

DR ALLISON GRACE HICKS (Orcid ID : 0000-0001-9961-1431)

DR CARINA VENTER (Orcid ID : 0000-0002-7473-5355)

Article type : Original Article

Title: Accidental Ingestions to Known Allergens by Food Allergic Children and Adolescents

Authors: Allison Hicks, MD^{1,2}, Claire Palmer, MS³, Maureen Bauer, MD ^{1,2}, Carina Venter PhD RD^{1,2}

Institutional Affiliations

1. University of Colorado School of Medicine, Department of Pediatrics, Section of Allergy and Immunology, Aurora, Colorado, United States of America
2. Children's Hospital Colorado, Aurora, Colorado, United States of America
3. University of Colorado School of Medicine, Department of Pediatrics, Aurora, Colorado, United States of America

Corresponding Author:

Allison Hicks, MD

13123 E. 16th Ave, Box 518

Aurora, CO 80045

720-777-2575

Allison.hicks@childrenscolorado.org

Word count:

Abstract: 412

Text: 3864

Figures: 7

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/PAI.13573](#)

This article is protected by copyright. All rights reserved

COI Statement

A. Hicks – no conflicts to disclose

C. Palmer – no conflicts to disclose

M. Bauer – no conflicts to disclose

C. Venter - has provided and reviewed educational material for Danone, Reckitt Benckiser, Abbott Nutrition, DBV technologies, and Nestle Nutrition Institute. She receives research funding from Reckitt Benckiser and the National Peanut Board.

Funding Sources:

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Abstract:

Background: Accidental ingestions (AI) of food allergens in children compared to adolescents with food allergies are poorly characterized. It is suggested that AIs are higher in adolescents than children and that their reactions may be more severe, presumptively due, at least in part, to increased risk taking behavior. We compared reported AIs in children vs. adolescents.

Methods: An on-line cross-sectional survey was distributed to parents of children with food allergies via Twitter, food allergy advocacy groups in the UK, South Africa and Australia, and locally at Children's Hospital Colorado.

Results: Of 558 respondents, 105 were parents of adolescents, and 453 had children < 12 years. 73% (341) reported an AI since diagnosis, with 85% of adolescents having had an AI vs 70% of children ($p = 0.0058$). The annualized rate of AI was significantly lower in the adolescent population at 0.21 vs 0.53 in children ($p < 0.0001$). Although adolescents reported fewer severe reactions (2% vs 16%, $p = 0.0283$), more adolescents required epinephrine administered by a medical professional for their most severe AI, (48% vs 24%, $p = 0.0378$). Comparison of the two age groups is limited by the fact that many AIs in the adolescent group occurred prior to age 12. There was no significant difference between the groups as to where the food was consumed or the type of food. There was a significant difference in accidental ingestions in patients in all age groups with more than one reported food allergy, 78% of those with more than one food allergy reported a prior history of at least one accidental ingestion, compared to 59% in those with a single food allergy ($p < 0.0001$). Regional differences were also noted with respondents in the US reporting 0.3 accidental ingestions a year, 0.4 in the UK and 0.5 in other countries ($p = 0.0455$). The number of reactions was, on average, 27% lower (95% CI: 40, 11%) in the USA compared to the UK ($p = 0.0019$).

Conclusion: The number of severe reactions, and epinephrine need, differ in children compared to adolescents, although many of the reported reactions in both groups occurred before the age of 12. There was also regional differences with the US reporting a lower number of AIs and less AIs per year than the other participating regions, as well as increased rates of AI in participants with more than one food allergy. Further characterization of the differences in AIs between children and adolescents, as well as between regions, is needed to assist with more patient-centered anticipatory guidance.

Key Message:

It is known pediatric food allergy patients have a high rate of accidental ingestion and adolescents may have more severe reactions compared to their pediatric counterparts. In our work, current adolescents had a lower annual rate of accidental ingestion and fewer reported severe reactions, although many accidental ingestions

occurred prior to adolescence. There were also regional differences in the rate of accidental ingestions between countries included in the study, and higher rates of accidental ingestion in participants with more than one food allergy. This affirms the importance of clinician discussion of food avoidance and self-care management of accidental ingestions in children and adolescents of all ages.

Keywords

Food allergy
Accidental ingestion
Adolescents
Epinephrine
Anaphylaxis

Abbreviations

AI – accidental ingestion
CM – cow's milk
FA – food allergy

Background:

A recent large self-reported survey reported a “convincing food allergy (FA) prevalence” in 7.6% of US-based children⁽¹⁾. Adolescents, age 14 to 17, had a prevalence of 7.1% (95% CI 6.3-7.9) for a food allergy to any food. The highest prevalence by age in this study was in 2 year-olds, with a rate of 10% (95% CI 7.2-13.7).

It is known that patients with food allergies continue to experience accidental ingestions (AI)⁽²⁾. In regard to the rate of accidental ingestions in pediatric patients, prior studies are limited. One study, examining milk and/or egg allergic preschool-age children (n of 512), 52.5% reported >1 reaction and a rate of 0.81 accidental ingestions per year⁽³⁾. An increased prevalence of accidental ingestions in adolescents vs children under 12 years has also been reported⁽⁴⁻⁶⁾.

Food allergy-related anaphylaxis is relatively common, and an increasing prevalence is seen^(5, 7, 8), mostly in 0-4 year old children though fatal anaphylaxis in this population is rare^(8, 9). Teenagers may experience the steepest rise in food allergy-related anaphylaxis and are at risk for severe reactions^(5, 6, 10-12), resulting in an increased risk for fatal anaphylaxis^(8, 9). A likely contributory factor is increased risk-taking behavior related to inadequate allergen avoidance and not carrying and/or using their epinephrine^(13, 14).

Timely treatment of reactions is life-saving, but multiple studies report under-treatment is common⁽¹⁵⁾. Fleischer et al.⁽³⁾ found that in preschool-aged children with a severe reaction, only 29.9% received epinephrine. Factors resulting in under-treatment included lack of recognition of severity, epinephrine being unavailable and fears regarding epinephrine administration.

Questions also remain regarding factors associated with accidental ingestions, including common locations and forms of foods implicated. One study found that 37% of accidental ingestions to peanut occurred in the home⁽¹⁶⁻¹⁹⁾ while others have reported accidental ingestions to peanut occurred most frequently at school, followed by homes and restaurants^(20, 21).

This study aimed to explore accidental ingestions in pediatric patients to better characterize their prevalence. Particularly, we attempted to better describe differences between an adolescent and child population. We aimed to report on differences between these populations regarding 1) rate of occurrence, 2) parent-reported severity of prior reactions, 3) treatment and 4) related factors including location and food preparation.

Methods:

This study used a one-time, anonymous survey distributed via online support groups for food allergy including the Anaphylaxis Campaign in the UK, Allergy South Africa and Australasian Society of Clinical Immunology and Allergy as well as social media to parents of children with food allergy. The survey was also distributed locally (Colorado) in the Allergy Clinic at Children's Hospital Colorado during routine visits and food challenge visits. Consent was obtained prior to initiation of the survey and no personally identifiable information was collected. The survey was distributed intermittently from July 2018 to January 2020.

Survey Design

The survey consisted of 318 potential fields but had significant branching logic. It collected demographic information regarding the parent completing the form. History of food allergy was assessed regarding diagnosis and prior reaction history to cow's milk, egg, wheat, peanut, tree nuts, soy, sesame, fish and shellfish, as well as an option to add other foods as needed.

For each reported food allergy parents were questioned on the following; if they had been diagnosed by a medical professional, the age at time of diagnosis and if diagnosis was based on testing alone or if their child had also had symptoms prompting testing. If they reported a symptom history, common IgE mediated symptoms appeared from which they were asked to select the symptoms that occurred with the child's initial reaction. Questions were modeled after other population studies of atopic disease⁽²²⁾.

The survey next asked about any prior accidental ingestions to known food allergies and details surrounding the most recent and most significant accidental ingestions, with no time limit given for the most severe reaction. The survey employed branching logic so respondents could select only from the foods they listed as provider-diagnosed food allergies as the causative food in the most recent and severe accidental ingestion. Each food was analyzed only with the cohort reporting this food as a concern. The severity of the reported symptoms was rated on a scale of 1 to 3 using the hypersensitivity reactions scale created by Brown et al. ⁽²³⁾ This scale was used as it focused on subjective symptoms only, which was what was reported in the survey. A severity grade of 1 was considered mild, with skin/subcutaneous tissues only. Symptoms suggestive of involvement of the respiratory or gastrointestinal tract received a grade of 2 and those concerning for severe symptoms like hypotension or hypoxia received a grade of 3. The survey in its entirety is available as an online supplement to this article.

