49	Milk	1.6	1.2	1.0	4.5	1.4	2.7
	50	Cheese	3.6	2.1	1.3	2.3	1.9	6.1
	51	Pork	3.4	2.3	4.4	13.1	5.9	36.9
	52	Beef	1.1	1.1	1.2	8.2	1.4	3.5
	53	Lamb meat	1.0	0.9	1.1	24.0	1.4	9.9
	54	Yeast	6.4	9.7	5.2	3.4	4.5	14.1
	55	Silkworm pupa	4.5	4.6	2.7	1.0	2.0	2.8

Supplementary Material 1. (Continued)

Figure 3A			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	2.0	2.0	1.6	7.0	2.7	20.5	8.3
	2	Barley	1.9	1.9	2.4	7.9	2.7	25.4	10.5
	3	Corn	1.9	1.9	4.3	6.9	2.6	27.9	11.7
	4	Rice	2.1	2.1	1.2	7.2	2.7	22.0	10.1
	5	Buckwheat	1.9	1.9	2.9	7.1	2.3	38.3	16.1
	6	Sesame	2.0	2.0	3.2	6.2	2.8	31.9	12.9
	7	Peanut	1.8	1.8	1.6	5.7	2.1	12.3	5.6
	8	Soy bean	2.3	2.3	3.8	8.0	2.9	12.2	5.7
	9	Hazel nut	2.3	2.3	2.8	8.3	3.0	13.5	7.4
	10	Almond	2.1	2.1	3.5	7.4	2.8	23.1	9.9
	11	Pine	2.1	2.1	3.5	7.4	2.8	23.1	9.9
	12	Sunflower	2.1	2.1	3.5	7.4	2.8	23.1	9.9
	13	Walnut	1.8	1.8	2.7	5.2	2.2	17.0	7.9
	14	Sweet nut	2.0	2.0	3.4	6.8	2.5	31.3	11.3
	15	Tomato	1.8	1.8	1.9	5.9	2.2	17.9	7.7
	16	Carrot	1.8	1.8	3.2	5.5	2.3	24.0	10.5
	17	Potato	1.6	1.6	2.9	4.7	2.1	13.2	6.8
	18	Garlic	1.9	1.9	3.8	5.4	2.4	17.8	7.5
	19	Onion	1.9	1.9	3.8	5.4	2.4	17.8	7.5
	20	Celery	1.6	1.6	2.2	5.0	2.0	20.9	9.1
	21	Strawberry	1.9	1.9	2.9	6.2	2.3	24.5	9.1
	22	Apple	1.6	1.6	2.3	5.3	2.1	23.5	10.3
	23	Kiwi	2.5	2.5	3.6	7.9	3.4	49.1	19.2
	24	Mango	2.5	2.5	3.6	7.9	3.4	49.1	19.2
	25	Banana	2.5	2.5	3.6	7.9	3.4	49.1	19.2
	26	Peach	1.2	1.2	2.0	3.6	1.7	13.1	6.7
	27	Cucumber	1.5	1.5	2.8	5.3	2.0	21.9	9.4
	28	Citrus mix	1.9	1.9	2.5	5.9	2.4	22.9	8.9
	29	Cacao	2.4	2.4	8.9	6.8	3.7	75.9	28.9
	30	CCD antigen	1.8	1.8	2.7	5.4	2.0	42.7	13.7
	31	Crab	1.8	1.8	5.0	6.8	2.3	5.3	17.0
	32	Shrimp	1.6	1.6	4.6	5.3	2.1	4.9	17.6
	33	Blue mussel	2.5	2.5	5.5	8.5	3.1	8.6	26.7
	34	Oyster	2.5	2.5	5.5	8.5	3.1	8.6	26.7
	35	Clam	2.5	2.5	5.5	8.5	3.1	8.6	26.7
	36	Scallop	2.5	2.5	5.5	8.5	3.1	8.6	26.7
	37	Lobster	2.2	2.2	0.0	9.5	2.7	8.3	60.3
	38	Pacific squid	2.2	2.2	0.0	9.5	2.7	8.3	60.3
	39	Mackerel	4.3	4.3	6.4	20.9	5.2	7.8	11.1
	40	Plaice	7.4	7.4	16.2	36.2	11.3	11.8	13.3
	41	Anchovy	7.4	7.4	16.2	36.2	11.3	11.8	13.3
	42	Alaska pollock	7.4	7.4	16.2	36.2	11.3	11.8	13.3
	43	Eel	5.8	5.8	20.4	34.7	7.3	9.6	11.7
	44	Tuna	3.6	3.6	4.4	21.1	4.8	10.6	10.2
	45	Salmon	3.6	3.6	4.4	21.0	4.8	10.6	10.1
	46	Codfish	4.4	4.4	5.5	20.9	5.6	9.1	13.6
	47	Egg white	2.2	2.2	2.5	5.6	2.7	2.7	2.1
	48	Chicken	5.9	5.9	16.5	33.5	8.0	10.4	11.5
	49	Milk	5.0	5.0	1.7	3.1	4.9	1.8	1.6
	50	Cheese	2.6	2.6	3.2	10.5	3.3	5.4	3.2
	51	Pork	18.0	18.0	12.0	37.8	27.0	4.1	5.4
	52	Beef	7.6	7.6	2.1	4.2	6.6	1.4	1.3
	53	Lamb meat	22.2	22.2	4.8	5.9	23.1	1.5	2.0
	54	Yeast	5.5	5.5	101.2	26.0	10.5	25.5	30.5
	55	Silkworm pupa	1.4	1.4	2.7	3.4	1.5	5.6	23.8

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	1.4	1.3	1.3	1.5	1.5	5.0
	2	Barley	1.5	1.4	1.4	1.6	1.6	5.4
	3	Corn	1.5	1.4	1.4	1.6	1.6	4.3
	4	Rice	1.6	1.4	1.4	1.6	1.7	3.6
	5	Buckwheat	1.6	1.5	1.5	1.7	1.7	4.3
	6	Sesame	1.5	1.4	1.4	1.6	1.6	3.6
	7	Peanut	1.5	1.4	1.4	1.6	1.6	4.1
	8	Soy bean	1.6	1.5	1.5	1.6	1.7	4.7
	9	Hazel nut	1.7	1.5	1.5	1.8	1.7	6.3
	10	Almond	1.6	1.5	1.5	1.7	1.7	4.3
	11	Pine	1.6	1.5	1.5	1.7	1.7	4.3
	12	Sunflower	1.6	1.5	1.5	1.7	1.7	4.3
	13	Walnut	1.7	1.5	1.5	1.8	1.8	3.3
	14	Sweet nut	1.6	1.4	1.5	1.7	1.7	3.5
	15	Tomato	1.5	1.4	1.4	1.5	1.5	3.4
	16	Carrot	1.5	1.4	1.4	1.5	1.6	2.6
	17	Potato	1.5	1.4	1.4	1.6	1.6	3.2
	18	Garlic	1.6	1.4	1.4	1.6	1.6	3.9
	19	Onion	1.6	1.4	1.4	1.6	1.6	3.9
	20	Celery	1.4	1.3	1.3	1.4	1.5	2.5
	21	Strawberry	1.5	1.4	1.4	1.6	1.6	4.5
	22	Apple	1.4	1.3	1.4	1.4	1.4	2.4
	23	Kiwi	1.6	1.4	1.4	1.6	1.6	3.7
	24	Mango	1.6	1.4	1.4	1.6	1.6	3.7
	25	Banana	1.6	1.4	1.4	1.6	1.6	3.7
	26	Peach	1.3	1.3	1.3	1.4	1.4	1.8
	27	Cucumber	1.4	1.4	1.4	1.5	1.5	3.2
	28	Citrus mix	1.5	1.4	1.4	1.5	1.6	4.3
	29	Cacao	1.3	1.5	1.4	1.7	1.5	13.5
	30	CCD antigen	1.5	1.4	1.4	1.5	1.5	2.9
	31	Crab	1.9	1.8	1.8	2.1	2.1	3.0
	32	Shrimp	1.8	1.7	1.7	2.1	1.9	2.1
	33	Blue mussel	2.0	1.8	1.8	2.1	2.3	2.4
	34	Oyster	2.0	1.8	1.8	2.1	2.3	2.4
	35	Clam	2.0	1.8	1.8	2.1	2.3	2.4
	36	Scallop	2.0	1.8	1.8	2.1	2.3	2.4
	37	Lobster	2.0	1.9	1.8	2.2	2.2	3.6
	38	Pacific squid	2.0	1.9	1.8	2.2	2.2	3.6
	39	Mackerel	1.9	1.7	1.6	1.8	2.0	9.5
	40	Plaice	1.9	1.3	1.4	1.6	1.7	4.5
	41	Anchovy	1.9	1.3	1.4	1.6	1.7	4.5
	42	Alaska pollock	1.9	1.3	1.4	1.6	1.7	4.5
	43	Eel	2.0	1.8	1.8	1.7	2.1	5.1
	44	Tuna	1.5	1.4	1.4	1.5	1.8	6.4
	45	Salmon	1.5	1.4	1.4	1.5	1.8	6.4
	46	Codfish	1.8	1.6	1.6	1.9	2.1	6.9
	47	Egg white	1.8	1.4	1.5	1.6	1.5	7.8
	48	Chicken	1.9	1.7	1.7	1.7	1.9	5.6
	49	Milk	1.1	1.1	1.1	1.1	1.1	1.4
	50	Cheese	1.7	1.5	1.5	1.6	1.7	4.7
	51	Pork	1.5	1.2	1.2	1.2	1.2	1.3
	52	Beef	1.1	1.1	1.1	1.1	1.2	1.4
	53	Lamb meat	1.1	1.0	1.0	1.0	1.0	1.6
	54	Yeast	1.7	1.7	1.6	1.8	1.8	50.9
	55	Silkworm pupa	1.7	1.7	1.7	2.0	1.7	2.3

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	4.9	4.1	5.4	2.7	10.0	8.5
	2	Barley	4.6	4.2	5.4	2.9	10.4	8.7
	3	Corn	3.8	3.7	4.4	3.0	13.4	11.2
	4	Rice	3.6	3.8	5.0	2.8	12.1	10.2
	5	Buckwheat	3.3	3.7	5.0	2.8	13.1	10.9
	6	Sesame	3.1	3.5	4.0	2.6	13.6	11.4
	7	Peanut	3.6	4.0	5.3	3.0	12.5	10.4
	8	Soy bean	2.1	2.7	3.9	2.3	9.8	8.4
	9	Hazel nut	4.5	3.6	5.2	2.1	10.7	9.0
	10	Almond	3.4	3.8	5.3	2.5	12.5	10.2
	11	Pine	3.4	3.8	5.3	2.5	12.5	10.2
	12	Sunflower	3.4	3.8	5.3	2.5	12.5	10.2
	13	Walnut	3.0	3.7	5.0	2.6	11.5	9.6
	14	Sweet nut	3.0	3.1	3.8	2.4	14.2	11.8
	15	Tomato	2.9	3.8	3.9	3.1	12.7	10.8
	16	Carrot	2.6	3.5	3.7	2.7	13.5	11.6
	17	Potato	3.3	3.4	4.1	2.8	12.1	10.4
	18	Garlic	2.9	3.5	3.6	2.9	12.8	11.1
	19	Onion	2.9	3.5	3.6	2.9	12.8	11.1
	20	Celery	2.5	3.1	3.3	2.8	13.2	11.5
	21	Strawberry	3.9	3.2	3.6	2.7	12.8	10.9
	22	Apple	2.0	3.2	3.4	2.7	9.1	7.6
	23	Kiwi	2.4	3.4	3.1	2.5	13.4	11.2
	24	Mango	2.4	3.4	3.1	2.5	13.4	11.2
	25	Banana	2.4	3.4	3.1	2.5	13.4	11.2
	26	Peach	2.0	2.5	2.2	2.4	5.7	5.2
	27	Cucumber	3.0	3.0	3.7	2.4	12.6	10.6
	28	Citrus mix	3.8	3.6	3.7	3.0	13.0	11.2
	29	Cacao	13.0	5.8	9.1	3.2	10.7	8.8
	30	CCD antigen	2.8	2.2	2.4	1.9	13.5	11.2
	31	Crab	2.0	2.2	2.5	1.8	2.3	2.3
	32	Shrimp	1.6	2.0	2.1	1.7	2.2	2.2
	33	Blue mussel	2.3	1.9	2.6	1.3	2.4	2.3
	34	Oyster	2.3	1.9	2.6	1.3	2.4	2.3
	35	Clam	2.3	1.9	2.6	1.3	2.4	2.3
	36	Scallop	2.3	1.9	2.6	1.3	2.4	2.3
	37	Lobster	2.7	2.8	4.4	1.2	2.5	2.5
	38	Pacific squid	2.7	2.8	4.4	1.2	2.5	2.5
	39	Mackerel	7.5	3.0	6.9	2.9	6.1	4.7
	40	Plaice	5.2	3.1	6.0	2.6	5.7	4.7
	41	Anchovy	5.2	3.1	6.0	2.6	5.7	4.7
	42	Alaska pollock	5.2	3.1	6.0	2.6	5.7	4.7
	43	Eel	4.9	2.2	5.6	1.6	9.4	7.8
	44	Tuna	7.7	4.1	5.3	3.1	5.7	4.0
	45	Salmon	7.7	4.1	5.3	3.1	5.7	4.0
	46	Codfish	7.2	2.4	5.6	2.3	5.9	4.8
	47	Egg white	6.7	4.0	6.0	2.8	3.8	3.5
	48	Chicken	5.3	4.3	6.3	2.4	7.6	6.2
	49	Milk	1.4	1.5	1.5	1.3	1.6	1.4
	50	Cheese	3.6	3.7	6.3	2.5	5.7	4.7
	51	Pork	2.1	1.8	2.7	1.4	1.8	1.6
	52	Beef	1.6	1.2	1.2	1.1	1.2	1.2
	53	Lamb meat	2.0	1.2	2.1	1.4	1.3	1.2
	54	Yeast	52.2	20.3	27.3	9.3	3.1	2.6
	55	Silkworm pupa	1.8	1.9	2.3	1.6	2.3	2.2

