

Table S1. Stratified Analysis of Allergen Sensitization Differentiating Asthma from Allergic Rhinitis Across Age Groups

Characteristic	<3				3-6				6-9				9-12				≥12			
	OR	95% CI	p-value	q-value [£]	OR	95% CI	p-value	q-value [£]	OR	95% CI	p-value	q-value [£]	OR	95% CI	p-value	q-value [£]	OR	95% CI	p-value	q-value [£]
Mugwort	0.39	0.02, 10.03	0.511	0.988	1.62	0.71, 3.73	0.248	0.417	1.31	0.61, 2.62	0.462	0.792	1.18	0.33, 3.34	0.778	0.954	NA	NA	NA	NA
House Dust Mite Mix [£]	0.92	0.41, 2.19	0.837	0.988	0.83	0.61, 1.13	0.246	0.417	0.99	0.68, 1.44	0.974	0.974	0.98	0.58, 1.70	0.954	0.954	0.94	0.43, 2.09	0.884	0.988
Dog Dander	0.70	0.24, 2.34	0.536	0.988	0.36	0.14, 0.81	0.019	0.299	1.84	0.91, 3.56	0.076	0.294	1.10	0.31, 3.11	0.864	0.954	1.23	0.18, 5.24	0.798	0.988
<i>Humulus scandens</i>	NA	NA	NA	NA	1.78	0.87, 3.69	0.115	0.417	1.01	0.55, 1.77	0.965	0.974	1.03	0.45, 2.15	0.946	0.954	1.52	0.47, 4.25	0.451	0.988
Cat Dander	0.52	0.20, 1.39	0.177	0.988	1.08	0.67, 1.73	0.748	0.839	1.37	0.87, 2.11	0.168	0.487	1.22	0.67, 2.16	0.509	0.954	0.96	0.38, 2.27	0.935	0.988
Mold Mix [°]	NA	NA	NA	NA	0.89	0.38, 2.00	0.788	0.839	1.66	0.73, 3.53	0.201	0.487	3.43	1.48, 7.65	0.003	0.071	0.97	0.05, 6.33	0.980	0.988
Ragweed	NA	NA	NA	NA	2.15	0.93, 5.22	0.078	0.417	2.10	0.87, 4.84	0.086	0.294	2.05	0.43, 7.58	0.309	0.928	0.97	0.05, 6.33	0.980	0.988
Tree Pollen Mix [§]	NA	0.00, NA	0.988	0.988	0.73	0.41, 1.28	0.278	0.417	0.94	0.53, 1.59	0.823	0.974	1.79	0.79, 3.78	0.144	0.723	1.19	0.37, 3.25	0.748	0.988
Cockroach	NA	NA	NA	NA	4.80	1.15, 32.37	0.051	0.412	4.11	1.34, 12.96	0.012	0.148	1.17	0.17, 4.81	0.844	0.954	16.11	1.98, 332.42	0.018	0.176
Respiratory Allergen	0.63	0.33, 1.22	0.160	0.988	0.77	0.57, 1.04	0.094	0.417	0.92	0.63, 1.35	0.657	0.974	0.98	0.56, 1.75	0.937	0.954	0.95	0.42, 2.26	0.903	0.988
Multiple Respiratory Allergies	0.89	0.28, 3.35	0.846	0.988	0.92	0.62, 1.36	0.674	0.809	1.30	0.87, 1.93	0.203	0.487	1.43	0.83, 2.46	0.193	0.723	0.96	0.40, 2.17	0.923	0.988
Severe Respiratory Allergy	0.58	0.20, 1.77	0.312	0.988	0.98	0.71, 1.36	0.921	0.921	1.10	0.76, 1.60	0.605	0.969	1.03	0.60, 1.77	0.917	0.954	0.85	0.38, 1.87	0.681	0.988
Sea Fish Mix [¶]	0.39	0.07, 2.13	0.252	0.988	1.83	0.76, 4.53	0.178	0.417	0.90	0.25, 2.53	0.856	0.974	0.46	0.02, 2.45	0.460	0.954	1.22	0.06, 8.65	0.859	0.988