Data Collection

Study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at University of Colorado Denver ^(24, 25). The survey was approved via an exempt review process by the Colorado Multiple Institutional Review Board, IRB number 18-0906.

Statistical Analysis

Demographic and clinical characteristics were compared using two-sample t-tests or Wilcoxon rank-sum tests for continuous variables and Fisher's exact or chi-squared tests for categorical variables, as appropriate. Differences between countries after adjusting for relevant demographic characteristics were assessed using logistic and linear regression. Continuous variables were visually assessed for normality using histograms. All tests were two-sided, and significance was set at 0.05. R version 3.4.1 software was utilized for analysis.

Results:

Demographics

A total of 558 parents of food allergic children participated in the survey, although not all participants completed the entire survey. 105 respondents were parents of adolescents (age 13 to 18) and 453 had children age 12 years or less at time of response. A majority of patients were residing in the US (58%, 323 respondents) and the UK (25%, 137 respondents) and 59% of the children were male (n=330). The child's mother completed 93% of the questionnaires (n=518) (Appendix I). There was a significant difference in maternal level of education ($p=0.0016$) between the UK, USA and other countries, with a higher proportion of USA respondents having a master's level or higher and more respondents in the UK and "other" countries with a high school degree or lower. There was also a significant difference in age of the patient between countries ($p=0.0005$), with the average age in the UK of 9.4 years (± 5.1), the US 7.6 years (± 4.5) and other countries 7.6 years (± 4.1) (Appendix II)

Food Allergy History

History of food allergy was per parental report. The nine major allergens (cow's milk, egg, wheat, peanut, tree nut, sesame, soy, fish and shellfish) were offered as options as well as "other". To attempt to verify food allergy history, respondents were questioned if the food allergy had been diagnosed by a medical provider, of which 90% of reported allergies were in our cohort. Respondents were also asked if the child avoided the food based on testing alone or had a history of symptoms as well and 70% of food allergies were reported to have involved symptoms.

Accidental Ingestion History

An accidental ingestion to a food allergen was reported by 73% of parents/guardians (n=341). (Table I) Of these, 85% of adolescents (n=76) vs 70% of children (n=263) had a history of at least one accidental ingestion ($p=0.0058$) (Table I). Time since diagnosis per food was significantly longer ($p<0.01$) in the adolescent population to all foods except wheat ($p=0.2395$) (Appendix III). There was a significant difference in the rate of accidental ingestions per year between the two groups, with an annual rate of 0.2 accidental ingestions in the adolescent group vs 0.4 accidental ingestions in children, ($p= <0.0001$) (Table I) There was a significant difference in the annualized rate of accidental ingestions between the two age groups after adjusting for the number of food allergies with an annual rate of 0.21 in adolescents vs 0.53 in children ($p= <0.0001$).

A majority of parents recalled 1-3 prior accidental ingestions (21%, 23% and 20% respectively for 1, 2 or 3 prior accidental ingestions) (Table I). Cow's milk (CM) had the highest rate of accidental ingestion, with 91% reporting an accidental ingestion since diagnosis. There was a statistical difference in the rate of accidental ingestion to CM in adolescents vs children, with 79% of the adolescent population reporting an accidental

ingestion vs 94% of the child population ($p=0.024$). No other food in question had a statistical difference in the rate of accidental ingestion between children and adolescents (Table I). For the most recent accidental ingestion, the average age at time of exposure was 12 ± 4 years in the adolescent population and 5 ± 3 years in children ($p<0.001$). For the most severe accidental ingestion the average age was 6 ± 5 years in adolescents vs 3 ± 3 years in children ($p<0.001$).

There was a significant difference in accidental ingestions in patients with more than one reported food allergy. 127 respondents reported a single food allergy and 339 reported more than one food allergy. 78% of those with more than one food allergy reported a prior history of at least one accidental ingestion, compared to 59% in those with a single food allergy ($p<0.0001$). (Appendix IV)

Severity and Treatment of Reactions

Parental report of symptoms was collected and graded on a severity scale using the grading system created by Brown et al. ⁽²³⁾. A majority of reported reactions, both for the most recent and most significant episode, fell into the moderate category (most recent 63%, $n=185$ and most severe 71%, $n=113$) (Table II). There was a statistically significant difference in the occurrence of severe reactions, with 2% ($n=1$) of the adolescent age group's reactions rated severe vs 16% ($n=19$) of the population under age 13 ($p=0.0283$) (Table II). 80% of patients received treatment by a caregiver for their most significant reaction ($n=131$), with 30% ($n=39$) reporting epinephrine use by a caregiver (Table III). 61% ($n=101$) received medical evaluation for their most significant reaction, of which 31% ($n=30$) received epinephrine by a medical professional (Table III). More reactions in the adolescent population reportedly received epinephrine, either by the caregiver or a medical professional and this difference was significant for epinephrine administered by a medical professional in the most significant reaction (48% vs 24%, $p=0.0378$) (Table III, Table IV).

Factors Related to Accidental Ingestion

For the most significant reaction history, the majority occurred in the home (43%, $n=76$) and there was no statistical difference in the location of ingestion between the different age groups. 41% of the most recent accidental ingestions occurred with prepackaged food (Table V). In this subset, 70% reported the food was listed as an ingredient in the prepackaged product and was unknowingly ingested. 18% attributed a reaction from a "may contain" label or other precautionary label (PAL). A majority of reactions attributed to a "may contain" label were labeled as moderate reactions ($n=5$), with one report of a "may contain" label reported as severe. The remainder of the most recent accidental ingestions were from prepared (not-prepackaged) foods, 35% were prepared in the home and 65% elsewhere. There was no statistical difference in the food preparation type between adolescents and children (Table V, Table VI).

Intentional Ingestions

9% of the most recent exposures were from knowingly ingesting the allergen, outside of a medically-supervised food challenge, with 88% of the intentional ingestions occurring in children under 12. For the most significant ingestion, 29% were reported as intentional (46 of 158), with 78% occurring in the child cohort.

Regional Differences in Accidental Ingestion History

There was no significant difference between the UK, US and other countries in a history of accidental ingestions. There was a significant difference in the rate of allergic reactions per year ($p=0.0455$) with respondents in the US reporting 0.3 accidental ingestions a year, 0.4 in the UK and 0.5 in other countries. (Table VII) This difference was still significant after adjusting for maternal level of education and the patient's age ($p=0.0022$). The number of reactions was, on average, 27% lower (95% CI: 40, 11%) in the USA compared to the UK ($p=0.0019$). There was no significant difference in the form of food ingested (prepacked vs prepared) between countries. (Table VII)

Conclusion:

We aimed to describe the occurrence of accidental ingestions in an international population for all major food allergens and to further characterize differences between an adolescent and child population. Our population was self-selected given the nature of our survey, which may result in a falsely high report of accidental ingestion, however there are still important take-aways from our findings. We found that 73% of parents/guardians reported a history of accidental ingestion with current adolescents having less reactions deemed as severe but more frequent use of their epinephrine autoinjector, and most reactions occurring prior to adolescence. There was no significant difference in the age groups for location or type of food implicated in the reaction, including when compared between different regions.

Food allergy history was based on parental report, but the survey did question whether the patient had been diagnosed by a medical professional and if diagnosis was based only on testing or if a reaction had occurred. A large portion of our respondents (90%) reported diagnosis of food allergy by a medical provider. 70% of respondents stated there were symptoms that led to medical diagnosis of a food allergy and 30% reported avoiding a food based on testing alone. While still relying on parental recall and limited ability to further investigate the exact history and diagnosis of the food allergy, we believe the high rate of physician diagnosis and history of reactions does mean our population may have a large portion of participants with true IgE-mediated food allergies.

In our population we found a large number of parents/guardians reported a history of accidental ingestion. This percentage may be larger than reported in other studies given it was based on parental definition of an accidental ingestion. However, for the most recent reaction, 94% of respondents reported their child developed IgE-mediated symptoms, making a true ingestion more likely. A significantly larger number ($p=0.0058$) of adolescent patients reported a history of accidental ingestion, which likely can be explained in part by the longer time since diagnosis. Notably, the most severe reaction reported in the adolescent population occurred when the patient was under the age of twelve, not while in their adolescent years. The most recent reaction in the adolescent population on average also occurred prior to adolescence, with an average age of 12 ± 4 years. On an annual basis, current adolescents had a lower rate of accidental ingestions (0.2 vs 0.4 , $p<0.0001$) compared to children. Of the foods in question, CM had the largest number of accidental ingestions reported and was implicated in 30% of the most severe reaction recalled, the largest percentile for any of the foods. 94% the cow's milk allergic child population reported an accidental ingestion to CM compared to the 79% in the adolescent CM-allergic population, in line with the belief that most patients outgrow their CM allergy ^(26, 27).