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			13 Orchard grass	14 Reed	15 Bent grass	16 Timothy grass	17 Cultivated rye	18 Alder
Food Allergens	1	Wheat	8.5	8.5	8.5	9.6	12.8	12.4
	2	Barley	8.7	8.7	8.7	10.0	13.2	12.2
	3	Corn	11.2	11.2	11.2	12.9	16.4	15.7
	4	Rice	10.2	10.2	10.2	11.4	14.5	13.9
	5	Buckwheat	10.9	10.9	10.9	12.5	16.9	16.4
	6	Sesame	11.4	11.4	11.4	13.2	17.9	16.9
	7	Peanut	10.4	10.4	10.4	11.9	15.0	14.2
	8	Soy bean	8.4	8.4	8.4	9.6	12.6	12.4
	9	Hazel nut	9.0	9.0	9.0	10.3	13.6	14.3
	10	Almond	10.2	10.2	10.2	11.8	15.7	15.2
	11	Pine	10.2	10.2	10.2	11.8	15.7	15.2
	12	Sunflower	10.2	10.2	10.2	11.8	15.7	15.2
	13	Walnut	9.6	9.6	9.6	10.9	14.4	14.3
	14	Sweet nut	11.8	11.8	11.8	13.5	18.4	16.3
	15	Tomato	10.8	10.8	10.8	12.3	14.7	13.3
	16	Carrot	11.6	11.6	11.6	13.1	16.7	15.7
	17	Potato	10.4	10.4	10.4	11.0	12.6	10.7
	18	Garlic	11.1	11.1	11.1	12.2	16.0	13.1
	19	Onion	11.1	11.1	11.1	12.2	16.0	13.1
	20	Celery	11.5	11.5	11.5	12.8	15.2	14.7
	21	Strawberry	10.9	10.9	10.9	12.3	15.9	14.5
	22	Apple	7.6	7.6	7.6	8.5	9.8	12.3
	23	Kiwi	11.2	11.2	11.2	12.8	17.5	17.3
	24	Mango	11.2	11.2	11.2	12.8	17.5	17.3
	25	Banana	11.2	11.2	11.2	12.8	17.5	17.3
	26	Peach	5.2	5.2	5.2	5.4	5.9	7.9
	27	Cucumber	10.6	10.6	10.6	12.0	15.4	13.5
	28	Citrus mix	11.2	11.2	11.2	12.5	15.5	14.8
	29	Cacao	8.8	8.8	8.8	10.2	13.9	14.2
	30	CCD antigen	11.2	11.2	11.2	12.9	17.5	12.9
	31	Crab	2.3	2.3	2.3	2.3	2.4	2.1
	32	Shrimp	2.2	2.2	2.2	2.1	2.2	1.8
	33	Blue mussel	2.3	2.3	2.3	2.1	2.4	2.2
	34	Oyster	2.3	2.3	2.3	2.1	2.4	2.2
	35	Clam	2.3	2.3	2.3	2.1	2.4	2.2
	36	Scallop	2.3	2.3	2.3	2.1	2.4	2.2
	37	Lobster	2.5	2.5	2.5	2.2	2.3	1.9
	38	Pacific squid	2.5	2.5	2.5	2.2	2.3	1.9
	39	Mackerel	4.7	4.7	4.7	5.6	6.2	5.5
	40	Plaice	4.7	4.7	4.7	5.0	5.6	4.2
	41	Anchovy	4.7	4.7	4.7	5.0	5.6	4.2
	42	Alaska pollock	4.7	4.7	4.7	5.0	5.6	4.2
	43	Eel	7.8	7.8	7.8	7.7	8.9	6.8
	44	Tuna	4.0	4.0	4.0	4.6	6.3	5.4
	45	Salmon	4.0	4.0	4.0	4.6	6.3	5.4
	46	Codfish	4.8	4.8	4.8	5.3	6.0	5.7
	47	Egg white	3.5	3.5	3.5	3.6	3.5	3.5
	48	Chicken	6.2	6.2	6.2	6.9	7.3	5.6
	49	Milk	1.4	1.4	1.4	1.6	1.6	1.6
	50	Cheese	4.7	4.7	4.7	5.2	5.6	5.1
	51	Pork	1.6	1.6	1.6	1.6	1.6	1.7
	52	Beef	1.2	1.2	1.2	1.2	1.4	1.3
	53	Lamb meat	1.2	1.2	1.2	1.3	1.6	1.1
	54	Yeast	2.6	2.6	2.6	2.9	4.0	4.1
	55	Silkworm pupa	2.2	2.2	2.2	2.1	2.3	1.8

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	5.6	12.2	9.4	24.7	15.8	10.2
	2	Barley	6.0	12.6	9.9	25.1	16.4	10.5
	3	Corn	7.4	15.9	12.0	29.2	19.6	12.5
	4	Rice	6.7	14.1	10.4	26.0	18.1	12.1
	5	Buckwheat	7.5	15.4	12.4	33.3	20.7	13.0
	6	Sesame	7.6	16.1	12.7	36.2	22.0	14.0
	7	Peanut	6.5	13.6	10.2	24.8	18.1	12.3
	8	Soy bean	6.4	12.1	9.7	23.5	13.7	9.5
	9	Hazel nut	7.5	13.5	11.5	29.5	17.0	11.3
	10	Almond	7.9	15.0	12.3	30.7	19.0	12.4
	11	Pine	7.9	15.0	12.3	30.7	19.0	12.4
	12	Sunflower	7.9	15.0	12.3	30.7	19.0	12.4
	13	Walnut	7.2	13.3	10.9	27.8	17.9	11.6
	14	Sweet nut	7.4	15.6	12.6	31.3	22.1	14.2
	15	Tomato	6.3	13.8	10.4	22.0	18.1	12.1
	16	Carrot	7.0	15.6	11.7	28.0	20.7	13.1
	17	Potato	5.4	11.5	8.0	17.1	15.3	11.5
	18	Garlic	6.9	15.8	10.8	24.8	19.3	12.5
	19	Onion	6.9	15.8	10.8	24.8	19.3	12.5
	20	Celery	7.1	15.6	11.3	24.8	19.4	12.3
	21	Strawberry	7.1	15.3	11.5	26.6	19.4	12.4
	22	Apple	8.1	11.3	9.3	18.9	12.3	8.7
	23	Kiwi	8.9	17.0	13.9	38.6	21.4	13.1
	24	Mango	8.9	17.0	13.9	38.6	21.4	13.1
	25	Banana	8.9	17.0	13.9	38.6	21.4	13.1
	26	Peach	8.8	7.0	9.0	8.8	6.7	5.3
	27	Cucumber	6.2	13.5	10.0	24.9	19.3	12.6
	28	Citrus mix	7.0	15.3	11.3	25.1	18.8	12.2
	29	Cacao	7.5	13.2	11.8	31.7	17.3	10.7
	30	CCD antigen	6.1	13.0	11.4	25.4	18.4	12.4
	31	Crab	1.6	2.6	2.1	3.1	2.7	2.6
	32	Shrimp	1.5	2.3	1.8	2.7	2.5	2.3
	33	Blue mussel	1.5	2.6	2.0	4.2	3.0	2.5
	34	Oyster	1.5	2.6	2.0	4.2	3.0	2.5
	35	Clam	1.5	2.6	2.0	4.2	3.0	2.5
	36	Scallop	1.5	2.6	2.0	4.2	3.0	2.5
	37	Lobster	1.4	2.9	2.5	4.3	3.8	3.1
	38	Pacific squid	1.4	2.9	2.5	4.3	3.8	3.1
	39	Mackerel	3.2	7.0	5.5	5.2	4.2	3.9
	40	Plaice	2.7	6.8	4.1	4.7	4.1	3.6
	41	Anchovy	2.7	6.8	4.1	4.7	4.1	3.6
	42	Alaska pollock	2.7	6.8	4.1	4.7	4.1	3.6
	43	Eel	4.9	11.7	7.7	6.4	5.6	5.6
	44	Tuna	3.0	6.5	5.2	4.8	3.9	3.6
	45	Salmon	3.0	6.5	5.2	4.8	3.9	3.6
	46	Codfish	2.9	6.5	4.2	5.2	5.1	4.6
	47	Egg white	2.6	4.1	3.2	3.6	3.4	4.2
	48	Chicken	3.4	9.0	5.4	5.0	5.9	5.3
	49	Milk	1.2	1.8	1.4	1.5	1.8	1.6
	50	Cheese	4.0	7.4	5.3	5.7	4.3	4.3
	51	Pork	1.4	2.2	1.7	1.6	1.8	1.6
	52	Beef	1.1	1.3	1.3	1.2	1.2	1.3
	53	Lamb meat	0.8	1.2	1.3	1.2	1.3	1.0
	54	Yeast	2.1	2.2	2.8	3.9	2.9	2.6
	55	Silkworm pupa	1.4	2.2	1.7	2.8	2.6	2.3

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	13.5	17.8	19.2	11.1	19.1	13.9
	2	Barley	14.2	18.7	20.2	14.7	20.0	14.4
	3	Corn	18.1	22.4	24.1	14.0	23.7	18.3
	4	Rice	15.6	19.8	21.9	12.5	22.4	15.7
	5	Buckwheat	18.1	23.9	25.9	16.0	26.7	18.1
	6	Sesame	19.1	24.8	27.4	16.8	27.8	19.0
	7	Peanut	15.3	19.4	20.7	11.5	22.5	15.8
	8	Soy bean	13.8	16.4	18.2	15.1	17.7	13.6
	9	Hazel nut	15.1	19.4	21.5	17.3	21.4	15.1
	10	Almond	17.2	22.3	24.5	18.5	24.5	17.4
	11	Pine	17.2	22.3	24.5	18.5	24.5	17.4
	12	Sunflower	17.2	22.3	24.5	18.5	24.5	17.4
	13	Walnut	15.6	20.9	21.6	14.3	22.5	15.9
	14	Sweet nut	17.8	23.6	26.0	16.9	27.9	19.7
	15	Tomato	15.2	18.8	20.0	10.9	21.4	16.2
	16	Carrot	18.2	22.5	24.0	12.8	23.9	18.8
	17	Potato	12.3	14.6	15.7	8.0	17.5	12.6
	18	Garlic	16.6	18.9	23.3	13.7	21.0	16.4
	19	Onion	16.6	18.9	23.3	13.7	21.0	16.4
	20	Celery	18.1	21.2	22.9	11.7	21.0	17.7
	21	Strawberry	16.9	20.1	23.2	13.9	22.5	17.2
	22	Apple	12.0	14.3	15.2	8.8	15.2	10.9
	23	Kiwi	19.4	25.4	27.8	24.7	27.6	19.4
	24	Mango	19.4	25.4	27.8	24.7	27.6	19.4
	25	Banana	19.4	25.4	27.8	24.7	27.6	19.4
	26	Peach	6.9	7.3	7.9	4.5	7.5	6.4
	27	Cucumber	15.5	19.8	20.9	10.7	22.9	16.6
	28	Citrus mix	17.1	20.5	22.2	12.5	21.1	17.6
	29	Cacao	15.5	21.8	22.5	24.9	22.7	15.2
	30	CCD antigen	14.4	18.8	20.1	14.1	22.3	17.6
	31	Crab	2.7	2.8	3.0	2.5	2.9	2.7
	32	Shrimp	2.4	2.4	2.6	2.1	2.7	2.3
	33	Blue mussel	2.8	3.1	3.1	3.7	3.5	2.8
	34	Oyster	2.8	3.1	3.1	3.7	3.5	2.8
	35	Clam	2.8	3.1	3.1	3.7	3.5	2.8
	36	Scallop	2.8	3.1	3.1	3.7	3.5	2.8
	37	Lobster	3.4	3.9	3.8	2.6	5.0	3.3
	38	Pacific squid	3.4	3.9	3.8	2.6	5.0	3.3
	39	Mackerel	7.6	5.1	6.0	2.5	5.5	7.4
	40	Plaice	6.6	4.9	5.8	1.3	4.4	6.8
	41	Anchovy	6.6	4.9	5.8	1.3	4.4	6.8
	42	Alaska pollock	6.6	4.9	5.8	1.3	4.4	6.8
	43	Eel	11.8	6.7	10.8	2.4	7.3	11.6
	44	Tuna	7.0	3.9	4.3	2.3	6.0	8.1
	45	Salmon	7.0	3.9	4.3	2.3	6.0	8.1
	46	Codfish	6.9	5.6	5.7	2.3	5.4	6.3
	47	Egg white	4.0	4.0	4.5	2.7	4.3	3.8
	48	Chicken	9.7	7.7	7.7	4.0	6.6	10.0
	49	Milk	1.8	1.7	1.8	1.3	1.8	1.8
	50	Cheese	6.6	5.1	6.5	3.4	6.6	6.5
	51	Pork	2.1	1.8	2.2	1.8	2.3	2.0
	52	Beef	1.3	1.2	1.1	1.5	1.1	1.3
	53	Lamb meat	1.2	1.1	1.3	1.3	1.0	1.3
	54	Yeast	3.8	3.4	1.9	2.5	3.8	2.5
	55	Silkworm pupa	2.3	2.4	2.6	2.2	2.8	2.3

