The majority of systemic reactions with re-stings were limited to cutaneous symptoms. Two re-sting systemic reactions were severe and resembled the pre-VIT systemic adverse reactions. Commencement of VIT protected 94.1% of VV-allergic patients and 84.4% BV-allergic patients from systemic reactions with re-sting.

CONCLUSIONS. Repeat stings are a major concern in Hymenoptera-allergic patients: the majority of children in the study cohort were re-stung. Venom immunotherapy induced long-term protection from repeat systemic adverse reactions in the majority of children studied.

REVIEWER COMMENTS. Children with a history of an anaphylactic reaction to a Hymenoptera sting have a 30% to 40% risk of a similar reaction if re-stung. Venom immunotherapy is 75% to 98% effective in preventing sting anaphylaxis (Golden DB. Insect sting anaphylaxis. *Immunol Allergy Clin North Am.* 2007;27[2]:261–272, vii). In the United States, VIT is rarely given to preschool-aged children. Four patients in the present study were aged <4 years; they all tolerated VIT well. This study found that young children have a high risk of being re-stung, that VIT is effective for preventing anaphylaxis in young children (3.4% had a systemic reaction with re-sting), and that VIT is well tolerated in young children. Any patient who has had a systemic reaction to a Hymenoptera sting should have an epinephrine autoinjector and should be evaluated by an allergist/immunologist.

Sandy Jung-Wu, MD
Los Angeles, CA

**Age-Dependent Sting Recurrence and Outcome in Immunotherapy-Treated Children With Anaphylaxis to Hymenoptera Venom**
Stritzke AI, Eng PA. *Clin Exp Allergy.* 2013;43(8):950–955

**PURPOSE OF THE STUDY.** The goal of this study was to investigate the rate of sting recurrence and outcome of Hymenoptera venom anaphylaxis in children treated with venom immunotherapy (VIT).

**STUDY POPULATION.** The study included a cohort of 83 Swiss children consecutively referred for Hymenoptera venom anaphylaxis between 1990 and 2007. Inclusion criteria were diagnosis of Hymenoptera anaphylaxis followed by commencement of VIT. Diagnosis of Hymenoptera anaphylaxis required a sting followed by a systemic adverse reaction affecting the respiratory and/or cardiovascular system, a positive intracutaneous test result with European honey bee (BV) and/or *Vespucla* (VV) venom, and specific IgE (>0.7 kU/L) to BV or VV. Forty-nine (59%) patients were treated with BV, 29 (35%) with VV, and 5 (6%) were treated with BV and VV. The average VIT duration was 3.6 years, and the average follow-up from commencement of VIT was 7.7 years. Age groups were stratified as children aged <6, 6 to 10, and 10 to 16 years. Boys were overrepresented in the population studied (67%).

**METHODS.** A standardized questionnaire administered by a nonblinded investigator targeted information about stings after commencement of VIT. The information included setting of sting, suspected culprit insect, and time course and severity of re-sting reaction.

**RESULTS.** Forty-five (56%) children were re-stung after commencement of VIT. The cumulative number of re-stings was 108, an average of 2.2 stings per re-stung patient. Younger children were re-stung more often than older children. In contrast, systemic reactions with re-sting increased with age. Sixty-three percent of all systemic reactions occurred with the first re-sting after commencement of VIT, 25% after the second re-sting, and 12% after the third re-sting.

The majority of systemic reactions with re-stings were limited to cutaneous symptoms. Two re-sting systemic reactions were severe and resembled the pre-VIT systemic adverse reactions. Commencement of VIT protected 94.1% of VV-allergic patients and 84.4% BV-allergic patients from systemic reactions with re-sting.

**CONCLUSIONS.** Repeat stings are a major concern in Hymenoptera-allergic patients: the majority of children in the study cohort were re-stung. Venom immunotherapy induced long-term protection from repeat systemic adverse reactions in the majority of children studied.

**REVIEWER COMMENTS.** This study highlights the improved progress of emergency physicians in appropriately using epinephrine during anaphylaxis, which was previously reported to be as low as 16%. However, the preferred intramuscular route of administration could be improved along with referral to allergy specialists and providing information to educational Web sites on anaphylaxis.


**The Economic Impact of Childhood Food Allergy in the United States**

**PURPOSE OF THE STUDY.** The goal of this study was to determine the economic impact of childhood food allergy in the United States and caregivers’ willingness to pay for food allergy treatment.

**STUDY POPULATION.** The study was a cross-sectional survey of 1643 US caregivers of a child with a current food allergy.

**METHODS.** Caregivers were asked to quantify the direct medical, out-of-pocket, lost labor productivity, and related opportunity costs. Caregivers were also asked about their willingness to pay for a theoretical “safe and effective food allergy treatment that allowed the child to eat all foods.”