We also collected data on the symptoms and treatment of the most recent and most significant reaction. Symptom recall was dependent on parental report and could be overestimated. We attempted to standardize the symptoms reported using a severity scale. Treatment given was collected to compare the severity of reported symptoms. Using parental recall, a majority of the most significant reactions reported were 71% moderate and 13% were severe. With this severity rating, per the World Allergy Organization's guidelines for the assessment and management of anaphylaxis ⁽²⁸⁾, the majority of our patients required epinephrine as the primary treatment for their reaction. Similar to prior studies ^(3, 15), epinephrine was underutilized, with only 30% of accidental ingestions receiving epinephrine by a caregiver and 31% by a medical professional. This result emphasizes the importance of anaphylaxis treatment education as part of the routine care of food allergic patients and the difficulty in educating caregivers on proper treatment of accidental ingestions.

Interestingly, a smaller number of accidental ingestions in the current adolescent population were rated as severe (2% versus 16%, $p = 0.0283$). This is not consistent with the current thought that adolescents, in general, have more severe accidental ingestions ^(5, 6, 10, 11). However, our finding is limited by the small number of accidental ingestions being deemed severe in our population overall and the fact that most of the most severe reactions in the adolescent group occurred before the age of twelve. More current adolescent patients did require epinephrine treatment for their reactions, some of which occurred as a child, and this finding was significant for epinephrine administered by a medical professional for the most significant reaction recalled ($p = 0.0378$) ^(5, 6, 14). Given the disconnect between symptoms meeting criteria for anaphylaxis and proper treatment with epinephrine it is difficult to determine the cause of this higher rate of epinephrine use in the adolescent population. It could be due a higher rate of anaphylaxis, or another factor such as longer time since diagnosis equating to more educational opportunities to teach proper management, or easier diagnosis of anaphylaxis as a child ages and can more clearly describe their symptoms. Again, it is difficult to make strong conclusions in the severity of reactions or rate of epinephrine use between the age groups given many of the accidental ingestions in the adolescent population likely occurred when the patient was a child.

As teens spend more time apart from their parents and exert their independence, there is the possibility that they do not report all accidental ingestions to their parents and accidental ingestions in this group may be underreported by parents. Prior research on the rate at which adolescents report accidental ingestions to their parents is limited. A prior study ⁽¹³⁾ reported that adolescents reported a food-allergy triggered reaction first to their parents, as opposed to no one or other adults, 61 percent of the time, and reported it to no-one/self-managed the episode 12 percent of the time. This study did not report if the adolescent later informed their parents after the acute reaction.

In regard to risk factors relating to the accidental ingestion, there was no difference in location of the accidental ingestion between the two ages, which is interesting as it may be presumed that adolescents spend more time outside the home and thus more of their accidental ingestions would also occur outside the home. Prior studies have reported schools as the primary location for accidental ingestions ⁽²⁰⁾, while we found the majority occurred at home. There was also no difference in food preparation between the groups. Most patients unknowingly ingested a food in which the allergen was an ingredient. There was a substantial number of ingestions that were surprisingly listed as intentional in both the child and adolescent group. There was a higher rate of reported intentional ingestion in the reactions reported as most severe. Again, it may be presumed that a larger amount of intentional ingestions would have occurred in the adolescent population, where an increase in risk-taking behaviors is expected ⁽¹³⁾, but this was not seen. The surprisingly high rate of intentional ingestions outside out a medically supervised challenge highlights the importance of educating families on complete food allergen avoidance. There was also a significant difference in the rate of accidental ingestion in patients with more than one food allergy (78% vs 59% with one allergy, $p<0.0001$) highlighting the difficulties families face with multi-food avoidance.

Significant differences between regions was also noted in our group. A majority of patients resided in the US or UK but we were able to compare these two groups to a combined group of the other participant countries. There was a significant difference in the rate of allergic reactions per year ($p=0.0455$) with respondents in the US reporting 0.3 accidental ingestions a year, 0.4 in the UK and 0.5 in other countries. There was also a significantly lower rate of reactions in the US population compared to the UK ($p=0.0019$). These regional variations highlight the different food allergy landscape in differing countries and the importance of considering region-specific food avoidance education as part of food allergy management.

Strengths of our survey include a relatively large number of respondents with a wide-range of ages. We also were able to collect responses from several English-speaking countries, making our findings more generalizable to the pediatric food allergy population at large. Our survey's generalizability was limited by the demographics of our respondents, who were predominately well-educated and Caucasian, but the large number of respondents does allow us to have some insight in the factors surrounding accidental ingestions in the larger food allergy population. As our population was approached primarily via support groups on the internet, this population may be a population with a higher rate of adverse reactions, leading to more involvement in support groups and subsequently increased motivation to complete our survey. Alternatively, it could be argued our recruitment methods may have targeted more empowered, allergy "aware" families who would be less likely to experience accidental ingestions, which could lead to an underreporting of reactions compared to the more general population of food allergic children. There may also be recall bias in the adolescent population as the average age of significant reactions in this population was age 6, many years

prior to completing the survey. Another limitation was in an effort to keep the survey as brief as possible for better response rates, a more extensive allergy history, including comorbid conditions such as asthma, was not obtained.

A further limitation is the subjective nature of determining if there was truly an accidental ingestion and describing subsequent symptoms. There was likely an over-reporting of symptoms per parental recall, as evidenced in the higher than previously reported occurrence of symptoms with ingestion of foods containing PALs ⁽²⁹⁾. The labeling provided on the packaging was collected per parental recollection but given that precautionary labeling remains unregulated worldwide, outside of the VITAL process, it is difficult to risk stratify the likelihood of a true exposure based on the label included ⁽³⁰⁻³²⁾. An analysis of the time to reaction may have also helped further differentiate IgE vs non-IgE mediated reactions but was not assessed in the survey. The survey tried to limit reporting of non-IgE mediated reactions by asking for presence of IgE-mediated symptoms and need for treatment, but it is still possible that some of the reported reactions were non-IgE mediated.

The survey highlights the high rate of accidental ingestion in pediatric food allergy patients per parental report. We aimed to detail some of the differences and similarities in accidental ingestions between children and adolescents. While our population may not be a guaranteed presentation of the general population, our results can be useful in considering educational needs for children and adolescents related to their food allergies. Given the high rate of accidental ingestion in our patient group, more extensive education appears to be needed for food allergy families. Particular areas that may improve from further education include label reading and proper treatment of reactions. The risk of intentional ingestion of the known allergy should be addressed directly as well. Accidental ingestion continues to be a major stressor to food allergy families and any information that may limit its occurrence can be of immense relief to families.

Acknowledgements:

We thank the Food Allergy Research Team at Children's Hospital Colorado, Lynne Regent and the Anaphylaxis Campaign in the UK, Allergy UK, Allergy South Africa and the Australasian Society of Clinical Immunology and Allergy for help with distribution of our survey.

References:

1. Gupta RS, Warren CM, Smith BM, Blumenstock JA, Jiang J, Davis MM, et al. The Public Health Impact of Parent-Reported Childhood Food Allergies in the United States. *Pediatrics*. 2018;142(6).
2. Capucilli P, Kennedy K, Lee J, Grundmeier RW, Spergel JM. Accidental versus new food allergy reactions in a pediatric emergency department. *The journal of allergy and clinical immunology In practice*. 2018.
3. Fleischer DM, Perry TT, Atkins D, Wood RA, Burks AW, Jones SM, et al. Allergic reactions to foods in preschool-aged children in a prospective observational food allergy study. *Pediatrics*. 2012;130(1):e25-32.
4. Sasaki M, Koplin JJ, Dharmage SC, Field MJ, Sawyer SM, McWilliam V, et al. Prevalence of clinic-defined food allergy in early adolescence: The SchoolNuts study. *The Journal of allergy and clinical immunology*. 2018;141(1):391-8.e4.
5. Bock SA, Munoz-Furlong A, Sampson HA. Fatalities due to anaphylactic reactions to foods. *The Journal of allergy and clinical immunology*. 2001;107(1):191-3.
6. Bock SA, Munoz-Furlong A, Sampson HA. Further fatalities caused by anaphylactic reactions to food, 2001-2006. *The Journal of allergy and clinical immunology*. 2007;119(4):1016-8.
7. Turner PJ, Campbell DE, Motosue MS, Campbell RL. Global Trends in Anaphylaxis Epidemiology and Clinical Implications. *The journal of allergy and clinical immunology In practice*. 2019.
8. Turner PJ, Gowland MH, Sharma V, Ierodiakonou D, Harper N, Garcez T, et al. Increase in anaphylaxis-related hospitalizations but no increase in fatalities: an analysis of United Kingdom national anaphylaxis data, 1992-2012. *The Journal of allergy and clinical immunology*. 2015;135(4):956-63.e1.
9. Turner PJ, Jerschow E, Umasunthar T, Lin R, Campbell DE, Boyle RJ. Fatal Anaphylaxis: Mortality Rate and Risk Factors. *The journal of allergy and clinical immunology In practice*. 2017;5(5):1169-78.
10. Pumphrey RS. Lessons for management of anaphylaxis from a study of fatal reactions. *Clin Exp Allergy*. 2000;30(8):1144-50.
11. Sampson HA, Mendelson L, Rosen JP. Fatal and near-fatal anaphylactic reactions to food in children and adolescents. *N Engl J Med*. 1992;327(6):380-4.
12. Mullins RJ, Dear KB, Tang ML. Time trends in Australian hospital anaphylaxis admissions in 1998-1999 to 2011-2012. *The Journal of allergy and clinical immunology*. 2015;136(2):367-75.
13. Sampson MA, Munoz-Furlong A, Sicherer SH. Risk-taking and coping strategies of adolescents and young adults with food allergy. *The Journal of allergy and clinical immunology*. 2006;117(6):1440-5.