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			31	32	33	34	35	36
			Mugwort	Ox-eye daisy	Dandelion	Plantain	Russian thistle	Goldenrod
Food Allergens	1	Wheat	12.2	9.9	13.2	15.2	12.5	11.5
	2	Barley	13.2	11.9	15.1	16.0	13.1	12.1
	3	Corn	14.6	12.9	14.8	20.4	15.4	13.1
	4	Rice	13.0	10.7	14.1	18.4	14.3	12.1
	5	Buckwheat	16.5	13.9	19.2	20.1	16.0	15.4
	6	Sesame	16.1	13.0	17.6	21.4	16.1	14.8
	7	Peanut	13.2	10.7	13.3	18.2	12.8	11.6
	8	Soy bean	12.5	12.0	14.7	14.4	13.5	12.9
	9	Hazel nut	15.3	15.2	17.1	16.4	12.6	13.4
	10	Almond	16.4	15.4	19.2	19.0	15.1	14.8
	11	Pine	16.4	15.4	19.2	19.0	15.1	14.8
	12	Sunflower	16.4	15.4	19.2	19.0	15.1	14.8
	13	Walnut	14.3	12.6	16.6	17.7	14.9	14.5
	14	Sweet nut	16.5	14.7	17.4	22.0	16.2	14.1
	15	Tomato	11.7	9.6	11.3	18.3	13.8	11.0
	16	Carrot	13.7	11.4	14.2	20.8	15.9	13.2
	17	Potato	9.4	7.7	9.1	15.5	12.6	8.7
	18	Garlic	12.4	10.5	12.6	18.9	13.4	10.6
	19	Onion	12.4	10.5	12.6	18.9	13.4	10.6
	20	Celery	12.6	10.7	12.2	19.5	15.7	12.6
	21	Strawberry	12.8	11.0	12.5	19.2	14.1	11.1
	22	Apple	10.1	8.5	10.5	12.7	10.8	9.7
	23	Kiwi	17.9	17.0	19.8	20.7	18.9	16.3
	24	Mango	17.9	17.0	19.8	20.7	18.9	16.3
	25	Banana	17.9	17.0	19.8	20.7	18.9	16.3
	26	Peach	5.6	4.8	5.3	7.1	6.2	5.2
	27	Cucumber	12.6	10.5	12.6	18.6	13.6	11.5
	28	Citrus mix	12.8	10.9	12.4	19.2	14.5	12.0
	29	Cacao	15.9	16.0	18.5	16.8	17.2	14.2
	30	CCD antigen	12.8	11.9	13.3	19.2	19.4	12.5
	31	Crab	2.4	2.9	2.8	3.0	2.5	2.4
	32	Shrimp	2.4	2.7	2.6	2.6	2.4	2.3
	33	Blue mussel	2.9	3.1	3.5	3.0	3.0	2.8
	34	Oyster	2.9	3.1	3.5	3.0	3.0	2.8
	35	Clam	2.9	3.1	3.5	3.0	3.0	2.8
	36	Scallop	2.9	3.1	3.5	3.0	3.0	2.8
	37	Lobster	3.8	3.9	4.8	4.0	3.8	3.1
	38	Pacific squid	3.8	3.9	4.8	4.0	3.8	3.1
	39	Mackerel	5.9	5.0	7.2	6.5	6.6	6.4
	40	Plaice	4.9	3.9	7.2	6.4	6.6	6.7
	41	Anchovy	4.9	3.9	7.2	6.4	6.6	6.7
	42	Alaska pollock	4.9	3.9	7.2	6.4	6.6	6.7
	43	Eel	7.3	6.8	12.1	10.8	12.4	10.3
	44	Tuna	6.3	5.8	8.7	6.4	7.2	7.6
	45	Salmon	6.3	5.8	8.7	6.4	7.2	7.6
	46	Codfish	5.9	5.0	7.1	7.0	6.9	6.5
	47	Egg white	3.6	4.1	4.2	4.7	3.9	4.1
	48	Chicken	6.4	6.0	10.2	8.8	9.5	8.2
	49	Milk	1.5	1.6	1.7	1.7	1.6	1.7
	50	Cheese	4.8	5.1	7.1	6.8	7.3	7.3
	51	Pork	1.5	1.9	2.2	2.1	2.2	2.0
	52	Beef	1.3	1.4	1.4	1.2	1.2	1.3
	53	Lamb meat	1.1	1.1	1.0	1.3	1.4	1.4
	54	Yeast	4.4	5.1	7.3	2.8	2.1	4.7
	55	Silkworm pupa	2.6	2.8	2.7	2.5	2.2	2.3

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens					
			37 Pigweed	38 Japanese hop	39 Cat	40 Horse	41 Dog	42 Guinea pig
Food Allergens	1	Wheat	18.8	6.3	1.7	1.5	2.2	1.8
	2	Barley	20.2	6.0	1.8	1.3	2.4	2.5
	3	Corn	23.0	7.5	2.0	2.4	2.4	3.6
	4	Rice	21.1	6.5	1.9	1.8	2.4	2.9
	5	Buckwheat	26.7	8.1	1.8	0.9	2.4	1.7
	6	Sesame	25.7	8.5	1.8	1.5	2.2	1.7
	7	Peanut	20.6	6.5	1.9	1.7	2.3	2.4
	8	Soy bean	17.5	6.6	2.0	2.8	2.5	5.3
	9	Hazel nut	21.6	7.0	2.0	1.4	2.6	2.2
	10	Almond	24.5	7.7	1.9	1.3	2.6	3.8
	11	Pine	24.5	7.7	1.9	1.3	2.6	3.8
	12	Sunflower	24.5	7.7	1.9	1.3	2.6	3.8
	13	Walnut	22.7	7.0	1.6	1.0	2.3	1.0
	14	Sweet nut	27.4	8.0	2.0	2.2	2.2	2.4
	15	Tomato	19.6	6.7	1.9	1.9	2.1	2.3
	16	Carrot	21.9	7.6	1.9	2.0	2.3	2.9
	17	Potato	15.9	5.5	1.9	1.7	2.2	2.4
	18	Garlic	19.5	7.1	2.0	2.1	2.1	2.4
	19	Onion	19.5	7.1	2.0	2.1	2.1	2.4
	20	Celery	19.8	7.3	1.9	1.8	2.3	2.5
	21	Strawberry	20.7	7.5	1.9	1.9	2.1	1.7
	22	Apple	14.4	6.0	1.8	1.6	2.2	2.5
	23	Kiwi	27.0	9.4	1.8	1.1	2.7	2.5
	24	Mango	27.0	9.4	1.8	1.1	2.7	2.5
	25	Banana	27.0	9.4	1.8	1.1	2.7	2.5
	26	Peach	6.9	4.3	1.8	1.4	1.9	1.7
	27	Cucumber	20.9	6.8	1.9	1.6	2.1	2.0
	28	Citrus mix	20.0	7.4	1.9	2.2	2.2	2.5
	29	Cacao	23.0	7.3	1.5	0.0	2.8	1.6
	30	CCD antigen	23.8	6.9	1.5	1.6	1.9	1.7
	31	Crab	2.8	2.6	1.6	1.5	1.5	2.7
	32	Shrimp	3.0	2.1	1.4	1.2	1.5	1.8
	33	Blue mussel	3.2	2.5	1.5	2.1	1.1	1.8
	34	Oyster	3.2	2.5	1.5	2.1	1.1	1.8
	35	Clam	3.2	2.5	1.5	2.1	1.1	1.8
	36	Scallop	3.2	2.5	1.5	2.1	1.1	1.8
	37	Lobster	4.3	3.1	1.2	1.0	1.1	1.8
	38	Pacific squid	4.3	3.1	1.2	1.0	1.1	1.8
	39	Mackerel	5.1	2.0	2.7	5.3	4.0	13.8
	40	Plaice	4.4	1.6	3.1	9.9	4.7	25.2
	41	Anchovy	4.4	1.6	3.1	9.9	4.7	25.2
	42	Alaska pollock	4.4	1.6	3.1	9.9	4.7	25.2
	43	Eel	4.6	2.1	3.1	9.3	4.3	23.0
	44	Tuna	6.1	1.7	2.5	5.5	2.7	13.6
	45	Salmon	6.1	1.7	2.5	5.5	2.7	13.6
	46	Codfish	4.8	3.1	2.2	2.1	2.3	8.0
	47	Egg white	4.0	2.2	2.8	7.5	4.3	12.8
	48	Chicken	4.8	3.0	2.5	7.6	3.6	18.8
	49	Milk	1.8	1.2	1.3	8.1	1.3	2.8
	50	Cheese	5.1	1.9	2.1	6.5	3.0	16.8
	51	Pork	1.7	1.3	2.5	17.4	3.7	24.9
	52	Beef	1.1	1.2	1.3	8.9	1.3	2.8
	53	Lamb meat	1.3	1.5	1.3	27.0	1.1	6.1
	54	Yeast	2.8	2.2	2.1	0.0	2.8	1.5
	55	Silkworm pupa	3.1	2.1	1.4	1.2	1.4	1.6

Supplementary Material 1. (Continued)

Figure 3B			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	1.2	1.2	4.5	2.6	1.4	26.8	10.9
	2	Barley	1.0	1.0	4.5	3.1	1.1	28.7	11.8
	3	Corn	2.1	2.1	3.3	5.0	2.4	23.2	8.6
	4	Rice	1.7	1.7	4.4	3.6	2.0	24.2	9.0
	5	Buckwheat	0.9	0.9	6.4	2.2	0.9	39.9	15.1
	6	Sesame	1.2	1.2	5.7	2.0	1.0	34.6	11.5
	7	Peanut	1.6	1.6	4.4	4.0	1.5	20.1	7.6
	8	Soy bean	2.5	2.5	8.9	8.3	3.2	27.7	13.2
	9	Hazel nut	1.0	1.0	7.5	4.3	1.3	24.9	9.8
	10	Almond	1.8	1.8	10.2	4.7	2.1	35.5	13.0
	11	Pine	1.8	1.8	10.2	4.7	2.1	35.5	13.0
	12	Sunflower	1.8	1.8	10.2	4.7	2.1	35.5	13.0
	13	Walnut	0.7	0.7	6.7	1.2	0.4	34.7	13.3
	14	Sweet nut	1.6	1.6	4.7	3.6	1.6	33.6	10.6
	15	Tomato	1.8	1.8	3.6	3.3	1.7	17.1	5.9
	16	Carrot	1.9	1.9	4.4	3.9	2.0	21.5	7.7
	17	Potato	1.8	1.8	3.3	3.7	1.7	13.7	5.4
	18	Garlic	1.7	1.7	3.9	4.0	1.8	19.5	7.3
	19	Onion	1.7	1.7	3.9	4.0	1.8	19.5	7.3
	20	Celery	1.6	1.6	2.4	3.2	1.8	17.7	6.5
	21	Strawberry	1.6	1.6	4.5	2.8	1.4	20.4	6.8
	22	Apple	1.4	1.4	3.8	3.5	1.8	14.1	5.6
	23	Kiwi	1.2	1.2	5.9	2.7	1.3	43.0	14.9
	24	Mango	1.2	1.2	5.9	2.7	1.3	43.0	14.9
	25	Banana	1.2	1.2	5.9	2.7	1.3	43.0	14.9
	26	Peach	1.2	1.2	2.8	2.2	1.4	5.9	2.7
	27	Cucumber	1.5	1.5	2.6	2.9	1.4	19.5	7.0
	28	Citrus mix	2.0	2.0	2.6	4.0	1.9	18.2	6.7
	29	Cacao	0.9	0.9	27.3	0.0	0.0	58.1	9.0
	30	CCD antigen	1.2	1.2	5.2	2.4	1.0	39.1	10.6
	31	Crab	1.5	1.5	0.9	2.8	1.6	3.3	7.8
	32	Shrimp	1.2	1.2	1.1	1.5	1.3	3.8	6.2
	33	Blue mussel	1.1	1.1	0.0	2.9	1.4	6.8	23.8
	34	Oyster	1.1	1.1	0.0	2.9	1.4	6.8	23.8
	35	Clam	1.1	1.1	0.0	2.9	1.4	6.8	23.8
	36	Scallop	1.1	1.1	0.0	2.9	1.4	6.8	23.8
	37	Lobster	1.3	1.3	0.0	3.5	1.1	7.7	34.4
	38	Pacific squid	1.3	1.3	0.0	3.5	1.1	7.7	34.4
	39	Mackerel	6.4	6.4	24.5	22.7	7.5	7.4	12.1
	40	Plaice	12.7	12.7	25.6	23.8	17.2	0.0	11.2
	41	Anchovy	12.7	12.7	25.6	23.8	17.2	0.0	11.2
	42	Alaska pollock	12.7	12.7	25.6	23.8	17.2	0.0	11.2
	43	Eel	11.9	11.9	0.0	28.0	13.5	0.0	10.6
	44	Tuna	6.7	6.7	0.0	18.5	6.4	3.5	5.0
	45	Salmon	6.7	6.7	0.0	18.5	6.4	3.5	5.0
	46	Codfish	3.5	3.5	0.0	11.4	3.5	5.4	15.6
	47	Egg white	5.9	5.9	18.0	18.7	10.2	1.8	2.3
	48	Chicken	8.3	8.3	15.8	25.6	10.6	7.2	8.6
	49	Milk	8.3	8.3	5.5	2.8	7.2	1.2	1.6
	50	Cheese	8.0	8.0	26.9	20.3	10.5	4.1	2.9
	51	Pork	19.2	19.2	7.6	29.0	24.5	0.4	2.5
	52	Beef	7.1	7.1	4.2	3.1	5.9	0.6	1.0
	53	Lamb meat	21.6	21.6	6.4	3.0	19.3	0.0	1.4
	54	Yeast	1.6	1.6	24.8	0.0	2.8	0.0	0.0
	55	Silkworm pupa	1.2	1.2	1.1	1.1	1.1	4.2	5.8