Characteristic	<3				3-6				6-9				9-12				≥12			
	OR	95% CI	p-value	q-value [‡]	OR	95% CI	p-value	q-value [‡]	OR	95% CI	p-value	q-value [‡]	OR	95% CI	p-value	q-value [‡]	OR	95% CI	p-value	q-value [‡]
Peanuts	1.03	0.38, 3.30	0.953	0.988	2.03	1.10, 3.84	0.025	0.299	2.29	1.02, 4.96	0.038	0.180	0.66	0.04, 3.80	0.701	0.954	0.97	0.05, 6.33	0.980	0.988
Soybeans	0.87	0.30, 2.82	0.794	0.988	1.33	0.84, 2.10	0.223	0.417	2.07	1.04, 3.98	0.032	0.180	1.32	0.42, 3.46	0.598	0.954	0.59	0.03, 3.43	0.631	0.988
Egg White	1.01	0.59, 1.75	0.974	0.988	0.96	0.69, 1.33	0.804	0.839	2.16	1.39, 3.34	<0.001	0.013	1.73	0.82, 3.48	0.134	0.723	3.40	1.07, 10.07	0.029	0.176
Cow's Milk	1.09	0.66, 1.82	0.733	0.988	1.21	0.87, 1.67	0.258	0.417	1.03	0.56, 1.81	0.911	0.974	1.18	0.38, 3.05	0.751	0.954	5.64	1.47, 21.69	0.010	0.176
Beef	1.07	0.57, 2.11	0.840	0.988	1.29	0.81, 2.04	0.275	0.417	1.54	0.62, 3.50	0.324	0.598	3.17	0.41, 19.53	0.211	0.723	1.64	0.08, 13.36	0.672	0.988
Shrimp/Prawn	0.39	0.05, 3.30	0.351	0.988	1.36	0.49, 3.73	0.547	0.730	0.84	0.19, 2.70	0.796	0.974	0.77	0.04, 4.63	0.813	0.954	1.64	0.08, 13.36	0.672	0.988
Crab	0.59	0.10, 4.53	0.566	0.988	1.67	0.68, 4.19	0.261	0.417	0.84	0.24, 2.34	0.764	0.974	1.17	0.17, 4.81	0.844	0.954	0.97	0.05, 6.33	0.980	0.988
Lamb	1.11	0.64, 1.99	0.715	0.988	0.84	0.59, 1.19	0.333	0.470	1.11	0.66, 1.79	0.691	0.974	1.73	0.79, 3.54	0.151	0.723	0.88	0.13, 3.50	0.869	0.988
Gastrointestinal Allergen	1.04	0.63, 1.72	0.865	0.988	1.07	0.80, 1.45	0.642	0.809	1.52	1.04, 2.21	0.030	0.180	1.68	0.96, 2.91	0.065	0.723	1.03	0.40, 2.44	0.942	0.988
Multiple Gastrointestinal Allergies	1.40	0.83, 2.41	0.219	0.988	1.20	0.87, 1.66	0.261	0.417	1.31	0.80, 2.08	0.267	0.535	1.23	0.51, 2.70	0.622	0.954	3.40	1.07, 10.07	0.029	0.176
Severe Gastrointestinal Allergy	1.28	0.52, 3.61	0.613	0.988	1.64	0.83, 3.28	0.156	0.417	1.65	0.70, 3.63	0.231	0.503	1.17	0.17, 4.81	0.844	0.954	2.54	0.34, 13.66	0.296	0.988

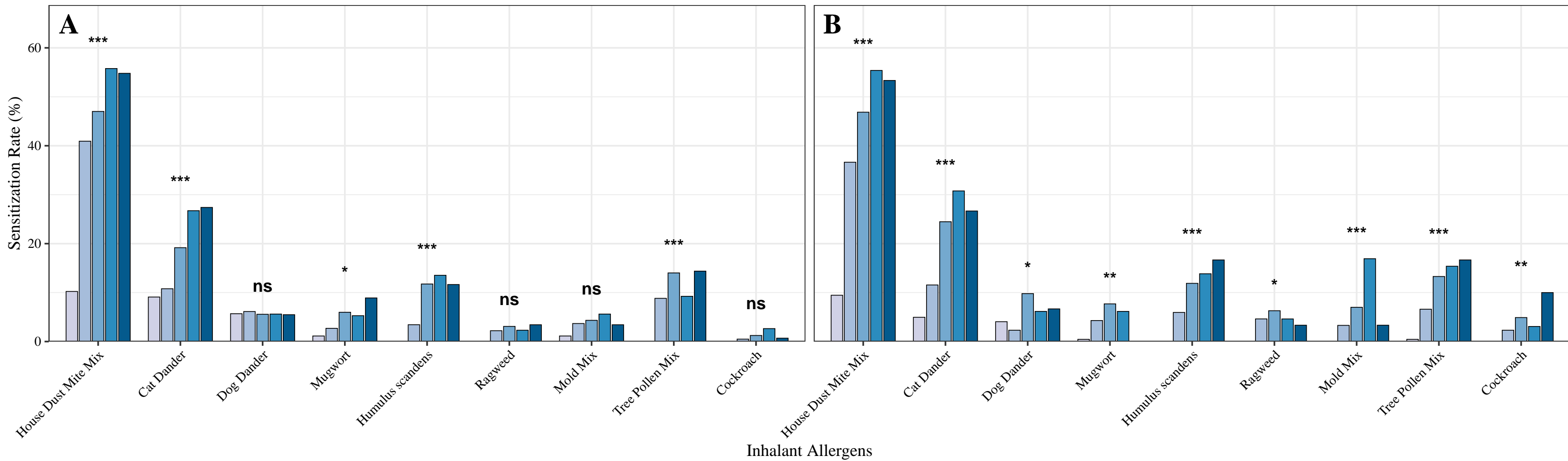
[‡]False discovery rate correction for multiple testing; [§]House Dust Mite Mix: *Dermatophagoides pteronyssinus* and *Dermatophagoides farinae*; [∞]Mold Mix: *Penicillium notatum*, *Alternaria alternata*, *Aspergillus fumigatus*, and *Cladosporium herbarum*; [§]Tree Pollen Mix: willow, poplar, and elm; [¶]Sea Fish Mix: cod, lobster, and scallop.