14. Marrs T, Lack G. Why do few food-allergic adolescents treat anaphylaxis with adrenaline?--Reviewing a pressing issue. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2013;24(3):222-9.
15. Kim JS, Sinacore JM, Pongracic JA. Parental use of EpiPen for children with food allergies. *The Journal of allergy and clinical immunology*. 2005;116(1):164-8.
16. Cherkaoui S, Ben-Shoshan M, Alizadehfar R, Asai Y, Chan E, Cheuk S, et al. Accidental exposures to peanut in a large cohort of Canadian children with peanut allergy. *Clinical and translational allergy*. 2015;5:16.
17. Yu JW, Kagan R, Verreault N, Nicolas N, Joseph L, St Pierre Y, et al. Accidental ingestions in children with peanut allergy. *The Journal of allergy and clinical immunology*. 2006;118(2):466-72.
18. Eigenmann PA, Zamora SA. An internet-based survey on the circumstances of food-induced reactions following the diagnosis of IgE-mediated food allergy. *Allergy*. 2002;57(5):449-53.
19. Versluis A, Knulst AC, Kruizinga AG, Michelsen A, Houben GF, Baumert JL, et al. Frequency, severity and causes of unexpected allergic reactions to food: a systematic literature review. *Clin Exp Allergy*. 2015;45(2):347-67.
20. Sicherer SH, Burks AW, Sampson HA. Clinical features of acute allergic reactions to peanut and tree nuts in children. *Pediatrics*. 1998;102(1):e6.
21. Carter CA, Pistiner M, Wang J, Sharma HP. Food Allergy in Restaurants Work Group Report. *The journal of allergy and clinical immunology In practice*. 2020;8(1):70-4.
22. Asher MI, Keil U, Anderson HR, Beasley R, Crane J, Martinez F, et al. International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods. *Eur Respir J*. 1995;8(3):483-91.
23. Brown SG. Clinical features and severity grading of anaphylaxis. *The Journal of allergy and clinical immunology*. 2004;114(2):371-6.
24. Harris PA, Taylor R, Minor BL, Elliott V, Fernandez M, O'Neal L, et al. The REDCap consortium: Building an international community of software platform partners. *J Biomed Inform*. 2019;95:103208.
25. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42(2):377-81.
26. Venter C, Patil V, Grundy J, Glasbey G, Twiselton R, Arshad SH, et al. Prevalence and cumulative incidence of food hyper-sensitivity in the first 10 years of life. *Pediatric allergy and immunology : official publication of the European Society of Pediatric Allergy and Immunology*. 2016;27(5):452-8.
27. Schoemaker AA, Sprickelman AB, Grimshaw KE, Roberts G, Grabenhenrich L, Rosenfeld L, et al. Incidence and natural history of challenge-proven cow's milk allergy in European children--EuroPrevall birth cohort. *Allergy*. 2015;70(8):963-72.

28. Simons FER, Arduzzo LRF, Bilò MB, El-Gamal YM, Ledford DK, Ring J, et al. World allergy organization guidelines for the assessment and management of anaphylaxis. *World Allergy Organ J.* 2011;4(2):13-37.
29. Allen KJ, Taylor SL. The Consequences of Precautionary Allergen Labeling: Safe Haven or Unjustifiable Burden? *The journal of allergy and clinical immunology In practice.* 2018;6(2):400-7.
30. Ford LS, Taylor SL, Pacenza R, Niemann LM, Lambrecht DM, Sicherer SH. Food allergen advisory labeling and product contamination with egg, milk, and peanut. *The Journal of allergy and clinical immunology.* 2010;126(2):384-5.
31. Holzhauser T, Johnson P, Hindley JP, O'Connor G, Chan CH, Costa J, et al. Are current analytical methods suitable to verify VITAL® 2.0/3.0 allergen reference doses for EU allergens in foods? *Food Chem Toxicol.* 2020;145:111709.
32. Allen KJ, Turner PJ, Pawankar R, Taylor S, Sicherer S, Lack G, et al. Precautionary labelling of foods for allergen content: are we ready for a global framework? *World Allergy Organ J.* 2014;7(1):10.

Table I: History of Accidental Ingestion

Characteristic	All (n=558)	Adolescents (n=105)	Children (n=453)	P Value
History of AI				0.0058
No	125 (27%)	13 (15%)	112 (30%)	
Yes	341 (73%)	76 (85%)	263 (70%)	
Number of AIs Since Diagnosis*				0.0342
1	70 (21%)	10 (13%)	60 (23%)	
2	77 (23%)	19 (25%)	58 (22%)	
3	67 (20%)	15 (20%)	52 (20%)	
4	38 (11%)	5 (7%)	33 (13%)	
5	26 (8%)	5 (7%)	21 (8%)	
6-8	24 (7%)	11 (14%)	13 (5%)	
10 +	37 (11%)	11 (14%)	26 (10%)	
Allergic reactions per year**	0.4 (0.2, 0.8)	0.2 (0.1, 0.4)	0.4 (0.2, 0.8)	<0.0001
Food Implicated in AI				
Egg	(n=159)	(n=32)	(n=127)	0.4635
No	56 (35%)	9 (28%)	47 (36%)	
Yes	103 (65%)	23 (72%)	80 (64%)	
Milk*	(n=157)	(n=29)	(n=128)	0.0244
No	14 (9%)	6 (21%)	8 (6%)	
Yes	143 (91%)	23 (79%)	120 (94%)	
Wheat*	(n=40)	(n=3)	(n=37)	1
No	10 (25%)	1 (33%)	9 (24%)	
Yes	30 (75%)	2 (67%)	28 (76%)	
Peanut	(n=204)	(n=41)	(n=163)	0.4852
No	97 (48%)	17 (41%)	80 (49%)	
Yes	107 (52%)	24 (59%)	83 (51%)	
Tree nuts	(n=180)	(n=41)	(n=139)	0.0712
No	99 (55%)	17 (41%)	82 (59%)	
Yes	81 (45%)	24 (59%)	57 (41%)	
Soy	(n=48)	(n=12)	(n=36)	0.8675
No	23 (48%)	5 (42%)	18 (50%)	
Yes	25 (52%)	7 (58%)	18 (50%)	
Sesame	(n=67)	(n=14)	(n=53)	0.5105
No	41 (61%)	7 (50%)	34 (64%)	
Yes	26 (39%)	7 (50%)	19 (36%)	
Fish*	(n=27)	(n=11)	(n=16)	0.1302
No	15 (56%)	4 (36%)	11 (69%)	
Yes	12 (44%)	7 (64%)	5 (31%)	

Shellfish*	(n=31)	(n=10)	(n=21)	1
No	17 (55%)	5 (50%)	12 (57%)	
Yes	14 (45%)	5 (50%)	9 (43%)	

*Fisher's exact test

**Median and IQR. P value from Wilcoxon rank-sum test

Table II: AI Severity

Characteristic	All	Adolescents	Children	P Value
Most Recent AI				
Reaction Severity*				0.4992
0	1 (0%)	0 (0%)	1 (0%)	
1	86 (29%)	17 (25%)	69 (31%)	
2	185 (63%)	48 (71%)	137 (61%)	
3	22 (7%)	3 (4%)	19 (8%)	
Most Severe AI				
Reaction Severity				0.0283
0	0 (0%)	0 (0%)	0 (0%)	
1	26 (16%)	5 (12%)	21 (18%)	
2	113 (71%)	36 (86%)	77 (66%)	
3	20 (12%)	1 (2%)	19 (16%)	