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	1.9	1.8	1.8	2.0	2.0	3.9
	2	Barley	2.0	1.9	1.9	2.1	2.1	5.1
	3	Corn	2.1	1.9	1.9	2.1	2.2	4.4
	4	Rice	2.0	1.9	1.9	2.1	2.1	5.1
	5	Buckwheat	2.1	1.9	2.0	2.1	2.2	3.6
	6	Sesame	2.0	1.9	1.9	2.1	2.1	3.9
	7	Peanut	2.0	1.8	1.9	2.1	2.1	4.2
	8	Soy bean	2.4	2.1	2.2	2.2	2.4	4.6
	9	Hazel nut	2.7	2.3	2.3	2.3	2.6	5.5
	10	Almond	2.1	1.9	2.0	2.1	2.2	3.6
	11	Pine	2.1	1.9	2.0	2.1	2.2	3.6
	12	Sunflower	2.1	1.9	2.0	2.1	2.2	3.6
	13	Walnut	2.1	1.9	2.0	2.1	2.1	3.3
	14	Sweet nut	2.0	1.8	1.9	2.0	2.1	3.6
	15	Tomato	1.9	1.8	1.8	2.0	1.9	3.4
	16	Carrot	1.9	1.8	1.8	2.0	2.0	3.5
	17	Potato	1.7	1.7	1.7	1.9	1.9	3.1
	18	Garlic	2.0	1.9	1.9	2.0	2.1	4.0
	19	Onion	2.0	1.9	1.9	2.0	2.1	4.0
	20	Celery	1.9	1.8	1.8	2.0	2.0	3.5
	21	Strawberry	2.0	1.9	1.9	2.1	2.1	4.4
	22	Apple	2.0	1.9	1.9	2.1	2.1	3.6
	23	Kiwi	2.3	2.1	2.2	2.2	2.4	4.4
	24	Mango	2.3	2.1	2.2	2.2	2.4	4.4
	25	Banana	2.3	2.1	2.2	2.2	2.4	4.4
	26	Peach	1.9	1.8	1.8	1.9	2.0	2.8
	27	Cucumber	1.9	1.8	1.8	2.0	2.0	3.3
	28	Citrus mix	2.0	1.9	1.9	2.1	2.1	3.9
	29	Cacao	2.6	2.2	2.3	2.3	2.7	8.1
	30	CCD antigen	1.8	1.7	1.7	1.9	1.9	3.1
	31	Crab	2.6	2.4	2.3	2.9	3.0	3.9
	32	Shrimp	2.6	2.5	2.3	3.1	2.7	3.8
	33	Blue mussel	3.0	2.4	2.3	2.5	3.0	4.7
	34	Oyster	3.0	2.4	2.3	2.5	3.0	4.7
	35	Clam	3.0	2.4	2.3	2.5	3.0	4.7
	36	Scallop	3.0	2.4	2.3	2.5	3.0	4.7
	37	Lobster	2.5	2.1	2.1	2.3	2.7	2.7
	38	Pacific squid	2.5	2.1	2.1	2.3	2.7	2.7
	39	Mackerel	2.5	2.2	2.1	2.4	2.6	6.3
	40	Plaice	2.9	2.2	2.1	2.5	2.9	6.5
	41	Anchovy	2.9	2.2	2.1	2.5	2.9	6.5
	42	Alaska pollock	2.9	2.2	2.1	2.5	2.9	6.5
	43	Eel	2.6	2.3	2.2	2.4	3.0	7.1
	44	Tuna	2.6	2.4	2.2	2.8	3.0	6.2
	45	Salmon	2.6	2.4	2.2	2.8	3.0	6.2
	46	Codfish	2.3	2.0	1.9	2.3	2.5	5.2
	47	Egg white	3.0	2.0	2.0	2.4	2.5	6.1
	48	Chicken	3.0	2.5	2.4	2.6	3.1	8.9
	49	Milk	1.3	1.3	1.3	1.3	1.3	1.7
	50	Cheese	2.4	1.9	2.0	2.3	2.5	5.3
	51	Pork	1.9	1.5	1.5	1.6	1.6	1.5
	52	Beef	1.4	1.3	1.3	1.3	1.3	1.4
	53	Lamb meat	1.5	1.3	1.3	1.4	1.4	1.5
	54	Yeast	2.9	2.5	2.2	3.0	3.0	55.3
	55	Silkworm pupa	2.6	2.4	2.3	3.1	2.6	3.9

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	4.2	3.3	3.8	2.1	9.3	8.4
	2	Barley	4.4	3.4	4.1	2.1	11.8	10.5
	3	Corn	5.0	3.7	4.5	2.5	14.4	12.8
	4	Rice	4.7	3.9	4.9	2.4	13.8	12.3
	5	Buckwheat	4.1	2.9	4.0	1.8	14.7	13.0
	6	Sesame	4.5	3.1	4.0	1.9	14.8	13.2
	7	Peanut	4.5	3.7	4.2	2.4	13.7	12.1
	8	Soy bean	4.6	3.8	4.0	1.9	11.4	10.2
	9	Hazel nut	6.4	4.6	5.8	2.9	12.6	11.3
	10	Almond	3.8	3.0	4.1	1.8	14.5	12.9
	11	Pine	3.8	3.0	4.1	1.8	14.5	12.9
	12	Sunflower	3.8	3.0	4.1	1.8	14.5	12.9
	13	Walnut	3.9	3.0	4.3	1.6	14.9	13.2
	14	Sweet nut	3.8	2.8	3.5	1.6	15.1	13.4
	15	Tomato	3.6	2.9	3.7	1.9	14.4	12.9
	16	Carrot	3.8	3.0	3.9	1.9	14.7	13.2
	17	Potato	3.0	2.7	3.2	1.8	14.0	12.4
	18	Garlic	4.3	3.6	4.1	2.6	14.6	13.1
	19	Onion	4.3	3.6	4.1	2.6	14.6	13.1
	20	Celery	3.7	3.1	3.8	2.1	14.7	13.2
	21	Strawberry	4.8	3.4	4.0	2.2	14.4	12.9
	22	Apple	3.9	3.9	4.0	2.9	11.1	9.9
	23	Kiwi	4.6	3.6	4.0	1.9	14.7	13.1
	24	Mango	4.6	3.6	4.0	1.9	14.7	13.1
	25	Banana	4.6	3.6	4.0	1.9	14.7	13.1
	26	Peach	3.2	3.4	3.1	3.2	7.2	6.6
	27	Cucumber	3.5	3.0	3.6	2.0	13.9	12.4
	28	Citrus mix	4.3	3.3	3.9	2.1	14.6	13.0
	29	Cacao	11.6	6.3	8.8	4.2	13.5	12.0
	30	CCD antigen	3.3	2.3	2.8	1.3	14.7	13.0
	31	Crab	3.8	3.4	3.3	2.8	2.8	2.7
	32	Shrimp	3.2	3.1	3.2	2.4	3.2	3.0
	33	Blue mussel	4.5	3.1	3.5	2.7	5.8	5.6
	34	Oyster	4.5	3.1	3.5	2.7	5.8	5.6
	35	Clam	4.5	3.1	3.5	2.7	5.8	5.6
	36	Scallop	4.5	3.1	3.5	2.7	5.8	5.6
	37	Lobster	3.4	3.3	3.5	3.3	3.9	3.7
	38	Pacific squid	3.4	3.3	3.5	3.3	3.9	3.7
	39	Mackerel	7.4	6.5	8.6	4.2	5.4	4.8
	40	Plaice	6.3	4.5	9.8	4.7	3.9	3.9
	41	Anchovy	6.3	4.5	9.8	4.7	3.9	3.9
	42	Alaska pollock	6.3	4.5	9.8	4.7	3.9	3.9
	43	Eel	6.2	4.2	7.9	3.6	6.3	6.4
	44	Tuna	10.0	4.7	9.1	4.4	3.0	3.2
	45	Salmon	10.0	4.7	9.1	4.4	3.0	3.2
	46	Codfish	5.3	3.6	6.6	2.3	3.7	3.6
	47	Egg white	5.6	4.3	7.3	4.7	2.4	2.4
	48	Chicken	11.3	6.9	11.8	5.7	6.1	5.7
	49	Milk	1.5	1.9	2.5	2.6	1.1	1.2
	50	Cheese	5.1	4.3	5.6	4.5	4.1	4.2
	51	Pork	1.9	2.0	2.6	2.1	1.4	1.4
	52	Beef	1.3	1.3	1.5	2.0	1.1	1.1
	53	Lamb meat	1.0	1.4	1.6	2.3	1.0	1.1
	54	Yeast	83.2	44.8	47.0	35.7	4.4	4.2
	55	Silkworm pupa	3.5	3.2	3.3	2.4	3.5	3.3

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			13 Orchard grass	14 Reed	15 Bent grass	16 Timothy grass	17 Cultivated rye	18 Alder
Food Allergens	1	Wheat	8.4	8.4	8.4	9.5	11.6	18.0
	2	Barley	10.5	10.5	10.5	12.0	14.9	21.7
	3	Corn	12.8	12.8	12.8	14.6	18.1	27.5
	4	Rice	12.3	12.3	12.3	14.1	17.2	25.4
	5	Buckwheat	13.0	13.0	13.0	15.0	18.9	31.8
	6	Sesame	13.2	13.2	13.2	15.1	19.1	30.1
	7	Peanut	12.1	12.1	12.1	13.9	17.2	25.2
	8	Soy bean	10.2	10.2	10.2	11.6	14.5	23.3
	9	Hazel nut	11.3	11.3	11.3	12.9	16.1	27.4
	10	Almond	12.9	12.9	12.9	14.7	18.5	30.1
	11	Pine	12.9	12.9	12.9	14.7	18.5	30.1
	12	Sunflower	12.9	12.9	12.9	14.7	18.5	30.1
	13	Walnut	13.2	13.2	13.2	15.2	19.0	31.4
	14	Sweet nut	13.4	13.4	13.4	15.4	19.3	25.4
	15	Tomato	12.9	12.9	12.9	14.6	17.5	21.1
	16	Carrot	13.2	13.2	13.2	15.1	18.6	26.2
	17	Potato	12.4	12.4	12.4	13.5	14.6	14.2
	18	Garlic	13.1	13.1	13.1	14.9	18.5	23.2
	19	Onion	13.1	13.1	13.1	14.9	18.5	23.2
	20	Celery	13.2	13.2	13.2	15.0	18.2	25.6
	21	Strawberry	12.9	12.9	12.9	14.7	18.2	25.3
	22	Apple	9.9	9.9	9.9	11.3	13.7	24.0
	23	Kiwi	13.1	13.1	13.1	15.0	18.8	31.9
	24	Mango	13.1	13.1	13.1	15.0	18.8	31.9
	25	Banana	13.1	13.1	13.1	15.0	18.8	31.9
	26	Peach	6.6	6.6	6.6	7.3	8.5	15.5
	27	Cucumber	12.4	12.4	12.4	14.2	17.4	21.9
	28	Citrus mix	13.0	13.0	13.0	14.9	18.3	26.3
	29	Cacao	12.0	12.0	12.0	13.8	17.1	29.3
	30	CCD antigen	13.0	13.0	13.0	14.9	18.4	18.6
	31	Crab	2.7	2.7	2.7	2.7	2.9	3.2
	32	Shrimp	3.0	3.0	3.0	3.1	3.3	3.7
	33	Blue mussel	5.6	5.6	5.6	5.9	6.9	9.7
	34	Oyster	5.6	5.6	5.6	5.9	6.9	9.7
	35	Clam	5.6	5.6	5.6	5.9	6.9	9.7
	36	Scallop	5.6	5.6	5.6	5.9	6.9	9.7
	37	Lobster	3.7	3.7	3.7	3.6	3.7	4.9
	38	Pacific squid	3.7	3.7	3.7	3.6	3.7	4.9
	39	Mackerel	4.8	4.8	4.8	5.2	5.4	5.9
	40	Plaice	3.9	3.9	3.9	3.8	3.7	4.0
	41	Anchovy	3.9	3.9	3.9	3.8	3.7	4.0
	42	Alaska pollock	3.9	3.9	3.9	3.8	3.7	4.0
	43	Eel	6.4	6.4	6.4	6.6	6.2	7.0
	44	Tuna	3.2	3.2	3.2	3.4	3.4	3.9
	45	Salmon	3.2	3.2	3.2	3.4	3.4	3.9
	46	Codfish	3.6	3.6	3.6	4.0	3.5	4.6
	47	Egg white	2.4	2.4	2.4	2.5	2.3	3.0
	48	Chicken	5.7	5.7	5.7	6.0	6.2	7.1
	49	Milk	1.2	1.2	1.2	1.2	1.0	1.2
	50	Cheese	4.2	4.2	4.2	4.2	5.0	5.5
	51	Pork	1.4	1.4	1.4	1.4	1.2	1.5
	52	Beef	1.1	1.1	1.1	1.1	1.1	1.3
	53	Lamb meat	1.1	1.1	1.1	1.2	1.0	1.4
	54	Yeast	4.2	4.2	4.2	5.0	4.2	5.5
	55	Silkworm pupa	3.3	3.3	3.3	3.4	3.6	4.2

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	8.5	17.5	13.3	25.4	16.2	11.1
	2	Barley	10.4	22.3	17.1	31.1	20.5	14.1
	3	Corn	12.1	27.5	20.4	37.2	25.5	17.0
	4	Rice	11.8	25.0	18.3	34.3	24.0	16.3
	5	Buckwheat	14.5	30.5	22.4	44.3	27.2	17.7
	6	Sesame	14.0	29.5	21.9	43.7	27.1	17.8
	7	Peanut	10.8	24.4	18.6	33.3	24.2	16.3
	8	Soy bean	15.7	24.0	17.5	35.5	20.3	13.6
	9	Hazel nut	18.2	27.2	19.5	41.0	23.0	15.2
	10	Almond	15.4	30.2	22.1	43.1	26.4	17.4
	11	Pine	15.4	30.2	22.1	43.1	26.4	17.4
	12	Sunflower	15.4	30.2	22.1	43.1	26.4	17.4
	13	Walnut	14.7	30.4	22.3	44.1	27.3	17.8
	14	Sweet nut	11.7	26.0	20.2	34.9	25.9	18.0
	15	Tomato	9.2	21.6	16.4	27.0	22.9	16.6
	16	Carrot	10.8	25.7	19.1	34.1	26.2	17.4
	17	Potato	6.5	14.9	11.2	17.8	17.0	14.0
	18	Garlic	11.0	26.0	18.6	31.6	24.4	17.2
	19	Onion	11.0	26.0	18.6	31.6	24.4	17.2
	20	Celery	11.1	25.7	19.4	33.1	25.6	17.1
	21	Strawberry	12.2	26.5	19.6	35.4	25.2	17.1
	22	Apple	14.4	22.8	17.0	31.6	19.6	13.2
	23	Kiwi	20.0	31.7	22.8	48.9	27.1	17.7
	24	Mango	20.0	31.7	22.8	48.9	27.1	17.7
	25	Banana	20.0	31.7	22.8	48.9	27.1	17.7
	26	Peach	18.2	13.9	14.8	17.6	11.4	8.3
	27	Cucumber	9.1	21.7	16.4	28.1	23.6	16.4
	28	Citrus mix	12.1	26.9	20.0	35.5	25.4	17.2
	29	Cacao	18.8	29.1	20.6	44.4	24.9	16.3
	30	CCD antigen	8.0	19.1	15.1	24.9	21.6	16.3
	31	Crab	2.4	3.5	3.0	3.7	3.2	3.3
	32	Shrimp	2.5	3.9	3.2	4.5	3.8	3.6
	33	Blue mussel	7.3	11.2	8.5	14.8	9.3	7.1
	34	Oyster	7.3	11.2	8.5	14.8	9.3	7.1
	35	Clam	7.3	11.2	8.5	14.8	9.3	7.1
	36	Scallop	7.3	11.2	8.5	14.8	9.3	7.1
	37	Lobster	3.6	5.3	4.6	5.6	4.9	4.3
	38	Pacific squid	3.6	5.3	4.6	5.6	4.9	4.3
	39	Mackerel	4.0	7.5	6.1	5.9	4.7	5.3
	40	Plaice	5.0	7.0	5.7	5.4	3.5	3.9
	41	Anchovy	5.0	7.0	5.7	5.4	3.5	3.9
	42	Alaska pollock	5.0	7.0	5.7	5.4	3.5	3.9
	43	Eel	7.9	13.4	10.0	8.3	5.9	6.4
	44	Tuna	3.0	4.8	3.8	3.8	3.0	3.4
	45	Salmon	3.0	4.8	3.8	3.8	3.0	3.4
	46	Codfish	3.3	5.6	4.5	4.6	4.5	4.2
	47	Egg white	2.6	3.2	2.8	2.4	2.4	3.3
	48	Chicken	6.1	10.2	8.3	7.1	5.5	6.5
	49	Milk	1.1	1.4	1.4	1.0	1.0	1.4
	50	Cheese	4.5	7.3	5.7	5.1	4.7	4.5
	51	Pork	1.4	1.6	1.4	1.2	1.5	1.5
	52	Beef	1.1	1.4	1.3	1.1	1.1	1.3
	53	Lamb meat	1.0	1.5	1.3	0.9	0.8	1.2
	54	Yeast	3.1	6.6	3.5	5.4	5.4	6.5
	55	Silkworm pupa	2.7	4.4	3.5	5.1	4.3	3.9