**RESULTS.** The overall economic cost of food allergy was estimated at $24.8 billion annually ($4184 per year per child). Annual direct medical costs were $4.3 billion or...
$724 per child. Yearly costs borne by the family totaled $20.5 billion. Specifically, annual out-of-pocket costs were $5.5 billion, with 31% stemming from the cost of special foods, and annual opportunity costs totaled $14.2 billion, relating to a caregiver needing to leave or change jobs. Caregivers were willing to pay $20.8 billion annually for a theoretical effective food allergy treatment (95% confidence interval: 15.7–25.7).

CONCLUSIONS. Childhood food allergy in the United States incurs significant direct medical costs to the US health care system and even larger costs to families with a food-allergic child. Caregivers’ willingness to pay for a theoretical effective food allergy treatment was similar to the total costs currently borne by families associated with out-of-pocket expenses, lost labor productivity, and lost opportunity in 1 year.

REVIEWER COMMENTS. As the authors indicate, this is the first study to comprehensively quantify the economic impact of childhood food allergy in the United States. Of an estimated $25 billion annual cost incurred, the most costly category was opportunity costs ($14 billion), defined as caregiver job change, restriction, or loss, which was a subjective measure based on self-report. Moreover, approximately one-quarter of the cohort surveyed was recruited from a food allergy support and advocacy organization, which may attract members who perceive food allergy as having a more significant impact on their quality of life. Nonetheless, the study highlights the considerable financial impact borne by families of children having food allergy.


Jennifer S. Kim, MD Chicago, IL

The Natural History and Clinical Predictors of Egg Allergy in the First 2 Years of Life: A Prospective, Population-Based Cohort Study


PURPOSE OF THE STUDY. The goal of this study was to gauge the natural history of egg allergy in a population-based cohort and to identify factors predicting persistence.

STUDY POPULATION. Children (n = 264) determined to be allergic to raw eggs (according to results of skin testing and oral food challenge) were recruited during February 2010 to August 2011 from the HealthNuts study, a prospective, population-based cohort of food-allergic children recruited at age 12 months (N = 5267) during immunization sessions in Melbourne, Australia.

METHODS. Egg-allergic infants were offered a baked egg oral food challenge to phenotype them as baked egg tolerant and baked egg allergic. At age 2 years, all infants were invited for repeat oral food challenge to raw egg, skin prick testing (SPT), and egg-specific IgE testing. A survey was administered (by telephone or in the clinic) at ages 1 and 2 years to determine the frequency of baked egg ingestion.

RESULTS. A total of 140 of 264 infants participated in the follow-up at age 2 years. Egg allergy resolved in 47% (95% confidence interval: 37–56) by age 2 years. Of those patients who were baked egg tolerant at 1 year of age, 56% experienced resolution of their egg allergy compared with only 13% with baked egg allergy (P = .02). Those infants classified as baked egg tolerant who had frequent consumption (≥5 times/month) of baked products were more likely to resolve their egg allergy compared with those with infrequent (0–4 times/month) consumption (adjusted odds ratio: 3.52 [95% confidence interval: 1.38–8.98]; P = .009). After adjusting for confounders, SPT of ≥4 mm and egg-specific IgE ≥1.7 kUA/L were the only 2 measures (P = .003) predictive of egg allergy persistence.

CONCLUSIONS. In this community-based population cohort, nearly one-half of all challenge-confirmed egg-allergic infants were egg tolerant at 2 years of age; however, the percentage of resolution was significantly increased for those with the baked egg–tolerant phenotype at age 1 year and for those with frequent consumption of baked egg products. Although the baked egg–tolerant phenotype is predictive of egg allergy resolution, SPT and egg-specific IgE aided in predicting persistence of egg allergy.

REVIEWER COMMENTS. This study is the first of its kind to evaluate the natural history of egg allergy in infants at the community level. Previous studies have evaluated egg-allergic children from subspecialty cohorts in which severe allergic disease is more highly represented, possibly leading to a higher average age at which tolerance to egg develops. This study highlights the importance of a detailed dietary history during initial egg allergy assessment as continued dietary ingestion of baked egg for those who tolerate it without allergic symptoms predicts possible earlier resolution. The differences observed in raw egg tolerance development between the baked egg–allergic and baked egg–tolerant phenotypes also have important implications for future studies in egg oral immunotherapy.

URL: www.pediatrics.org/cgi/doi/10.1542/peds.2014–1817EE

Amika Sood, MD Stacie M. Jones, MD Little Rock, AR

Baseline Specific IgE levels Are Useful to Predict Safety of Oral Immunotherapy in Egg-Allergic Children


PURPOSE OF THE STUDY. The goal of this study was to evaluate the safety of egg oral immunotherapy (OIT) and to predict
The Economic Impact of Childhood Food Allergy in the United States
Jennifer S. Kim
Pediatrics 2014;134;S149
DOI: 10.1542/peds.2014-1817DD

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/134/Supplement_3/S149.2.full.html