Table III. Treatment of Most Significant AI

Characteristic	All (n=177)	Adolescents (n=48)	Children (n=129)	P Value
Treatment by parent/ caregiver				1
No	33 (20%)	8 (19%)	25 (20%)	
Yes	131 (80%)	34 (81%)	97 (80%)	
Treatment administered*				0.2799
After symptoms developed	126 (97%)	32 (94%)	94 (98%)	
Before symptoms developed	4 (3%)	2 (6%)	2 (2%)	
Medications administered by caregiver				
Epinephrine autoinjector				0.3338
No	90 (70%)	21 (62%)	69 (73%)	
Yes	39 (30%)	13 (38%)	26 (27%)	
Antihistamines				1
No	15 (12%)	4 (12%)	11 (12%)	
Yes	111 (88%)	29 (88%)	83 (88%)	
Asthma Inhalers				0.1921
No	80 (62%)	17 (52%)	63 (66%)	
Yes	48 (38%)	16 (48%)	32 (34%)	
Other*				1
No	110 (87%)	28 (88%)	82 (87%)	
Yes	16 (13%)	4 (12%)	12 (13%)	
Treatment by a Medical Professional?				0.9025
No	65 (39%)	16 (37%)	49 (40%)	
Yes	101 (61%)	27 (63%)	74 (60%)	
Medications administered by medical				
Epinephrine				0.0378
No	68 (69%)	14 (52%)	54 (76%)	
Yes	30 (31%)	13 (48%)	17 (24%)	
Antihistamines				0.518
No	21 (22%)	7 (29%)	14 (20%)	
Yes	73 (78%)	17 (71%)	56 (80%)	
Steroids				1
No	23 (23%)	6 (22%)	17 (24%)	
Yes	75 (77%)	21 (78%)	54 (76%)	
Nebulizers/inhalers				0.6791
No	50 (52%)	12 (46%)	38 (54%)	
Yes	47 (48%)	14 (54%)	33 (46%)	
IV fluids/drips				0.6809
No	68 (73%)	17 (68%)	51 (75%)	
Yes	25 (27%)	8 (32%)	17 (25%)	
Other*				1
No	77 (88%)	19 (90%)	58 (87%)	
Yes	11 (12%)	2 (10%)	9 (13%)	

*Fisher's exact test

Table IV. Treatment of Most Recent AI

Characteristic	All (n=341)	Adolescents (n=76)	Children (n=265)	P Value
Treatment by parent/caregiver				
Treatment by caregiver?				0.0115
No	56 (17%)	5 (7%)	51 (20%)	
Yes	266 (83%)	68 (93%)	198 (80%)	
Treatment Administered				0.4103
After symptoms developed	240 (91%)	64 (94%)	176 (90%)	
Before symptoms developed	24 (9%)	4 (6%)	20 (10%)	
Medications administered by caregiver				
Epinephrine autoinjector				0.1585
No	184 (70%)	42 (63%)	142 (73%)	
Yes	78 (30%)	25 (37%)	53 (27%)	
Antihistamines				0.2473
No	31 (12%)	11 (17%)	20 (10%)	
Yes	229 (88%)	55 (83%)	174 (90%)	
Asthma Inhalers				0.0037
No	180 (69%)	36 (55%)	144 (75%)	
Yes	79 (31%)	30 (45%)	49 (25%)	
Other*				0.7884
No	239 (93%)	62 (94%)	177 (92%)	
Yes	19 (7%)	4 (6%)	15 (8%)	
Treatment by a medical professional?				0.1842
No	197 (62%)	39 (54%)	158 (64%)	
Yes	123 (38%)	33 (46%)	90 (36%)	
Medications administered by medical				
Epinephrine				0.3769
No	87 (73%)	21 (66%)	66 (76%)	
Yes	32 (27%)	11 (34%)	21 (24%)	
Antihistamines				0.2454
No	39 (33%)	13 (43%)	26 (30%)	
Yes	79 (67%)	17 (57%)	62 (70%)	
Steroids				1
No	36 (31%)	9 (30%)	27 (31%)	
Yes	81 (69%)	21 (70%)	60 (69%)	
Nebulizers/inhalers				0.427
No	77 (66%)	17 (59%)	60 (69%)	
Yes	39 (34%)	12 (41%)	27 (31%)	
IV fluids/drip				0.0349
No	84 (71%)	17 (55%)	67 (77%)	
Yes	34 (29%)	14 (45%)	20 (23%)	
Other*				0.7567
No	101 (88%)	26 (87%)	75 (88%)	
Yes	14 (12%)	4 (13%)	10 (12%)	

*Fisher's exact test

Table V: Characteristics of Most Recent AI

Characteristic	All (n=341)	Adolescents (n=76)	Children (n=265)	P Value
Location*				0.8274
A relative's or friend's house	58 (18%)	10 (14%)	48 (19%)	
Home	119 (36%)	26 (36%)	93 (36%)	
Other	35 (11%)	10 (14%)	25 (10%)	
Restaurant	57 (17%)	13 (18%)	44 (17%)	
School/Daycare	60 (18%)	14 (19%)	46 (18%)	
Work	1 (0%)	0 (0%)	1 (0%)	
Form of food ingested				0.6826
Prepackaged	129 (41%)	27 (39%)	102 (41%)	
Prepared or cooked at home (i.e. made by a parent or caretaker)	66 (21%)	13 (19%)	53 (21%)	
Prepared or cooked outside the home (i.e. at a restaurant, cafeteria or bakery)	122 (38%)	30 (43%)	92 (37%)	
Prepared food AI*				0.1387
Ate a product that was contaminated with the food (in preparation, i.e. at a restaurant)	61 (33%)	10 (24%)	51 (36%)	
Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)	12 (6%)	1 (2%)	11 (8%)	
Unknowingly or accidentally ingested the food	112 (61%)	31 (74%)	81 (57%)	
Prepackaged food AI*				0.6985
Ate a food with a precautionary allergy label	21 (18%)	6 (24%)	15 (15%)	
Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)	15 (12%)	2 (8%)	13 (14%)	
Unknowingly or accidentally ingested an item with the allergen listed as an ingredient	84 (70%)	17 (68%)	67 (71%)	

*Fisher's exact test

Table VI: Characteristics of Most Significant AI

Characteristic	All (n=177)	Adolescents (n=48)	Children (n=129)	P Value
Location				0.389
A relative's or friend's house	28 (16%)	10 (21%)	18 (14%)	
Home	76 (43%)	17 (35%)	59 (46%)	
Other	17 (10%)	7 (15%)	10 (8%)	
Restaurant	20 (11%)	6 (12%)	14 (11%)	
School/Daycare	35 (20%)	8 (17%)	27 (21%)	
Food preparation				0.8487
Prepackaged	57 (35%)	15 (33%)	42 (35%)	
Prepared or cooked at home (i.e. made by a parent or caretaker)	63 (38%)	17 (37%)	46 (39%)	
Prepared or cooked outside the home (i.e. at a restaurant, cafeteria or bakery)	45 (27%)	14 (30%)	31 (26%)	
How prepared food AI occurred*				0.8318
Ate a product that was contaminated with the food (in preparation, i.e. at a restaurant)	14 (13%)	4 (13%)	10 (14%)	
Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)	32 (30%)	8 (26%)	24 (32%)	
Unknowingly or accidentally ingested the food	59 (56%)	19 (61%)	40 (54%)	
How prepackaged food AI occurred*				0.3261
Ate a food with a precautionary allergy label	9 (17%)	1 (8%)	8 (20%)	
Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)	14 (26%)	2 (15%)	12 (30%)	
Unknowingly or accidentally ingested an item with the allergen listed as an ingredient	30 (57%)	10 (77%)	20 (50%)	

*Fisher's exact test

Table VII: Regional Differences in Accidental Ingestions

Characteristic	All (n=558)	Other (n=98)	UK (n=137)	USA (n=323)	P Value
History of AI					0.7082
No	125 (27%)	18 (23%)	31 (26%)	76 (28%)	
Yes	341 (73%)	59 (77%)	87 (74%)	195 (72%)	
Allergic reactions per year*	0.4 (0.2, 0.8)	0.5 (0.3, 0.8)	0.4 (0.2, 0.8)	0.3 (0.2, 0.6)	0.0455
Food Preparation					0.6197
Prepackaged	129 (41%)	18 (32%)	34 (41%)	77 (43%)	
Prepared or cooked at home (	66 (21%)	15 (27%)	17 (20%)	34 (19%)	
Prepared or cooked outside the home	122 (38%)	23 (41%)	32 (39%)	67 (38%)	

*Median (IQR). Wilcoxon rank-sum test.