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	19.0	19.5	21.7	16.0	17.5	12.1
	2	Barley	23.8	24.2	27.6	20.6	22.0	15.6
	3	Corn	29.4	30.2	33.6	22.7	27.3	19.1
	4	Rice	27.0	28.1	31.2	21.7	26.2	17.8
	5	Buckwheat	32.7	33.7	38.7	28.3	29.8	19.8
	6	Sesame	31.9	32.7	36.5	27.7	29.2	19.8
	7	Peanut	26.4	27.9	30.6	20.0	25.9	17.9
	8	Soy bean	25.8	24.9	29.3	34.5	21.9	15.2
	9	Hazel nut	28.5	28.2	33.5	46.1	25.2	16.9
	10	Almond	32.3	32.7	38.2	30.1	28.9	19.3
	11	Pine	32.3	32.7	38.2	30.1	28.9	19.3
	12	Sunflower	32.3	32.7	38.2	30.1	28.9	19.3
	13	Walnut	33.2	33.8	39.3	29.6	29.9	19.9
	14	Sweet nut	27.5	29.2	32.9	22.5	27.8	20.0
	15	Tomato	22.7	24.1	26.3	16.9	24.2	18.0
	16	Carrot	27.7	29.2	31.6	20.6	28.0	19.5
	17	Potato	15.6	16.7	17.4	11.1	17.9	13.8
	18	Garlic	26.8	26.7	31.3	21.1	24.9	18.8
	19	Onion	26.8	26.7	31.3	21.1	24.9	18.8
	20	Celery	27.7	28.8	31.6	20.5	27.2	19.3
	21	Strawberry	27.9	28.0	32.3	23.7	26.5	18.9
	22	Apple	24.0	23.9	27.3	21.8	21.1	14.5
	23	Kiwi	34.1	33.8	39.8	44.1	29.7	19.8
	24	Mango	34.1	33.8	39.8	44.1	29.7	19.8
	25	Banana	34.1	33.8	39.8	44.1	29.7	19.8
	26	Peach	13.8	13.3	15.0	12.8	12.0	8.9
	27	Cucumber	23.2	25.0	26.6	16.7	25.4	17.9
	28	Citrus mix	28.4	28.5	32.6	23.0	26.6	19.2
	29	Cacao	31.2	31.0	36.6	48.0	27.3	17.8
	30	CCD antigen	20.2	22.0	23.2	15.4	22.8	17.9
	31	Crab	3.6	3.5	3.6	3.6	3.3	3.0
	32	Shrimp	4.1	4.1	4.3	3.9	4.0	3.4
	33	Blue mussel	11.1	11.0	12.9	17.4	9.9	7.3
	34	Oyster	11.1	11.0	12.9	17.4	9.9	7.3
	35	Clam	11.1	11.0	12.9	17.4	9.9	7.3
	36	Scallop	11.1	11.0	12.9	17.4	9.9	7.3
	37	Lobster	5.5	5.7	5.9	4.4	5.1	4.5
	38	Pacific squid	5.5	5.7	5.9	4.4	5.1	4.5
	39	Mackerel	9.1	7.3	6.1	6.8	6.3	5.8
	40	Plaice	8.4	5.3	5.7	4.4	4.9	3.8
	41	Anchovy	8.4	5.3	5.7	4.4	4.9	3.8
	42	Alaska pollock	8.4	5.3	5.7	4.4	4.9	3.8
	43	Eel	13.2	9.8	10.2	8.7	8.0	6.5
	44	Tuna	5.0	4.1	3.5	3.0	4.1	4.0
	45	Salmon	5.0	4.1	3.5	3.0	4.1	4.0
	46	Codfish	6.5	5.6	5.2	5.3	5.2	4.3
	47	Egg white	3.5	2.8	2.9	2.9	2.6	2.7
	48	Chicken	12.4	9.6	7.6	7.1	8.2	7.0
	49	Milk	1.7	1.3	1.0	1.5	1.1	1.4
	50	Cheese	7.8	6.0	5.9	5.4	5.6	4.9
	51	Pork	1.8	1.8	1.4	1.6	1.6	1.4
	52	Beef	1.4	1.2	1.2	1.2	1.2	1.2
	53	Lamb meat	1.7	1.3	0.9	1.6	1.0	1.2
	54	Yeast	7.1	5.5	8.0	7.0	6.7	4.1
	55	Silkworm pupa	4.6	4.6	5.0	4.6	4.5	3.7

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			31 Mugwort	32 Ox-eye daisy	33 Dandelion	34 Plantain	35 Russian thistle	36 Goldenrod
Food Allergens	1	Wheat	13.7	12.4	16.6	14.0	10.3	14.1
	2	Barley	18.4	16.7	20.6	18.0	13.1	17.9
	3	Corn	20.9	18.4	24.3	22.2	15.6	21.2
	4	Rice	19.5	17.0	22.9	21.3	15.2	19.8
	5	Buckwheat	23.3	20.4	29.3	23.1	16.2	23.6
	6	Sesame	22.8	20.2	27.5	23.2	16.3	22.8
	7	Peanut	19.2	16.4	22.2	21.0	14.6	19.7
	8	Soy bean	19.4	19.0	23.0	17.7	12.6	18.3
	9	Hazel nut	22.3	21.3	26.0	19.7	13.6	20.4
	10	Almond	23.7	21.7	29.0	22.7	16.1	23.2
	11	Pine	23.7	21.7	29.0	22.7	16.1	23.2
	12	Sunflower	23.7	21.7	29.0	22.7	16.1	23.2
	13	Walnut	24.0	21.3	29.2	23.4	16.6	23.9
	14	Sweet nut	21.0	18.6	23.7	23.5	16.5	21.3
	15	Tomato	16.9	14.2	17.8	21.2	15.4	17.5
	16	Carrot	19.0	16.1	22.4	22.8	16.0	20.3
	17	Potato	11.8	10.1	12.2	17.0	14.7	12.3
	18	Garlic	19.3	16.8	21.2	22.1	15.6	19.3
	19	Onion	19.3	16.8	21.2	22.1	15.6	19.3
	20	Celery	19.2	16.2	21.3	22.6	16.0	20.4
	21	Strawberry	20.1	17.5	22.3	22.2	15.4	20.0
	22	Apple	17.6	15.4	20.5	16.8	12.1	17.1
	23	Kiwi	25.6	24.0	30.1	23.1	16.4	23.7
	24	Mango	25.6	24.0	30.1	23.1	16.4	23.7
	25	Banana	25.6	24.0	30.1	23.1	16.4	23.7
	26	Peach	10.5	9.7	11.4	10.0	7.5	10.2
	27	Cucumber	17.0	14.6	18.4	21.0	15.0	17.6
	28	Citrus mix	20.5	18.0	22.5	22.4	15.5	20.4
	29	Cacao	23.5	22.2	28.3	21.1	15.1	22.1
	30	CCD antigen	15.9	13.5	16.7	20.8	16.3	16.5
	31	Crab	3.1	3.8	3.6	3.2	2.9	3.4
	32	Shrimp	3.7	4.1	4.2	3.7	3.4	3.9
	33	Blue mussel	8.7	9.2	10.3	8.4	6.1	8.7
	34	Oyster	8.7	9.2	10.3	8.4	6.1	8.7
	35	Clam	8.7	9.2	10.3	8.4	6.1	8.7
	36	Scallop	8.7	9.2	10.3	8.4	6.1	8.7
	37	Lobster	4.4	4.8	5.9	4.7	3.8	5.2
	38	Pacific squid	4.4	4.8	5.9	4.7	3.8	5.2
	39	Mackerel	6.2	6.1	5.8	6.0	5.6	6.9
	40	Plaice	5.5	5.8	5.6	5.0	4.2	5.4
	41	Anchovy	5.5	5.8	5.6	5.0	4.2	5.4
	42	Alaska pollock	5.5	5.8	5.6	5.0	4.2	5.4
	43	Eel	7.0	9.2	7.8	9.6	7.0	8.3
	44	Tuna	3.8	5.2	4.9	3.5	2.9	4.8
	45	Salmon	3.8	5.2	4.9	3.5	2.9	4.8
	46	Codfish	4.1	4.8	5.1	4.6	4.0	5.2
	47	Egg white	2.9	3.8	3.7	2.3	2.3	3.7
	48	Chicken	9.3	7.8	8.0	7.8	6.7	8.8
	49	Milk	1.4	1.7	1.4	1.1	1.1	1.4
	50	Cheese	5.2	5.0	6.6	5.9	4.3	5.8
	51	Pork	1.6	2.0	1.9	1.5	1.5	1.8
	52	Beef	1.3	1.4	1.4	1.2	1.1	1.3
	53	Lamb meat	1.4	1.6	1.1	1.1	1.1	1.4
	54	Yeast	6.5	6.3	7.8	6.2	3.2	7.6
	55	Silkworm pupa	4.0	4.5	4.7	4.1	3.7	4.2

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens					
			37 Pigweed	38 Japanese hop	39 Cat	40 Horse	41 Dog	42 Guinea pig
Food Allergens	1	Wheat	14.9	11.2	1.5	1.0	1.5	2.1
	2	Barley	19.1	13.7	1.8	1.1	1.7	2.3
	3	Corn	23.0	16.3	1.9	1.2	1.9	2.7
	4	Rice	22.1	14.9	1.9	0.9	1.8	2.2
	5	Buckwheat	24.5	18.6	1.8	1.0	1.9	2.3
	6	Sesame	24.3	18.4	1.7	0.7	1.9	2.0
	7	Peanut	21.8	14.4	1.8	1.2	1.8	2.4
	8	Soy bean	18.5	15.8	2.3	2.3	2.7	4.4
	9	Hazel nut	20.6	17.9	2.5	0.9	3.4	3.1
	10	Almond	23.9	18.2	1.9	1.3	2.0	2.8
	11	Pine	23.9	18.2	1.9	1.3	2.0	2.8
	12	Sunflower	23.9	18.2	1.9	1.3	2.0	2.8
	13	Walnut	24.9	18.0	1.8	1.0	2.0	2.2
	14	Sweet nut	24.4	15.6	1.7	1.0	1.6	1.9
	15	Tomato	21.5	12.4	1.7	1.0	1.6	2.0
	16	Carrot	23.6	14.7	1.7	1.1	1.7	2.1
	17	Potato	17.0	8.7	1.6	1.2	1.6	1.8
	18	Garlic	22.2	14.6	1.9	1.0	1.7	2.1
	19	Onion	22.2	14.6	1.9	1.0	1.7	2.1
	20	Celery	23.2	14.6	1.7	0.9	1.8	1.9
	21	Strawberry	22.6	16.0	1.8	1.0	1.8	2.0
	22	Apple	17.4	14.3	2.1	1.0	2.2	2.4
	23	Kiwi	24.5	20.9	1.9	0.9	2.4	2.3
	24	Mango	24.5	20.9	1.9	0.9	2.4	2.3
	25	Banana	24.5	20.9	1.9	0.9	2.4	2.3
	26	Peach	10.1	9.7	2.4	1.3	2.4	2.1
	27	Cucumber	21.8	12.9	1.7	0.9	1.6	1.9
	28	Citrus mix	22.7	16.2	1.8	0.9	1.8	2.1
	29	Cacao	22.6	19.0	2.3	0.7	3.5	2.5
	30	CCD antigen	21.6	11.2	1.4	0.8	1.3	1.5
	31	Crab	3.6	4.6	2.2	1.8	1.9	4.6
	32	Shrimp	4.1	4.2	1.9	1.4	1.7	3.0
	33	Blue mussel	8.5	8.0	3.6	3.8	3.3	4.9
	34	Oyster	8.5	8.0	3.6	3.8	3.3	4.9
	35	Clam	8.5	8.0	3.6	3.8	3.3	4.9
	36	Scallop	8.5	8.0	3.6	3.8	3.3	4.9
	37	Lobster	5.0	4.9	2.9	2.8	2.2	3.8
	38	Pacific squid	5.0	4.9	2.9	2.8	2.2	3.8
	39	Mackerel	6.1	4.8	3.6	5.2	4.2	16.0
	40	Plaice	4.1	3.5	6.2	18.4	8.9	33.0
	41	Anchovy	4.1	3.5	6.2	18.4	8.9	33.0
	42	Alaska pollock	4.1	3.5	6.2	18.4	8.9	33.0
	43	Eel	7.1	5.4	4.7	12.6	5.5	27.8
	44	Tuna	4.1	4.6	3.4	6.2	3.8	15.9
	45	Salmon	4.1	4.6	3.4	6.2	3.8	15.9
	46	Codfish	4.4	4.6	3.3	6.8	3.7	13.2
	47	Egg white	2.3	3.2	6.0	14.1	8.1	19.0
	48	Chicken	7.2	5.7	5.7	10.3	7.5	29.2
	49	Milk	1.0	1.3	2.1	15.4	2.3	4.6
	50	Cheese	5.3	3.5	4.2	10.5	5.3	18.1
	51	Pork	1.5	1.4	3.7	27.6	5.4	24.0
	52	Beef	1.1	1.3	1.9	15.3	2.1	4.5
	53	Lamb meat	0.9	1.0	2.4	47.8	2.8	13.2
	54	Yeast	4.0	5.5	4.3	3.2	4.7	5.0
	55	Silkworm pupa	4.6	4.4	1.9	1.3	1.8	2.8

