$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.

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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 kU/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.

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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
who may have significant reactions or complications during the therapy.

STUDY POPULATION. This study was a nonrandomized controlled, parallel-group intervention trial with an active study population of 50 consecutively enrolled children aged 5 to 18 years. The study children underwent egg OIT after confirming immunoglobulin (Ig)E-mediated egg allergy by using a double-blind, placebo-controlled egg food challenge (DBPCFC). The control group included 32 children who also had a positive DBPCFC but continued avoidance during a median observation period of 18 months.

METHODS. Subjects were started on an induction phase that lasted 16 weeks, including a 2-day in-hospital intensive rush phase. Once they reached the maintenance phase, children consumed 1 raw egg or their maximal tolerated dose twice weekly for 12 months. All dose-related reactions over a median period of 18 months on OIT (range: 12–28 months) were registered. Children were retrospectively divided into 3 subgroups: (1) children who stopped reacting to OIT doses over time (resolved reactions [RR]); (2) children with ongoing dose-related reactions over the entire period on OIT (persistent reactions); and (3) children who discontinued OIT within the induction phase due to frequent reactions not improved by protocol re-adaptation and medication (early discontinuation).

RESULTS. At the end of the induction phase, 40 (80%) children had achieved complete desensitization to egg. In the control group, only 5 (14%) of 32 developed natural tolerance over time (P < .001). During the study period, 45 (90%) of the children had dose-related reactions of varying magnitude, and the rate of reactions was 7.6%. Epinephrine was needed in 26% of the children. The 3 subgroups corresponded to 3 different safety phenotypes: (1) 24 children (48%, RR) experienced infrequent and mainly mild reactions that resolved over time (none required epinephrine); (2) 17 children (34%, persistent reactions) experienced more frequent and severe ongoing reactions over time; and (3) 9 children (18%, early discontinuation) had frequent, moderate reactions, and discontinued OIT due to their reactions. In those children who discontinued OIT, high serum-specific IgE levels to egg white, ovomucoid, and ovalbumin were found. They reacted to smaller amounts of egg on initial DBPCFC and had more severe asthma. In contrast, lower egg-specific IgE levels and less severe reactions at food challenge were associated with the subgroup RR. One baseline parameter measured, serum-specific ovomucoid IgE, helped predict the likelihood of tolerating OIT. Levels <8.85 kiliunit/L indicated 77% probability of belonging to the RR group, whereas levels above it indicated 95% probability of early discontinuation or ongoing reactions over time.

CONCLUSIONS. The results of this study showed that egg OIT could induce desensitization in a large number of subjects with egg allergy. Egg OIT involves substantial risks, but baseline parameters, particularly ovomucoid serum-specific IgE, may help identify which children are better candidates for this therapy.

REVIEWER COMMENTS. This study tries to determine which children are not good candidates for this therapy. This study had higher reaction rates than previous studies, presumably related to participant selection criteria. The results reinforce the need for appropriate patient selection for OIT and place a significant emphasis on safety, highlighting that the safety and efficacy of OIT are still not well established. Serum-specific ovomucoid IgE level may be helpful in determining which children are not good candidates for such therapy.


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Baked Egg Food Challenges—Clinical Utility of Skin Test to Baked Egg and Ovomucoid in Children With Egg Allergy


PURPOSE OF THE STUDY. The goal of this study was to investigate if a skin prick test to ovomucoid and baked egg could predict which patients would pass an oral food challenge (OFC) to baked egg.

STUDY POPULATION. This prospective study evaluated 143 children from the allergy clinics at the Children’s Hospital at Westmead (Sydney, Australia). These children had a high probability of egg allergy based on either: (1) clinical reactions to egg within the 12 months before the study and positive skin prick test result or serum-specific IgE to egg white; or (2) skin prick test result or serum-specific IgE to egg white >95 positive predictive values previously established in those who did not ingest egg.

METHODS. Subjects underwent skin prick testing to egg white, ovomucoid, and baked egg muffin homogenized with normal saline on the day of the OFC. The skin prick tests were performed according to standard techniques, and positive results were wheal size at least 3 mm greater than that of the saline control subject at 15 minutes. The OFC used baked egg muffins with 1 g of egg per muffin challenge.

RESULTS. A total of 143 OFCs were conducted; 90 (63%) were negative. Of the 53 failed challenges, 3 had severe reactions. The medium skin prick size for failed challenges was 6.0 mm for muffin, 7.5 mm for ovomucoid, and 9.0 mm for egg white, whereas the size for passed challenges was 4.0 mm, 5.0 mm, and 8.0 mm for muffin, ovomucoid, and egg white, respectively. Skin test size did not predict severity. A skin prick test size of <2 mm to the baked egg
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