Accepted Article

Appendix I: Comparison of Demographics between Children (0-12 years) and Adolescents (13-18 years)

Characteristic	All (n=558)	Adolescents (n=105)	Children (n=453)	P Value
Country of Residence				0.0024
Australia	22 (4%)	6 (6%)	16 (4%)	
Canada	13 (2%)	1 (1%)	12 (3%)	
Other	30 (5%)	3 (3%)	27 (6%)	
South Africa	33 (6%)	4 (4%)	29 (6%)	
United Kingdom	137 (25%)	43 (41%)	94 (21%)	
United States of America	323 (58%)	48 (46%)	275 (61%)	
Patient's Gender				0.8449
Female	228 (41%)	41 (39%)	186 (41%)	
Male	330 (59%)	63 (61%)	267 (59%)	
Patient Race*				0.8985
American Indian or Alaska Native	1 (0%)	0 (0%)	1 (0%)	
Asian	22 (4%)	4 (4%)	18 (4%)	
Black	3 (1%)	0 (0%)	3 (1%)	
Black or African-American	7 (1%)	2 (2%)	5 (1%)	
More than one race	53 (10%)	8 (8%)	45 (10%)	
White	467 (84%)	89 (86%)	376 (84%)	
Patient Ethnicity*				0.7677
Hispanic or Latino	25 (8%)	4 (9%)	21 (8%)	
Not Hispanic or Latino	290 (92%)	41 (91%)	248 (92%)	
Relation to the patient*				1
Father	38 (7%)	7 (7%)	30 (7%)	
Legal guardian	2 (0%)	0 (0%)	1 (0%)	
Mother	518 (93%)	97 (93%)	421 (93%)	
Other	1 (0%)	0 (0%)	1 (0%)	
Marital status of the child's parents*				0.0033
Divorced/Separated	30 (5%)	12 (12%)	18 (4%)	
Married/Domestic Partnership	511 (92%)	87 (84%)	423 (94%)	
Single (never married)	13 (2%)	3 (3%)	10 (2%)	
Widowed	1 (0%)	1 (1%)	0 (0%)	
Highest maternal level of education*				0.0133
College/University Degree	273 (50%)	50 (51%)	222 (50%)	

High school degree or equivalent	49 (9%)	12 (12%)	37 (8%)	0.1198
Less than high school degree or equivalent	6 (1%)	4 (4%)	2 (0%)	
Master's level or higher	221 (40%)	33 (33%)	187 (42%)	
Highest paternal level of education*				
College/University Degree	261 (48%)	38 (38%)	222 (50%)	
High school degree or equivalent	92 (17%)	20 (20%)	72 (16%)	
Less than high school degree or equivalent	16 (3%)	5 (5%)	11 (2%)	
Master's level or higher	176 (32%)	36 (36%)	140 (31%)	

*Fisher's exact test

Appendix II: Comparison of Select Demographics by Country

Characteristic	All (n=558)	Other (n=98)	UK (n=137)	USA (n=323)	P Value
Demographic					
What is the highest level of education obtained by the mother of the child?					0.0016
College/University Degree	272 (50%)	51 (53%)	66 (50%)	155 (49%)	
High school or less	55 (10%)	17 (18%)	18 (14%)	20 (6%)	
Master's level or higher	220 (40%)	28 (29%)	48 (36%)	144 (45%)	
Patient's Gender					0.7669
Female	227 (41%)	43 (44%)	56 (41%)	128 (40%)	
Male	330 (59%)	55 (56%)	81 (59%)	194 (60%)	
Race					0.3098
Other	86 (16%)	19 (20%)	17 (12%)	50 (16%)	
White	465 (84%)	77 (80%)	120 (88%)	268 (84%)	
Patient's Current Age (in years)	8±4.7	7.6±4.1	9.4±5.1	7.6±4.5	0.0005

Appendix III: Allergy Diagnosis and Time Since Diagnosis

Characteristic	All (n=558)	Adolescents (n=105)	Children (n=453)	P Value
Milk	202 (36%)	32 (31%)	170 (38%)	1
Time since diagnosis (yrs)	7±5	14±2	5±4	<0.0001
Egg	242 (44%)	44 (43%)	198 (44%)	0.3355
Time since diagnosis (yrs)	7±5	13±3	5±3	<0.0001
Wheat	62 (11%)	7 (7%)	55 (12%)	1
Time since diagnosis (yrs)	4±3	7±6	4±3	0.2395
Peanut	347 (62%)	62 (59%)	285 (63%)	1
Time since diagnosis (yrs)	6±4	11±4	5±3	<0.0001
Tree nut	290 (52%)	47 (45%)	243 (54%)	0.1307
Time since diagnosis (yrs)	6±4	12±4	5±3	<0.0001
Soy	62 (11%)	12 (12%)	50 (11%)	0.2784
Time since diagnosis (yrs)	5±4	10±6	4±3	0.0033
Sesame	103 (19%)	16 (16%)	87 (19%)	0.4113
Time since diagnosis (yrs)	5±4	10±4	5±3	<0.0001
Fish	39 (7%)	12 (12%)	27 (6%)	1
Time since diagnosis (yrs)	7±4	12±3	5±3	<0.0001
Shellfish	44 (8%)	14 (14%)	30 (7%)	1
Time since diagnosis (yrs)	7±3	9±4	6±2	0.0099

Appendix IV: More than one food allergy and accidental exposure

Characteristic	All (n=466)	<1 allergy (n=127)	>1 allergy (n=339)	P Value
Accidental exposure to a food since diagnosis				<0.0001
No	125 (27%)	52 (41%)	73 (22%)	
Yes	341 (73%)	75 (59%)	266 (78%)	

Accidental Ingestion Survey

This is a short survey regarding living with a child with food allergies.

If you qualify, you will learn more about the purpose of the survey and proceed to the survey regarding your child and your experiences with their food allergies.

Do you have a child under the age of 18 years who has one or more food allergy?

☐ Yes
☐ No

Sorry, you do not qualify to take this survey.

Thank you for your time.

Study Title: Parental Survey of Accidental Exposures to Known Food Allergies in Pediatric Patients

Principal Investigator: Allison Hicks, MD

COMIRB No: 18-0906

Version Date: 5/9/18

You are being asked to be in this research study because your child has a food allergy.

If you join the study, you will be asked to complete a one-time survey. The survey will ask questions related to your child's food allergy history including past reactions as well as questions regarding your quality of life, demographics and educational preferences.

This study is designed to learn more about children with food allergies, including their prior reactions and how having a child with a food allergy impacts parent's/guardian's quality of life.

This study involves no greater than minimal risk. We will do everything we can to protect your privacy and confidentially and no identifying information regarding you or your child will be stored.

The survey will not ask any identifying information and please do not include any in your responses.

You have a choice about being in this study. You do not have to be in this study if you do not want to be.

If you have questions, you can call Allison Hicks at 720-777-2575. You can call and ask questions at any time.

You may have questions about your rights as someone in this study. If you have questions, you can call the COMIRB (the responsible Institutional Review Board). Their number is (303) 724-1055.

By completing this survey, you are agreeing to participate in this research study.

I consent

☐ Yes

Demographic Information

In what country do you currently reside?

- ☐ United States of America
- ☐ United Kingdom
- ☐ Canada
- ☐ Australia
- ☐ South Africa
- ☐ Other

In what country do you currently reside?

Patient's Current Age (in years)

- ☐ < 1
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12
- ☐ 13
- ☐ 14
- ☐ 15
- ☐ 16
- ☐ 17
- ☐ 18

Patient's Gender

- ☐ Female
- ☐ Male
- ☐ Prefer not to answer

Patient Race (choose the one which you MOST CLOSELY identify with)

- ☐ Asian
- ☐ Black
- ☐ White
- ☐ More than one race
- ☐ Unknown or prefer not to report

Patient Race (chosed the one which you MOST CLOSELY identify with)

- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Black or African-American
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ White
- ☐ More than one race
- ☐ Unknown or prefer not to report

Patient Ethnicity (choose the one which you MOST CLOSELY identify with)

- ☐ Hispanic or Latino
- ☐ Not Hispanic or Latino
- ☐ Unknown or not reported

What is your relation to the patient?

- ☐ Mother
- ☐ Father
- ☐ Legal guardian
- ☐ Other

What is your relation to the patient?

What is the marital status of the child's parents?

- ☐ Single (never married)
- ☐ Married/Domestic Partnership
- ☐ Widowed
- ☐ Divorced/Separated
- ☐ Prefer not to answer

What is the highest level of education obtained by the mother of the child?

- ☐ Less than high school degree or equivalent
- ☐ High school degree or equivalent
- ☐ College/University Degree
- ☐ Master's level or higher
- ☐ Prefer not to answer

What is the highest level of education obtained by the father of the child?

- ☐ Less than high school degree or equivalent
- ☐ High school degree or equivalent
- ☐ College/University Degree
- ☐ Master's level or higher
- ☐ Prefer not to answer

Is your child allergic to...