Supplementary Material 1. (Continued)

Figure 3C			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	1.4	1.4	3.4	2.2	1.3	12.1	12.9
	2	Barley	1.5	1.5	4.8	2.4	1.1	15.1	16.4
	3	Corn	1.6	1.6	5.6	3.4	1.3	16.9	16.8
	4	Rice	1.4	1.4	5.7	2.2	1.0	16.6	17.1
	5	Buckwheat	1.4	1.4	4.5	2.5	1.1	19.8	21.4
	6	Sesame	1.2	1.2	5.4	2.3	1.0	19.7	19.8
	7	Peanut	1.5	1.5	4.9	2.9	1.3	15.7	15.5
	8	Soy bean	2.4	2.4	9.8	4.7	2.6	16.3	21.9
	9	Hazel nut	1.4	1.4	12.1	1.7	1.5	16.7	24.2
	10	Almond	1.6	1.6	7.5	3.9	1.6	19.6	22.9
	11	Pine	1.6	1.6	7.5	3.9	1.6	19.6	22.9
	12	Sunflower	1.6	1.6	7.5	3.9	1.6	19.6	22.9
	13	Walnut	1.4	1.4	5.1	2.2	1.0	20.0	23.9
	14	Sweet nut	1.5	1.5	4.8	2.2	1.0	17.8	17.4
	15	Tomato	1.4	1.4	3.6	2.2	1.1	14.1	13.1
	16	Carrot	1.4	1.4	3.9	2.5	1.2	16.2	15.3
	17	Potato	1.3	1.3	3.7	2.4	1.3	11.0	9.9
	18	Garlic	1.5	1.5	5.2	2.4	1.2	15.4	15.5
	19	Onion	1.5	1.5	5.2	2.4	1.2	15.4	15.5
	20	Celery	1.3	1.3	3.7	2.2	1.1	15.6	15.1
	21	Strawberry	1.4	1.4	4.4	2.2	1.1	16.3	15.2
	22	Apple	1.3	1.3	4.4	2.8	1.2	13.6	15.5
	23	Kiwi	1.4	1.4	6.5	2.6	1.2	21.2	25.6
	24	Mango	1.4	1.4	6.5	2.6	1.2	21.2	25.6
	25	Banana	1.4	1.4	6.5	2.6	1.2	21.2	25.6
	26	Peach	1.3	1.3	4.0	2.3	1.3	7.5	7.6
	27	Cucumber	1.3	1.3	2.4	2.2	1.1	14.4	13.4
	28	Citrus mix	1.4	1.4	3.9	2.4	1.1	16.7	16.7
	29	Cacao	1.4	1.4	17.4	2.8	1.3	20.2	22.2
	30	CCD antigen	1.2	1.2	3.7	1.7	0.9	14.6	13.0
	31	Crab	2.1	2.1	4.1	2.9	2.1	2.4	4.6
	32	Shrimp	1.8	1.8	3.9	2.3	1.7	3.1	5.2
	33	Blue mussel	2.7	2.7	19.7	6.7	3.1	7.3	17.0
	34	Oyster	2.7	2.7	19.7	6.7	3.1	7.3	17.0
	35	Clam	2.7	2.7	19.7	6.7	3.1	7.3	17.0
	36	Scallop	2.7	2.7	19.7	6.7	3.1	7.3	17.0
	37	Lobster	2.6	2.6	11.7	4.6	2.7	3.0	8.1
	38	Pacific squid	2.6	2.6	11.7	4.6	2.7	3.0	8.1
	39	Mackerel	5.7	5.7	31.9	24.8	6.0	4.0	8.7
	40	Plaice	12.4	12.4	47.3	45.5	20.0	2.1	5.4
	41	Anchovy	12.4	12.4	47.3	45.5	20.0	2.1	5.4
	42	Alaska pollock	12.4	12.4	47.3	45.5	20.0	2.1	5.4
	43	Eel	10.6	10.6	62.3	46.3	12.2	3.8	9.1
	44	Tuna	4.8	4.8	15.0	16.4	5.1	1.7	4.9
	45	Salmon	4.8	4.8	15.0	16.4	5.1	1.7	4.9
	46	Codfish	5.2	5.2	11.4	22.2	6.5	3.4	5.8
	47	Egg white	8.1	8.1	20.6	31.0	14.4	1.6	3.2
	48	Chicken	10.0	10.0	34.0	44.6	11.3	4.0	8.4
	49	Milk	10.0	10.0	4.5	5.0	10.4	0.9	1.7
	50	Cheese	7.4	7.4	30.8	26.7	10.5	3.1	4.5
	51	Pork	22.8	22.8	9.2	29.1	30.9	1.1	1.7
	52	Beef	9.1	9.1	3.0	5.1	8.5	0.9	1.3
	53	Lamb meat	23.5	23.4	6.8	14.2	28.8	0.7	1.7
	54	Yeast	3.5	3.5	26.7	5.3	4.0	2.9	4.4
	55	Silkworm pupa	1.7	1.7	3.0	2.1	1.6	3.6	5.7

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			1	2	3	4	5	6
			House dust	<i>Dermatophagoides pteronyssinus</i>	<i>Dermatophagoides farinae</i>	<i>Acarus siro</i>	<i>Tyrophagus putrescentiae</i>	<i>Penicillium notatum</i>
Food Allergens	1	Wheat	3.2	2.9	2.9	2.9	3.2	2.6
	2	Barley	3.3	2.9	3.0	2.9	3.2	4.1
	3	Corn	3.3	2.9	3.0	2.8	3.2	3.2
	4	Rice	3.2	2.9	2.9	2.8	3.2	3.5
	5	Buckwheat	3.3	2.9	3.1	2.8	3.3	2.7
	6	Sesame	3.4	2.9	3.0	2.8	3.2	3.0
	7	Peanut	3.1	2.8	2.8	2.8	3.0	3.0
	8	Soy bean	4.2	3.4	3.6	2.9	3.8	3.4
	9	Hazel nut	4.8	3.9	4.1	3.4	4.5	4.2
	10	Almond	3.2	2.9	3.0	2.7	3.1	2.9
	11	Pine	3.2	2.9	3.0	2.7	3.1	2.9
	12	Sunflower	3.2	2.9	3.0	2.7	3.1	2.9
	13	Walnut	3.4	3.0	3.2	2.9	3.2	2.2
	14	Sweet nut	3.2	2.8	2.9	2.7	3.2	2.9
	15	Tomato	2.9	2.6	2.6	2.6	2.8	2.5
	16	Carrot	3.1	2.8	2.8	2.7	3.0	2.6
	17	Potato	2.6	2.4	2.4	2.4	2.5	2.5
	18	Garlic	3.2	2.8	2.8	2.7	3.1	2.8
	19	Onion	3.2	2.8	2.8	2.7	3.1	2.8
	20	Celery	3.0	2.7	2.8	2.7	3.0	2.6
	21	Strawberry	3.2	2.8	2.9	2.7	3.3	3.3
	22	Apple	3.3	2.9	3.0	2.9	3.3	2.9
	23	Kiwi	3.9	3.3	3.5	3.1	3.9	3.5
	24	Mango	3.9	3.3	3.5	3.1	3.9	3.5
	25	Banana	3.9	3.3	3.5	3.1	3.9	3.5
	26	Peach	3.0	2.6	2.7	2.5	3.0	2.5
	27	Cucumber	3.0	2.7	2.7	2.7	2.9	2.5
	28	Citrus mix	3.3	2.8	2.9	2.7	3.2	2.9
	29	Cacao	4.3	3.5	4.0	3.0	3.8	2.8
	30	CCD antigen	2.9	2.6	2.6	2.5	2.8	2.8
	31	Crab	4.5	3.8	3.4	4.3	5.1	4.6
	32	Shrimp	4.5	4.2	3.7	4.8	4.3	4.3
	33	Blue mussel	4.3	2.8	2.7	2.7	3.5	3.8
	34	Oyster	4.3	2.8	2.7	2.7	3.5	3.8
	35	Clam	4.3	2.8	2.7	2.7	3.5	3.8
	36	Scallop	4.3	2.8	2.7	2.7	3.5	3.8
	37	Lobster	3.8	3.0	2.8	3.0	3.9	6.6
	38	Pacific squid	3.8	3.0	2.8	3.0	3.9	6.6
	39	Mackerel	3.1	2.7	2.7	3.0	4.1	14.6
	40	Plaice	5.3	4.1	3.8	3.5	5.8	4.6
	41	Anchovy	5.3	4.1	3.8	3.5	5.8	4.6
	42	Alaska pollock	5.3	4.1	3.8	3.5	5.8	4.6
	43	Eel	3.7	3.5	2.9	2.5	4.6	11.1
	44	Tuna	4.0	2.9	2.5	3.3	4.8	4.9
	45	Salmon	4.0	2.9	2.5	3.3	4.8	4.9
	46	Codfish	3.0	2.7	2.4	2.4	3.3	3.3
	47	Egg white	2.7	2.5	2.2	2.3	2.5	7.9
	48	Chicken	3.8	3.9	2.9	3.0	4.5	9.9
	49	Milk	1.5	1.7	1.5	1.5	1.5	5.3
	50	Cheese	2.3	2.4	2.7	3.0	1.7	4.0
	51	Pork	3.1	2.6	2.1	2.2	2.6	6.2
	52	Beef	1.5	1.5	1.5	1.6	1.3	1.3
	53	Lamb meat	2.8	2.4	2.2	2.7	3.0	3.1
	54	Yeast	7.6	5.5	5.1	6.9	3.2	30.8
	55	Silkworm pupa	4.7	4.3	3.9	4.8	4.4	4.2

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			7 <i>Cladosporium herbarum</i>	8 <i>Aspergillus fumigatus</i>	9 <i>Candida albicans</i>	10 <i>Alternaria alternata</i>	11 Bermuda grass	12 Sweet vernal grass
Food Allergens	1	Wheat	2.7	2.6	3.1	1.7	8.9	8.5
	2	Barley	2.3	2.8	3.5	3.4	10.5	10.0
	3	Corn	2.5	2.8	3.1	2.5	12.1	11.6
	4	Rice	2.1	2.5	3.9	2.1	11.7	11.2
	5	Buckwheat	2.3	2.4	3.1	2.6	12.2	11.6
	6	Sesame	2.5	2.5	3.3	1.9	12.0	11.5
	7	Peanut	2.6	2.9	3.1	2.5	11.4	10.9
	8	Soy bean	3.4	3.9	3.3	4.9	10.3	9.9
	9	Hazel nut	6.3	4.5	3.3	2.7	11.3	10.8
	10	Almond	2.4	2.5	3.5	2.1	11.8	11.3
	11	Pine	2.4	2.5	3.5	2.1	11.8	11.3
	12	Sunflower	2.4	2.5	3.5	2.1	11.8	11.3
	13	Walnut	2.1	2.6	3.4	2.2	12.1	11.6
	14	Sweet nut	2.6	3.0	2.8	2.7	12.2	11.6
	15	Tomato	2.1	2.5	2.9	1.9	11.9	11.4
	16	Carrot	2.3	2.4	3.1	2.1	12.0	11.5
	17	Potato	2.3	2.3	2.7	1.8	11.6	11.0
	18	Garlic	2.2	3.1	2.9	3.8	12.0	11.5
	19	Onion	2.2	3.1	2.9	3.8	12.0	11.5
	20	Celery	2.1	2.5	2.9	2.9	12.0	11.5
	21	Strawberry	2.8	3.5	2.9	3.2	12.0	11.5
	22	Apple	2.9	2.8	3.3	3.3	11.2	10.7
	23	Kiwi	3.1	3.5	3.4	3.0	12.1	11.5
	24	Mango	3.1	3.5	3.4	3.0	12.1	11.5
	25	Banana	3.1	3.5	3.4	3.0	12.1	11.5
	26	Peach	2.4	2.9	2.6	2.0	8.4	8.2
	27	Cucumber	2.1	2.2	3.0	2.3	12.1	11.6
	28	Citrus mix	2.3	2.4	2.9	2.8	11.9	11.4
	29	Cacao	5.3	2.2	5.1	6.5	11.7	11.1
	30	CCD antigen	2.6	2.7	3.0	2.7	11.8	11.4
	31	Crab	3.9	4.5	4.0	4.9	3.1	3.2
	32	Shrimp	3.3	3.1	4.0	2.7	3.6	3.5
	33	Blue mussel	3.4	4.5	3.1	7.4	4.6	4.6
	34	Oyster	3.4	4.5	3.1	7.4	4.6	4.6
	35	Clam	3.4	4.5	3.1	7.4	4.6	4.6
	36	Scallop	3.4	4.5	3.1	7.4	4.6	4.6
	37	Lobster	3.0	2.1	8.1	0.0	5.3	5.3
	38	Pacific squid	3.0	2.1	8.1	0.0	5.3	5.3
	39	Mackerel	8.7	12.5	6.0	28.1	3.4	3.5
	40	Plaice	6.2	4.4	3.8	26.7	4.9	5.9
	41	Anchovy	6.2	4.4	3.8	26.7	4.9	5.9
	42	Alaska pollock	6.2	4.4	3.8	26.7	4.9	5.9
	43	Eel	9.9	10.7	6.0	21.3	6.4	8.0
	44	Tuna	3.3	2.3	5.0	0.0	4.2	4.0
	45	Salmon	3.3	2.3	5.0	0.0	4.2	4.0
	46	Codfish	3.0	4.3	3.2	6.4	3.1	3.1
	47	Egg white	4.1	1.8	5.5	7.0	2.3	2.4
	48	Chicken	8.9	6.4	10.8	19.1	5.3	5.9
	49	Milk	2.6	2.3	4.3	8.3	2.2	2.3
	50	Cheese	5.4	0.0	11.5	23.2	3.7	4.6
	51	Pork	3.3	1.2	8.1	7.1	4.3	4.1
	52	Beef	0.5	0.8	2.4	1.9	2.3	2.2
	53	Lamb meat	1.4	3.0	3.9	6.1	3.8	4.0
	54	Yeast	82.6	29.6	12.6	355.7	4.1	7.8
	55	Silkworm pupa	3.2	2.9	3.8	2.5	3.9	3.8