Abbreviations: CI = Confidence Interval; OR = Odds Ratio; NA: Not applicable (Odds ratios and 95% confidence intervals could not be reliably estimated due to zero cells or sparse data within specific strata).

Figure S1. Age-stratified sensitization rates of specific inhalant and foodborne allergens.

The panels exhibit prevalence dynamics allocated into four independent quadrants: (A) Inhalant allergens in patients with Allergic Rhinitis (AR); (B) Inhalant allergens in patients with Allergic Asthma (AS); (C) Foodborne allergens in patients with AR; and (D) Foodborne allergens in patients with AS. Bar charts present the prevalence of sensitization to individual allergens across predefined pediatric age groups (<3, 3-6, 6-9, 9-12, and ≥ 12 years). The statistical differences in sensitization rates across the five age groups were evaluated using the Chi-square test. *P*-values indicating statistically significant age-related variations are annotated accordingly, *ns*, *not significant*; * *P* < 0.05; ** *P* < 0.01; *** *P* < 0.001.

Age Stratum <3 3-6 6-9 9-12 >=12



Age Stratum <3 3-6 6-9 9-12 >=12

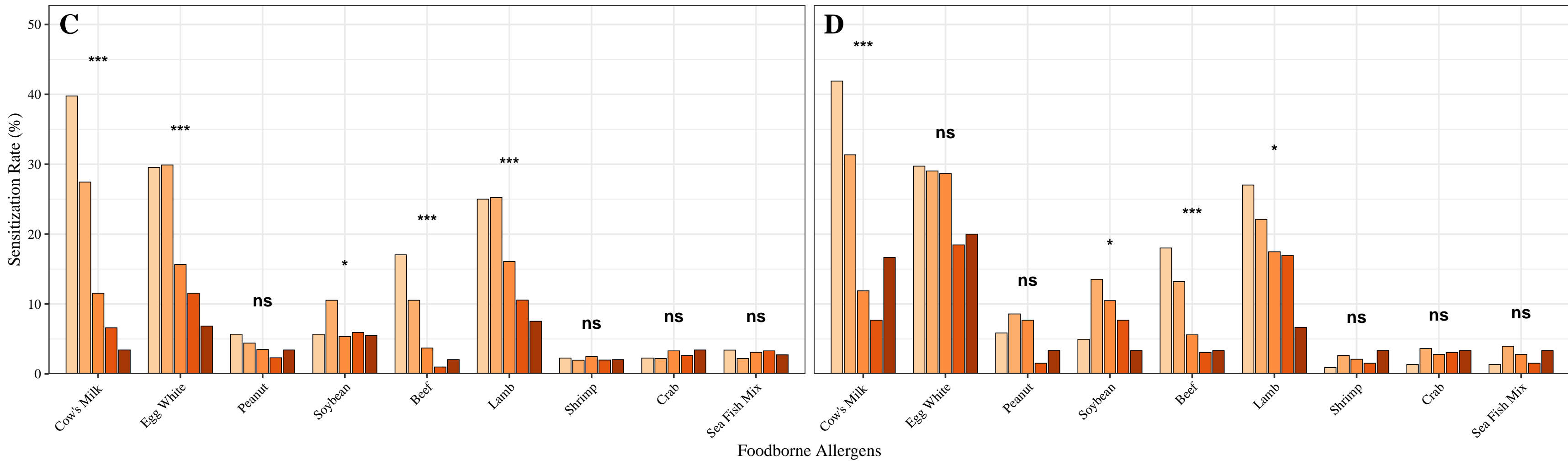


Figure S2. Comparison of specific IgE (sIgE) titers for individual allergens between the Asthma and Allergic Rhinitis cohorts.

The subpanels (A-R) correspond to the distribution of specific IgE titers for Mugwort (A), House Dust Mite Mix (B), Dog Dander (C), Humulus scandens (D), Cat Dander (E), Mold Mix (F), Ragweed (G), Tree Pollen Mix (H), Cockroach (I), Sea Fish Mix (J), Peanut (K), Soybean (L), Egg White (M), Cow's Milk (N), Beef (O), Shrimp (P), Crab (Q), and Lamb (R), respectively. Boxplots illustrate the quantitative distribution of sIgE levels among sensitized individuals ($sIgE \geq 0.35$ IU/mL) across different specific allergens. Statistical differences in sIgE titers between the asthma and allergic rhinitis phenotypes were assessed using the Mann-Whitney U test. *Notes: House Dust Mite Mix includes Dermatophagoides pteronyssinus and Dermatophagoides farinae; Mold Mix includes Penicillium notatum, Alternaria alternata, Aspergillus fumigatus, and Cladosporium herbarum; Tree Pollen Mix includes willow, poplar, and elm; Sea Fish Mix includes cod, lobster, and scallop. ns, not significant; * $P < 0.05$; ** $P < 0.01$.*