	Yes	No	Unsure
Egg	☐	☐	☐
Milk	☐	☐	☐
Wheat	☐	☐	☐
Peanut	☐	☐	☐
Tree nuts	☐	☐	☐
Soy	☐	☐	☐
Sesame	☐	☐	☐
Fish	☐	☐	☐
Shellfish	☐	☐	☐
Other	☐	☐	☐

What makes you unsure your child is allergic to egg?

What makes you unsure your child is allergic to milk?

What makes you unsure your child is allergic to wheat?

What makes you unsure your child is allergic to peanut?

What makes you unsure your child is allergic to tree nuts?

What makes you unsure your child is allergic to soy?

What makes you unsure your child is allergic to sesame?

What makes you unsure your child is allergic to fish?

What makes you unsure your child is allergic to shellfish?

Other food:

Egg

Has your child been diagnosed with an egg allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with an egg allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What form of egg is your child allergic to?

- ☐ Allergic to cooked/raw egg (i.e. scrambled or fried eggs), but can tolerate baked egg (i.e. in cakes or store-bought cookies)
☐ Allergic to egg in all forms

Is your child allergic to egg based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to eggs occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to eggs?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

EGGRXNSEVERITY

Other reaction symptoms to egg?

Milk	
Has your child been diagnosed with a milk allergy by a medical provider? (i.e. their pediatrician or an allergist)	☐ Yes ☐ No
Approximately how old in years was your child when they were first diagnosed with a milk allergy by a medical professional?	☐ < 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18
What form of milk is your child allergic to?	☐ Allergic to milk such as liquid milk, yogurt or cheese but can tolerate products with baked milk (i.e. cakes and muffins) ☐ Allergic to milk in all forms
Is your child allergic to milk based on...	☐ Testing alone, has never eaten the food ☐ Has had symptoms with the food
Approximately how old in years was your child when the first reaction to milk occurred?	☐ < 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18

What symptoms occurred with the first reaction to milk?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

MILKRXNSEVERITY

Other reaction symptoms to milk?

Wheat

Has your child been diagnosed with a wheat allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a wheat allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Is your child allergic to wheat based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to wheat occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to wheat?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

WHEATRXNSEVERITY

Other reaction symptoms to wheat?

Peanut

Has your child been diagnosed with a peanut allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a peanut allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Is your child allergic to peanut based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to peanut occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to peanuts?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

PEANUTRXNSEVERITY

Other reaction symptoms to peanut?

Tree nut

Has your child been diagnosed with a tree nut allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a tree nut allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Which tree nuts is your child allergic to?

- ☐ All tree nuts
☐ Only certain tree nuts

Which tree nuts is your child allergic to? (select all that apply)

- ☐ Almonds
☐ Brazil Nuts
☐ Cashews
☐ Filberts/Hazelnuts
☐ Macadamia nuts
☐ Pecans
☐ Pine Nuts
☐ Pistachios
☐ Walnuts

Which tree nuts does your child currently avoid?

- ☐ All tree nuts
☐ Only certain tree nuts

Which tree nuts does your child currently avoid? (select all that apply)

- ☐ Almonds
☐ Brazil Nuts
☐ Cashews
☐ Filberts/Hazelnuts
☐ Macadamia nuts
☐ Pecans
☐ Pine Nuts
☐ Pistachios
☐ Walnuts

Is your child allergic to tree nuts based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to tree nuts occurred?

- ☐ < 1
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12
- ☐ 13
- ☐ 14
- ☐ 15
- ☐ 16
- ☐ 17
- ☐ 18

What symptoms occurred with the first reaction to tree nuts?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

TREENUTRXNSEVERITY

Other reaction symptoms to tree nuts

Soy

Has your child been diagnosed with a soy allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a soy allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Is your child allergic to soy based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to soy occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to soy?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

SOYRXNSEVERITY

Other reaction symptoms to soy?

Sesame

Has your child been diagnosed with a sesame allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a sesame allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Is your child allergic to sesame based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to sesame occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to sesame?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

SESAMERXNSEVERITY

Other reaction symptoms to sesame?

Fish	
Has your child been diagnosed with a fish allergy by a medical provider? (i.e. their pediatrician or an allergist)	☐ Yes ☐ No
Approximately how old in years was your child when they were first diagnosed with a fish allergy by a medical professional?	☐ < 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18
Is your child allergic to fish based on...	☐ Testing alone, has never eaten the food ☐ Has had symptoms with the food
Approximately how old in years was your child when the first reaction to fish occurred?	☐ < 1 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18

What symptoms occurred with the first reaction to fish?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

FISHRXNSEVERITY

Other reaction symptoms to fish?

Shellfish

Has your child been diagnosed with a shellfish allergy by a medical provider? (i.e. their pediatrician or an allergist)

- ☐ Yes
☐ No

Approximately how old in years was your child when they were first diagnosed with a shellfish allergy by a medical professional?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Is your child allergic to shellfish based on...

- ☐ Testing alone, has never eaten the food
☐ Has had symptoms with the food

Approximately how old in years was your child when the first reaction to shellfish occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

What symptoms occurred with the first reaction to shellfish?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

SHELLFISHRXNSEVERITY

Other reaction symptoms to shellfish?

Has your child seen a dietitian regarding their food allergies to the following?

	Yes	No
Egg	☐	☐
Milk	☐	☐
Wheat	☐	☐
Peanut	☐	☐
Tree nuts	☐	☐
Soy	☐	☐
Sesame	☐	☐
Fish	☐	☐
Shellfish	☐	☐

Does your child have a current Food Allergy Action Plan?

- ☐ Yes
☐ No
☐ Unsure

Has your child had a reaction to the foods they are allergic to in the past after the following?

	Yes	No	Unsure
Being near the food (i.e. in the same room)	☐	☐	☐
Touching a surface that the food has been on	☐	☐	☐
Touching the food itself	☐	☐	☐
Inhaling the food	☐	☐	☐
Eating the food	☐	☐	☐

We will now ask about any accidental ingestions your child has had to their known food allergies.

For the purpose of this study, we will define an accidental ingestion as eating a food that is a known allergy, with or without development of symptoms.

Has your child ever had an accidental exposure to a food they are allergic to since being diagnosed?

- ☐ Yes
☐ No
☐ Unsure

How many accidental exposures can you recall your child has had to their allergic food(s) since being diagnosed?

- ☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10 +

Which of your child's food allergies have they had an accidental exposure to?

	Yes	No	Unsure
Egg	☐	☐	☐
Milk	☐	☐	☐
Wheat	☐	☐	☐
Peanut	☐	☐	☐
Tree nuts	☐	☐	☐
Soy	☐	☐	☐
Sesame	☐	☐	☐
Fish	☐	☐	☐
Shellfish	☐	☐	☐

We will now ask about the most recent and the most severe reaction you can recall. We will start with the most recent accidental exposure.

What food was accidentally ingested with the most recent episode?

- ☐ Egg
- ☐ Milk
- ☐ Wheat
- ☐ Peanut
- ☐ Tree nuts
- ☐ Soy
- ☐ Sesame
- ☐ Fish
- ☐ Shellfish
- ☐ Other
- ☐ Unsure

What food was accidentally ingested with the most recent episode?

Approximately how old in years was your child when this most recent accidental ingestion to [aifoods_1] occurred?

- ☐ < 1
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12
- ☐ 13
- ☐ 14
- ☐ 15
- ☐ 16
- ☐ 17
- ☐ 18

Where did the accidental ingestion to [aifoods_1] occur?

- ☐ Home
- ☐ School/Daycare
- ☐ Work
- ☐ Restaurant
- ☐ A relative's or friend's house
- ☐ Other

Where did the ingestion occur?

How was the food containing the allergen prepared?

- ☐ Prepared or cooked at home (i.e. made by a parent or caretaker)
- ☐ Prepared or cooked outside the home (i.e. at a restaurant, cafeteria or bakery)
- ☐ Prepackaged
- ☐ Don't remember

How did the accidental ingestion to [aifoods_1] occur?

- ☐ Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)
- ☐ Unknowingly or accidentally ingested the food
- ☐ Ate a product that was contaminated with the food (in preparation, i.e. at a restaurant)
- ☐ Don't remember

How did the accidental ingestion to [aifoods_1] occur?

- ☐ Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)
- ☐ Unknowingly or accidentally ingested an item with the allergen listed as an ingredient
- ☐ Ate a food with a label stating it "may contain" trace amounts of the allergens
- ☐ Ate a food with a label with any other form of "may contain" labeling i.e. processed in a facility, etc
- ☐ I don't remember

How much of the food containing the allergen did your child consume?

- ☐ A bite
- ☐ A small amount
- ☐ Most or all of it

Did symptoms occur with the most recent episode?