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			13 Orchard grass	14 Reed	15 Bent grass	16 Timothy grass	17 Cultivated rye	18 Alder
Food Allergens	1	Wheat	8.5	8.5	8.5	9.3	11.4	19.6
	2	Barley	10.0	10.0	10.0	11.0	13.6	21.7
	3	Corn	11.6	11.6	11.6	12.8	15.8	26.3
	4	Rice	11.2	11.2	11.2	12.3	14.9	23.4
	5	Buckwheat	11.6	11.6	11.6	12.8	16.1	29.1
	6	Sesame	11.5	11.5	11.5	12.8	15.9	27.4
	7	Peanut	10.9	10.9	10.9	12.0	14.9	23.6
	8	Soy bean	9.9	9.9	9.9	11.0	13.6	23.8
	9	Hazel nut	10.8	10.8	10.8	11.9	14.8	27.5
	10	Almond	11.3	11.3	11.3	12.5	15.5	27.5
	11	Pine	11.3	11.3	11.3	12.5	15.5	27.5
	12	Sunflower	11.3	11.3	11.3	12.5	15.5	27.5
	13	Walnut	11.6	11.6	11.6	12.8	16.0	28.3
	14	Sweet nut	11.6	11.6	11.6	12.9	16.0	23.3
	15	Tomato	11.4	11.4	11.4	12.5	15.1	19.2
	16	Carrot	11.5	11.5	11.5	12.7	15.7	23.8
	17	Potato	11.0	11.0	11.0	11.6	12.3	12.8
	18	Garlic	11.5	11.5	11.5	12.7	15.7	21.5
	19	Onion	11.5	11.5	11.5	12.7	15.7	21.5
	20	Celery	11.5	11.5	11.5	12.7	15.7	22.9
	21	Strawberry	11.5	11.5	11.5	12.7	15.7	23.8
	22	Apple	10.7	10.7	10.7	11.8	14.5	26.1
	23	Kiwi	11.5	11.5	11.5	12.8	15.8	29.1
	24	Mango	11.5	11.5	11.5	12.8	15.8	29.1
	25	Banana	11.5	11.5	11.5	12.8	15.8	29.1
	26	Peach	8.2	8.2	8.2	8.9	10.7	19.3
	27	Cucumber	11.6	11.6	11.6	12.8	15.6	21.2
	28	Citrus mix	11.4	11.4	11.4	12.5	15.5	24.2
	29	Cacao	11.1	11.1	11.1	12.3	15.4	28.2
	30	CCD antigen	11.4	11.4	11.4	12.5	14.9	16.4
	31	Crab	3.2	3.2	3.2	3.1	3.5	3.8
	32	Shrimp	3.5	3.5	3.5	3.5	3.8	4.4
	33	Blue mussel	4.6	4.6	4.6	5.0	5.9	8.7
	34	Oyster	4.6	4.6	4.6	5.0	5.9	8.7
	35	Clam	4.6	4.6	4.6	5.0	5.9	8.7
	36	Scallop	4.6	4.6	4.6	5.0	5.9	8.7
	37	Lobster	5.3	5.3	5.3	6.2	7.7	5.0
	38	Pacific squid	5.3	5.3	5.3	6.2	7.7	5.0
	39	Mackerel	3.5	3.5	3.5	3.6	3.4	3.7
	40	Plaice	5.9	5.9	5.9	5.8	3.2	3.0
	41	Anchovy	5.9	5.9	5.9	5.8	3.2	3.0
	42	Alaska pollock	5.9	5.9	5.9	5.8	3.2	3.0
	43	Eel	8.0	8.0	8.0	8.3	6.5	7.2
	44	Tuna	4.0	4.0	4.0	4.1	4.7	7.1
	45	Salmon	4.0	4.0	4.0	4.1	4.7	7.1
	46	Codfish	3.1	3.1	3.1	3.4	3.3	4.7
	47	Egg white	2.4	2.4	2.4	2.7	2.6	1.6
	48	Chicken	5.9	5.9	5.9	6.0	5.2	4.3
	49	Milk	2.3	2.3	2.3	2.2	1.8	1.6
	50	Cheese	4.6	4.6	4.6	3.9	2.8	5.2
	51	Pork	4.1	4.1	4.1	4.7	4.8	5.2
	52	Beef	2.2	2.2	2.2	2.2	2.1	2.6
	53	Lamb meat	4.0	4.0	4.0	3.7	3.7	4.8
	54	Yeast	7.8	7.8	7.8	4.3	5.4	20.1
	55	Silkworm pupa	3.8	3.8	3.8	3.9	4.2	5.3

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			19	20	21	22	23	24
			Birch	Hazel	Oak	Olive	Maple leaf sycamore	Willow
Food Allergens	1	Wheat	13.2	18.6	15.7	23.1	15.2	10.6
	2	Barley	15.0	21.6	18.5	25.9	17.9	12.5
	3	Corn	16.7	25.9	21.3	30.0	21.1	14.4
	4	Rice	15.3	22.7	18.8	26.8	19.7	13.9
	5	Buckwheat	19.9	28.2	22.5	34.3	21.8	14.7
	6	Sesame	18.7	26.6	21.7	32.7	21.4	14.5
	7	Peanut	14.3	22.4	19.1	26.3	19.8	13.7
	8	Soy bean	26.2	25.1	19.4	30.9	18.4	12.6
	9	Hazel nut	29.7	27.5	21.3	34.4	20.2	13.8
	10	Almond	21.0	27.9	21.8	33.0	21.1	14.3
	11	Pine	21.0	27.9	21.8	33.0	21.1	14.3
	12	Sunflower	21.0	27.9	21.8	33.0	21.1	14.3
	13	Walnut	19.8	27.4	22.1	33.3	21.6	14.6
	14	Sweet nut	15.4	23.3	19.7	26.1	20.5	14.5
	15	Tomato	11.6	19.0	16.3	20.9	18.4	13.7
	16	Carrot	13.9	22.9	19.1	25.9	20.8	14.3
	17	Potato	7.9	13.0	11.1	13.8	13.5	11.4
	18	Garlic	14.1	22.9	18.7	24.4	19.5	14.0
	19	Onion	14.1	22.9	18.7	24.4	19.5	14.0
	20	Celery	13.8	22.3	18.9	25.0	20.5	14.3
	21	Strawberry	16.5	24.6	20.1	27.8	20.6	14.4
	22	Apple	20.1	25.2	20.1	30.5	19.7	13.4
	23	Kiwi	29.2	29.3	22.5	36.8	21.6	14.5
	24	Mango	29.2	29.3	22.5	36.8	21.6	14.5
	25	Banana	29.2	29.3	22.5	36.8	21.6	14.5
	26	Peach	24.3	17.9	17.5	21.7	13.8	9.8
	27	Cucumber	12.3	20.5	17.5	22.8	19.7	14.2
	28	Citrus mix	15.9	24.5	20.3	27.6	20.3	14.2
	29	Cacao	29.1	28.3	21.9	35.6	20.8	14.2
	30	CCD antigen	9.9	16.5	14.3	18.0	16.6	13.0
	31	Crab	3.9	4.5	4.2	4.4	3.6	3.7
	32	Shrimp	3.8	4.6	4.2	4.9	4.1	4.0
	33	Blue mussel	9.6	9.8	7.8	11.4	7.2	5.6
	34	Oyster	9.6	9.8	7.8	11.4	7.2	5.6
	35	Clam	9.6	9.8	7.8	11.4	7.2	5.6
	36	Scallop	9.6	9.8	7.8	11.4	7.2	5.6
	37	Lobster	5.5	8.5	7.1	8.1	7.3	6.3
	38	Pacific squid	5.5	8.5	7.1	8.1	7.3	6.3
	39	Mackerel	5.2	5.2	4.0	2.6	2.7	3.1
	40	Plaice	8.2	7.5	6.9	3.8	3.3	3.7
	41	Anchovy	8.2	7.5	6.9	3.8	3.3	3.7
	42	Alaska pollock	8.2	7.5	6.9	3.8	3.3	3.7
	43	Eel	17.1	14.4	14.8	10.5	6.2	7.1
	44	Tuna	5.2	7.9	4.3	6.9	5.8	4.3
	45	Salmon	5.2	7.9	4.3	6.9	5.8	4.3
	46	Codfish	4.0	4.3	4.2	4.5	4.0	3.2
	47	Egg white	2.6	2.2	3.0	2.5	2.2	3.2
	48	Chicken	8.2	7.5	9.1	6.7	5.5	6.3
	49	Milk	1.0	1.7	2.3	1.8	1.6	2.1
	50	Cheese	2.9	3.9	5.0	4.9	3.8	3.2
	51	Pork	4.4	5.6	5.2	5.5	5.3	5.1
	52	Beef	1.6	2.3	2.0	2.4	2.5	2.1
	53	Lamb meat	3.7	4.4	3.9	4.7	3.8	3.5
	54	Yeast	21.9	10.0	15.4	0.0	0.0	9.9
	55	Silkworm pupa	4.2	5.3	4.6	5.7	4.7	4.4

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			25	26	27	28	29	30
			Cottonwood	White ash	White pine	Japanese cedar	Acacia	Ragweed
Food Allergens	1	Wheat	19.2	17.8	19.8	19.8	15.7	11.9
	2	Barley	21.8	20.4	23.1	23.0	18.1	14.2
	3	Corn	26.1	24.3	27.4	24.9	21.6	16.5
	4	Rice	23.4	22.4	24.7	23.4	20.6	15.4
	5	Buckwheat	28.7	26.3	30.3	30.3	22.5	16.7
	6	Sesame	27.1	25.1	28.1	29.0	21.8	16.5
	7	Peanut	23.0	22.7	24.4	21.5	20.2	15.5
	8	Soy bean	24.9	22.0	25.7	45.2	18.5	14.1
	9	Hazel nut	27.8	24.3	29.0	61.2	21.1	15.7
	10	Almond	28.1	25.3	29.7	32.6	21.8	16.2
	11	Pine	28.1	25.3	29.7	32.6	21.8	16.2
	12	Sunflower	28.1	25.3	29.7	32.6	21.8	16.2
	13	Walnut	27.8	26.1	29.9	30.9	22.3	16.6
	14	Sweet nut	23.6	22.6	25.2	23.3	20.7	16.5
	15	Tomato	19.1	19.3	20.5	17.2	18.9	15.3
	16	Carrot	23.4	22.8	24.8	21.6	21.3	16.3
	17	Potato	13.3	13.3	13.7	11.4	13.8	11.8
	18	Garlic	22.7	20.9	24.2	21.3	19.3	16.0
	19	Onion	22.7	20.9	24.2	21.3	19.3	16.0
	20	Celery	22.8	22.5	24.3	20.8	21.0	16.3
	21	Strawberry	24.5	22.8	25.8	25.5	20.9	16.4
	22	Apple	25.7	23.2	26.9	30.0	20.3	15.1
	23	Kiwi	29.6	26.1	30.7	48.7	22.4	16.6
	24	Mango	29.6	26.1	30.7	48.7	22.4	16.6
	25	Banana	29.6	26.1	30.7	48.7	22.4	16.6
	26	Peach	17.9	16.0	18.4	21.7	14.3	11.3
	27	Cucumber	21.0	21.0	22.4	18.4	20.5	16.1
	28	Citrus mix	24.3	22.6	25.7	24.3	20.7	16.2
	29	Cacao	28.6	25.1	29.9	57.7	21.8	16.1
	30	CCD antigen	16.8	16.8	17.7	14.7	17.0	14.5
	31	Crab	4.4	3.7	4.5	5.2	3.8	3.6
	32	Shrimp	4.7	4.4	4.8	5.3	4.3	3.8
	33	Blue mussel	9.8	8.4	9.8	20.0	7.1	5.9
	34	Oyster	9.8	8.4	9.8	20.0	7.1	5.9
	35	Clam	9.8	8.4	9.8	20.0	7.1	5.9
	36	Scallop	9.8	8.4	9.8	20.0	7.1	5.9
	37	Lobster	9.4	7.0	9.0	15.7	8.2	8.1
	38	Pacific squid	9.4	7.0	9.0	15.7	8.2	8.1
	39	Mackerel	4.8	3.8	3.3	5.2	2.4	3.3
	40	Plaice	13.6	5.4	4.7	7.3	3.5	3.4
	41	Anchovy	13.6	5.4	4.7	7.3	3.5	3.4
	42	Alaska pollock	13.6	5.4	4.7	7.3	3.5	3.4
	43	Eel	15.7	8.6	12.6	14.7	6.5	6.8
	44	Tuna	7.2	7.0	7.5	3.9	6.1	4.9
	45	Salmon	7.2	7.0	7.5	3.9	6.1	4.9
	46	Codfish	5.5	4.8	4.6	3.5	3.9	3.3
	47	Egg white	2.8	2.3	2.3	2.9	2.3	2.7
	48	Chicken	9.7	5.7	6.8	10.5	5.8	5.5
	49	Milk	2.7	2.0	1.3	3.4	1.9	2.6
	50	Cheese	6.6	5.8	4.1	3.2	4.0	3.7
	51	Pork	6.9	6.4	5.9	11.8	5.8	5.9
	52	Beef	2.5	2.7	2.6	3.3	2.7	2.1
	53	Lamb meat	5.2	4.3	4.3	7.5	3.7	3.7
	54	Yeast	10.1	8.9	10.5	0.0	0.0	11.3
	55	Silkworm pupa	5.5	5.2	5.6	6.4	4.9	4.2

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			31 Mugwort	32 Ox-eye daisy	33 Dandelion	34 Plantain	35 Russian thistle	36 Goldenrod
Food Allergens	1	Wheat	16.6	15.9	19.3	12.9	9.1	15.1
	2	Barley	20.4	19.8	21.7	15.3	10.7	17.8
	3	Corn	22.6	21.0	25.3	17.8	12.3	20.3
	4	Rice	20.4	19.3	23.1	17.2	12.0	18.8
	5	Buckwheat	24.8	23.3	29.4	18.1	12.5	21.7
	6	Sesame	23.7	22.4	27.1	17.9	12.3	20.7
	7	Peanut	20.0	18.3	22.4	16.8	11.6	18.6
	8	Soy bean	23.0	23.4	25.5	15.3	10.6	18.5
	9	Hazel nut	25.7	26.0	28.0	16.8	11.6	20.5
	10	Almond	24.7	24.0	28.5	17.6	12.1	21.0
	11	Pine	24.7	24.0	28.5	17.6	12.1	21.0
	12	Sunflower	24.7	24.0	28.5	17.6	12.1	21.0
	13	Walnut	24.9	23.5	28.4	18.1	12.5	21.7
	14	Sweet nut	21.1	20.2	22.9	18.0	12.4	19.0
	15	Tomato	17.2	15.5	17.7	16.7	12.1	16.4
	16	Carrot	19.4	17.7	22.0	17.7	12.3	18.7
	17	Potato	11.7	10.7	11.9	13.4	11.7	11.6
	18	Garlic	19.9	18.6	20.9	17.3	12.1	18.1
	19	Onion	19.9	18.6	20.9	17.3	12.1	18.1
	20	Celery	19.7	17.7	21.0	17.6	12.3	18.7
	21	Strawberry	21.3	19.7	22.8	17.6	12.2	18.8
	22	Apple	23.1	21.3	25.6	16.3	11.4	19.5
	23	Kiwi	27.0	27.2	29.7	17.9	12.3	21.6
	24	Mango	27.0	27.2	29.7	17.9	12.3	21.6
	25	Banana	27.0	27.2	29.7	17.9	12.3	21.6
	26	Peach	16.4	15.8	17.4	11.7	8.5	13.9
	27	Cucumber	18.3	16.5	19.3	17.5	12.4	17.5
	28	Citrus mix	21.7	20.4	22.9	17.4	12.1	19.0
	29	Cacao	26.6	26.3	29.1	17.3	11.9	20.9
	30	CCD antigen	15.2	13.8	15.5	15.7	12.0	14.5
	31	Crab	4.2	5.1	4.5	3.7	3.2	4.2
	32	Shrimp	4.3	4.7	4.8	4.0	3.7	4.5
	33	Blue mussel	8.5	9.1	9.6	6.1	4.6	7.8
	34	Oyster	8.5	9.1	9.6	6.1	4.6	7.8
	35	Clam	8.5	9.1	9.6	6.1	4.6	7.8
	36	Scallop	8.5	9.1	9.6	6.1	4.6	7.8
	37	Lobster	8.0	9.4	8.9	7.4	5.5	6.9
	38	Pacific squid	8.0	9.4	8.9	7.4	5.5	6.9
	39	Mackerel	3.4	3.5	3.3	2.9	2.9	5.1
	40	Plaice	4.2	4.3	3.1	5.5	5.1	7.8
	41	Anchovy	4.2	4.3	3.1	5.5	5.1	7.8
	42	Alaska pollock	4.2	4.3	3.1	5.5	5.1	7.8
	43	Eel	8.9	11.3	7.4	8.8	6.1	9.9
	44	Tuna	5.1	4.5	6.5	4.8	4.0	4.7
	45	Salmon	5.1	4.5	6.5	4.8	4.0	4.7
	46	Codfish	4.4	4.1	4.5	3.8	2.9	4.9
	47	Egg white	2.9	3.0	2.4	2.2	1.8	3.2
	48	Chicken	6.0	8.1	6.6	5.3	4.5	8.0
	49	Milk	1.9	3.4	1.8	1.8	2.2	2.2
	50	Cheese	3.6	2.5	4.0	4.8	3.9	4.9
	51	Pork	5.9	6.8	5.0	5.2	4.8	4.8
	52	Beef	2.1	2.1	2.4	2.4	2.5	2.5
	53	Lamb meat	4.7	4.8	4.2	3.3	3.6	4.1
	54	Yeast	9.3	0.0	0.0	0.0	4.2	7.5
	55	Silkworm pupa	4.9	5.2	5.6	4.5	4.0	5.1

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens					
			37 Pigweed	38 Japanese hop	39 Cat	40 Horse	41 Dog	42 Guinea pig
Food Allergens	1	Wheat	13.3	16.8	3.1	2.5	3.6	6.7
	2	Barley	15.6	18.8	3.7	3.1	4.0	6.5
	3	Corn	18.1	22.0	3.8	4.4	4.3	8.4
	4	Rice	17.5	19.4	3.3	3.0	4.3	7.4
	5	Buckwheat	18.6	24.3	3.8	2.9	4.8	9.6
	6	Sesame	18.3	24.0	3.4	2.7	4.4	7.7
	7	Peanut	17.1	18.9	3.4	3.1	3.8	6.4
	8	Soy bean	15.6	23.2	5.0	3.7	7.5	13.8
	9	Hazel nut	17.2	25.8	5.5	6.8	11.5	19.5
	10	Almond	17.9	23.6	3.9	4.0	4.7	10.1
	11	Pine	17.9	23.6	3.9	4.0	4.7	10.1
	12	Sunflower	17.9	23.6	3.9	4.0	4.7	10.1
	13	Walnut	18.5	22.9	3.7	2.5	4.8	8.0
	14	Sweet nut	18.2	20.0	3.6	3.6	3.9	7.0
	15	Tomato	16.9	15.8	3.1	3.5	3.3	5.8
	16	Carrot	18.0	19.0	3.4	2.9	3.8	6.3
	17	Potato	13.3	10.8	2.8	2.8	3.1	4.6
	18	Garlic	17.3	18.7	3.5	4.0	3.5	7.0
	19	Onion	17.3	18.7	3.5	4.0	3.5	7.0
	20	Celery	18.0	18.5	3.3	3.0	3.7	5.5
	21	Strawberry	17.9	21.3	3.2	4.6	3.9	7.8
	22	Apple	16.8	22.0	3.7	2.4	4.5	9.1
	23	Kiwi	18.4	27.3	3.7	3.1	5.6	10.5
	24	Mango	18.4	27.3	3.7	3.1	5.6	10.5
	25	Banana	18.4	27.3	3.7	3.1	5.6	10.5
	26	Peach	11.9	17.1	4.0	3.4	4.5	7.9
	27	Cucumber	17.8	17.2	3.1	2.9	3.5	5.4
	28	Citrus mix	17.6	21.4	3.4	4.0	4.1	7.5
	29	Cacao	17.8	26.7	4.3	5.0	10.2	20.9
	30	CCD antigen	15.9	13.8	2.9	3.0	3.3	5.0
	31	Crab	3.9	6.6	3.5	4.4	3.0	23.2
	32	Shrimp	4.3	5.7	3.1	3.7	2.8	10.8
	33	Blue mussel	6.4	9.0	10.3	5.0	14.5	7.9
	34	Oyster	6.4	9.0	10.3	5.0	14.5	7.9
	35	Clam	6.4	9.0	10.3	5.0	14.5	7.9
	36	Scallop	6.4	9.0	10.3	5.0	14.5	7.9
	37	Lobster	7.2	8.8	3.3	6.4	3.1	0.0
	38	Pacific squid	7.2	8.8	3.3	6.4	3.1	0.0
	39	Mackerel	4.0	3.0	7.4	4.7	8.4	37.4
	40	Plaice	3.8	4.2	12.6	27.0	17.5	85.4
	41	Anchovy	3.8	4.2	12.6	27.0	17.5	85.4
	42	Alaska pollock	3.8	4.2	12.6	27.0	17.5	85.4
	43	Eel	6.0	6.8	13.4	32.4	14.0	102.4
	44	Tuna	5.5	7.4	2.2	0.0	1.1	33.7
	45	Salmon	5.5	7.4	2.2	0.0	1.1	33.7
	46	Codfish	3.6	4.4	4.0	3.2	3.2	5.1
	47	Egg white	2.1	2.0	4.2	5.3	3.4	14.0
	48	Chicken	4.7	5.0	11.0	0.0	14.0	45.7
	49	Milk	1.9	1.3	5.7	30.9	7.7	4.4
	50	Cheese	3.3	4.9	6.1	0.0	3.8	0.0
	51	Pork	6.0	5.7	16.4	50.3	21.5	113.8
	52	Beef	2.6	1.8	7.6	12.0	8.4	7.8
	53	Lamb meat	3.6	4.5	19.0	153.2	28.8	87.3
	54	Yeast	6.3	9.4	18.6	89.9	0.0	142.3
	55	Silkworm pupa	4.8	6.3	3.3	3.4	3.2	9.3

Supplementary Material 1. (Continued)

Figure 3D			Inhalant Allergens						
			43	44	45	46	47	48	49
			Mouse	Rat	Sheep	Rabbit	Hamster	Cockroach	Latex
Food Allergens	1	Wheat	3.7	3.7	2.7	3.4	1.6	7.9	10.4
	2	Barley	4.2	4.2	0.0	4.8	1.6	8.9	11.9
	3	Corn	6.4	6.4	4.4	5.2	4.0	10.0	12.3
	4	Rice	4.6	4.6	0.0	3.9	3.6	9.5	12.2
	5	Buckwheat	5.7	5.7	2.1	4.5	3.2	11.0	14.6
	6	Sesame	5.3	5.3	3.9	3.9	2.9	10.7	13.8
	7	Peanut	4.7	4.7	3.7	4.4	2.6	9.0	11.1
	8	Soy bean	9.9	9.9	0.0	4.2	6.0	9.7	15.6
	9	Hazel nut	9.9	9.9	0.0	10.8	9.8	10.3	18.3
	10	Almond	7.3	7.3	2.1	4.8	4.5	10.6	15.3
	11	Pine	7.3	7.3	2.1	4.8	4.5	10.6	15.3
	12	Sunflower	7.3	7.3	2.1	4.8	4.5	10.6	15.3
	13	Walnut	4.9	4.9	0.0	3.8	2.0	10.7	15.6
	14	Sweet nut	4.6	4.6	1.3	4.6	2.0	9.7	11.9
	15	Tomato	4.7	4.7	1.0	4.0	2.3	8.3	9.7
	16	Carrot	4.6	4.6	2.4	3.8	2.6	9.2	11.0
	17	Potato	3.5	3.5	1.8	3.1	2.2	6.6	7.3
	18	Garlic	7.0	7.0	4.6	4.3	3.9	8.9	11.1
	19	Onion	7.0	7.0	4.6	4.3	3.9	8.9	11.1
	20	Celery	4.4	4.4	1.1	3.8	2.4	8.9	10.8
	21	Strawberry	6.1	6.1	2.9	5.2	3.1	9.5	10.8
	22	Apple	5.6	5.6	1.9	3.8	2.3	9.6	13.6
	23	Kiwi	6.7	6.7	4.0	3.5	2.5	11.1	16.0
	24	Mango	6.7	6.7	4.0	3.5	2.5	11.1	16.0
	25	Banana	6.7	6.7	4.0	3.5	2.5	11.1	16.0
	26	Peach	5.2	5.2	2.7	4.3	3.3	6.8	8.4
	27	Cucumber	4.4	4.4	2.1	3.7	2.8	8.8	10.1
	28	Citrus mix	6.6	6.6	2.8	4.8	2.9	9.8	12.2
	29	Cacao	2.4	2.4	0.0	5.6	7.9	10.9	15.3
	30	CCD antigen	4.4	4.4	2.5	3.7	2.0	7.8	8.8
	31	Crab	6.8	6.8	6.6	4.1	5.3	2.5	4.5
	32	Shrimp	4.1	4.1	4.9	3.2	2.7	2.9	5.1
	33	Blue mussel	12.6	12.6	29.5	7.0	11.9	4.7	9.2
	34	Oyster	12.6	12.6	29.5	7.0	11.9	4.7	9.2
	35	Clam	12.6	12.6	29.5	7.0	11.9	4.7	9.2
	36	Scallop	12.6	12.6	29.5	7.0	11.9	4.7	9.2
	37	Lobster	0.0	0.0	0.0	0.0	0.0	4.3	6.8
	38	Pacific squid	0.0	0.0	0.0	0.0	0.0	4.3	6.8
	39	Mackerel	13.7	13.7	0.0	10.7	22.7	2.3	4.4
	40	Plaice	77.9	77.9	0.0	45.7	129.2	2.4	9.5
	41	Anchovy	77.9	77.9	0.0	45.7	129.2	2.4	9.5
	42	Alaska pollock	77.9	77.9	0.0	45.7	129.2	2.4	9.5
	43	Eel	109.1	109.1	85.4	36.6	129.2	4.3	7.6
	44	Tuna	10.3	10.3	0.0	0.0	17.0	3.8	5.0
	45	Salmon	10.3	10.3	0.0	0.0	17.0	3.8	5.0
	46	Codfish	14.1	14.1	0.0	14.7	15.6	2.7	2.7
	47	Egg white	12.8	12.8	14.0	10.0	21.2	2.0	4.0
	48	Chicken	27.8	27.8	0.0	21.8	46.1	2.6	4.5
	49	Milk	56.8	56.8	0.0	11.1	37.0	1.8	3.5
	50	Cheese	0.0	0.0	0.0	0.0	0.0	3.6	5.5
	51	Pork	140.2	140.2	28.5	65.0	146.4	2.9	5.1
	52	Beef	18.8	18.8	0.0	12.2	9.4	2.3	4.0
	53	Lamb meat	150.5	150.5	0.0	159.4	51.4	3.4	5.4
	54	Yeast	129.9	129.9	0.0	0.0	215.3	4.0	10.5
	55	Silkworm pupa	2.8	2.8	3.6	3.2	1.4	3.4	5.4