- ☐ Yes
- ☐ No
- ☐ Don't remember

What symptoms occurred with the most recent episode?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

AIRXNSEVERITY_1

What other symptom(s) occurred?

Did you or another caregiver (i.e. babysitter or grandparent) give any medications/treatments?

- ☐ Yes
☐ No
☐ Don't Remember

Did you give treatment...

- ☐ Before symptoms developed
☐ After symptoms developed
☐ I don't remember

Is this what your child's Food Allergy Action plan recommends?

- ☐ Yes
☐ No
☐ Unsure

What treatment did you or another caregiver provide?

	Yes	No	Don't remember
The child's epinephrine autoinjector	☐	☐	☐
Antihistamines (i.e. diphenhydramine, cetirizine, loratadine)	☐	☐	☐
Asthma Inhalers	☐	☐	☐
Other	☐	☐	☐

What other treatment did you or another caregiver provide?

Did your child receive care by a medical professional?

- ☐ Yes
☐ No
☐ Don't remember

What treatment by a medical professional did your child receive?

	Yes	No	Don't remember
Epinephrine	☐	☐	☐
Antihistamines	☐	☐	☐
Steroids	☐	☐	☐
Nebulizers/inhalers	☐	☐	☐
IV fluids/drip	☐	☐	☐
Other	☐	☐	☐

What other treatments by a medical professional did your child receive?

Was your child's most recent accidental exposure the most severe episode you can remember?

- ☐ Yes
☐ No

What food was accidentally ingested with the most severe episode you can remember?

- ☐ Egg
☐ Milk
☐ Wheat
☐ Peanut
☐ Tree nuts
☐ Soy
☐ Sesame
☐ Fish
☐ Shellfish
☐ Other
☐ Unsure

What food was accidentally ingested with the most severe reaction?

Approximately how old in years was your child when this accidental ingestion to [aifoods_2] occurred?

- ☐ < 1
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10
☐ 11
☐ 12
☐ 13
☐ 14
☐ 15
☐ 16
☐ 17
☐ 18

Where did the accidental ingestion to [aifoods_2] occur?

- ☐ Home
☐ School/Daycare
☐ Work
☐ Restaurant
☐ A relative's or friend's house
☐ Other

Where did the ingestion occur?

How was the food containing the allergen prepared?

- ☐ Prepared or cooked at home (i.e. made by a parent or caretaker)
- ☐ Prepared or cooked outside the home (i.e. at a restaurant, cafeteria or bakery)
- ☐ Prepackaged
- ☐ Don't remember

How did the accidental ingestion to [aifoods_1] occur?

- ☐ Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)
- ☐ Unknowingly or accidentally ingested the food
- ☐ Ate a product that was contaminated with the food (in preparation, i.e. at a restaurant)
- ☐ Don't remember

How did the accidental ingestion to [aifoods_1] occur?

- ☐ Knowingly ate the food or a product containing the food (not in a medically supervised food challenge setting)
- ☐ Unknowingly or accidentally ingested an item with the allergen listed as an ingredient
- ☐ Ate a food with a label stating it "may contain" trace amounts of the allergens
- ☐ Ate a food with a label with any other form of "may contain" labeling i.e. processed in a facility etc
- ☐ I don't remember

How much of the food containing the allergen do your child consume?

- ☐ A bite
- ☐ A small amount
- ☐ Most or all of it

Did symptoms occur with this episode?

- ☐ Yes
- ☐ No
- ☐ Don't Remember

What symptoms occurred with this episode?

	Yes	No	Unsure/Don't remember
Hives	☐	☐	☐
Itching	☐	☐	☐
Swelling (i.e. of lips or eyes)	☐	☐	☐
Abdominal pain	☐	☐	☐
Vomiting	☐	☐	☐
Diarrhea	☐	☐	☐
Runny nose	☐	☐	☐
Trouble breathing	☐	☐	☐
Fainting	☐	☐	☐
Other	☐	☐	☐

AIRXNSEVERITY_2

What other symptom(s) occurred?

Did you or another caregiver (i.e. babysitter or grandparent) give any medications/treatments?

- ☐ Yes
☐ No
☐ Don't Remember

Did you give treatment...

- ☐ Before symptoms developed
☐ After symptoms developed
☐ I don't remember

Is this what your child's Food Allergy Action plan recommends?

- ☐ Yes
☐ No
☐ Unsure

What treatment did you or another caregiver provide?

	Yes	No	Don't remember
The child's epinephrine autoinjector	☐	☐	☐
Antihistamines (i.e. diphenhydramine, cetirizine, loratadine)	☐	☐	☐
Asthma Inhalers	☐	☐	☐
Other	☐	☐	☐

What other treatment did you or another caregiver provide?

Did your child receive care by a medical professional?

- ☐ Yes
☐ No
☐ Don't remember

What treatment by a medical professional did your child receive?

	Yes	No	Don't remember
Epinephrine	☐	☐	☐
Antihistamines	☐	☐	☐
Steroids	☐	☐	☐
Nebulizers/inhalers	☐	☐	☐
IV fluids/drips	☐	☐	☐
Other	☐	☐	☐

What other treatments by a medical professional did your child receive?

Parental Quality of Life

	Not troubled	Hardly troubled at all	Somewhat troubled	Moderately troubled	Quite a bit troubled	Very troubled	Extremely troubled
If you and your family were planning a holiday/vacation, how much would your choice of vacation be limited by your child's food allergy?	☐	☐	☐	☐	☐	☐	☐
If you and your family were planning to go to a restaurant, how much would your choice of a restaurant be limited by your child's food allergy?	☐	☐	☐	☐	☐	☐	☐
If you and your family were planning to participate in social activities with others involving food (e.g. parties, holiday, etc) how limited would your ability to participate in social activities that involve food be because of your child's food allergy?	☐	☐	☐	☐	☐	☐	☐

Consider the following statements in regard to the PAST WEEK.

	Not troubled	Hardly troubled at all	Somewhat troubled	Moderately troubled	Quite a bit troubled	Very troubled	Extremely troubled
In the past week how troubled have you been by your need to spend extra time preparing meals (i.e. label reading, extra time shopping, preparing extra meals, etc.) due to your child's food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been about your need to take special precautions before going out of the home with your child because of their food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been by anxiety relating to your child's food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been that your child may not overcome their food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been by the possibility of, or actually leaving your child in the care of others because of their food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been by frustration over other's lack of appreciation for the seriousness of food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been by sadness regarding the burden your child carries because of their food allergy?	☐	☐	☐	☐	☐	☐	☐
In the past week how troubled have you been about your child's attending school, camp, day care, or other group activity with children because of their food allergy?	☐	☐	☐	☐	☐	☐	☐

In the past week how troubled have you been by your concerns for your child's health because of their food allergy?

☐☐☐☐☐☐☐☐

In the past week how troubled with the worry that you will not be able to help your child if they have an allergic reaction to food?

☐☐☐☐☐☐☐☐

In the past week how troubled have you been with the worry that your child will not have a normal upbringing because of their food allergy?

☐☐☐☐☐☐☐☐

In the past week how troubled have you been about concerns for your child's nutrition because of their food allergy?

☐☐☐☐☐☐☐☐

In the past week how troubled have you been with issues concerning your child being near others while eating because of their food allergy?

☐☐☐☐☐☐☐☐

In the past week how troubled have you been with being frightened by the thought that your child will have a food allergic reaction?

☐☐☐☐☐☐☐☐

Food Allergy Education

Where do you currently find information related to your child's food allergies? (select all that apply)

- ☐ From my child's allergist
- ☐ From my child's primary care provider
- ☐ From another medical provider
- ☐ From a support group
- ☐ From websites
- ☐ From blogs/social media
- ☐ Magazines
- ☐ From family, friends or community members
- ☐ Other

Where else do you currently find information related to your child's food allergies

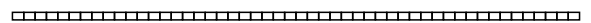
What social media sites do you currently use for food allergy information?

- ☐ Facebook
- ☐ Twitter
- ☐ YouTube
- ☐ Instagram
- ☐ Other

What other social media sites do you use for information regarding food allergies?

How much of your food allergy information do you currently receive from social media?

0% 50% 100%



(Place a mark on the scale above)

Would you like to receive further information regarding your child's food allergies?

- ☐ Yes
- ☐ No

What method of information would work best for you? (select all that apply)

- ☐ Website
- ☐ Emailed newsletter
- ☐ Support groups
- ☐ Social media
- ☐ Classes i.e. cooking classes, label reading
- ☐ Patient and Family-centered Educational Conferences
- ☐ Other

What other methods of information would be best for you?

Do you have any further suggestions on how the food allergy community can help your child and family in regard to living with a food allergy?
