

2013

Peanut Allergen Threshold Study (PATs): validation of eliciting doses using a novel single- dose challenge protocol

Giovanni A. Zurzolo

Murdoch Childrens Research Institute

Katrina J. Allen

Murdoch Childrens Research Institute

Steve Taylor

University of Nebraska-Lincoln

Wayne Shreffler

Massachusetts General Hospital/Harvard Medical School

Joseph Baumert

University of Nebraska-Lincoln

See next page for additional authors

Follow this and additional works at: <http://digitalcommons.unl.edu/foodsciefacpub>

Zurzolo, Giovanni A.; Allen, Katrina J.; Taylor, Steve; Shreffler, Wayne; Baumert, Joseph; Tang, Mimi L K; Gurrin, Lyle C.; Mathai, Michael L.; Nordlee, Julie A.; DunnGalvin, Audrey; and O'B Hourihane, Jonathan, "Peanut Allergen Threshold Study (PATs): validation of eliciting doses using a novel single-dose challenge protocol" (2013). *Faculty Publications in Food Science and Technology*. 125.

<http://digitalcommons.unl.edu/foodsciefacpub/125>

Authors

Giovanni A. Zurzolo, Katrina J. Allen, Steve Taylor, Wayne Shreffler, Joseph Baumert, Mimi L K Tang, Lyle C. Gurrin, Michael L. Mathai, Julie A. Nordlee, Audrey DunnGalvin, and Jonathan O'B Hourihane



RESEARCH

Open Access

Peanut Allergen Threshold Study (PATS): validation of eliciting doses using a novel single-dose challenge protocol

Giovanni A Zurzolo^{1,2}, Katrina J Allen^{1,3,4}, Steve L Taylor⁵, Wayne G Shreffler⁶, Joseph L Baumert⁵, Mimi L K Tang^{1,3,4}, Lyle C Gurrin⁷, Michael L Mathai², Julie A Nordlee⁵, Audrey DunnGalvin⁸ and Jonathan O'B Hourihane^{8*}

Abstract

Background: The eliciting dose (ED) for a peanut allergic reaction in 5% of the peanut allergic population, the ED05, is 1.5 mg of peanut protein. This ED05 was derived from oral food challenges (OFC) that use graded, incremental doses administered at fixed time intervals. Individual patients' threshold doses were used to generate population dose-distribution curves using probability distributions from which the ED05 was then determined. It is important to clinically validate that this dose is predictive of the allergenic response in a further unselected group of peanut-allergic individuals.

Methods/Aims: This is a multi-centre study involving three national level referral and teaching centres. (Cork University Hospital, Ireland, Royal Children's Hospital Melbourne, Australia and Massachusetts General Hospital, Boston, U.S.A.) The study is now in process and will continue to run until all centres have recruited 125 participants in each respective centre.

A total of 375 participants, aged 1–18 years will be recruited during routine Allergy appointments in the centres. The aim is to assess the precision of the predicted ED05 using a single dose (6 mg peanut = 1.5 mg of peanut protein) in the form of a cookie. Validated Food Allergy related Quality of Life Questionnaires (FAQLQ) will be self-administered prior to OFC and 1 month after challenge to assess the impact of a single dose OFC on FAQL. Serological and cell based in vitro studies will be performed.

Conclusion: The validation of the ED05 threshold for allergic reactions in peanut allergic subjects has potential value for public health measures. The single dose OFC, based upon the statistical dose-distribution analysis of past challenge trials, promises an efficient approach to identify the most highly sensitive patients within any given food-allergic population.

Keywords: Eliciting dose (ED), Food Allergy related Quality of Life Questionnaires (FAQLQ), Single dose, Peanut thresholds, Oral Food Challenges (OFC), Voluntary Incidental Trace Allergen Labelling (MITAL), Peanut Allergen Threshold Study (PATS)

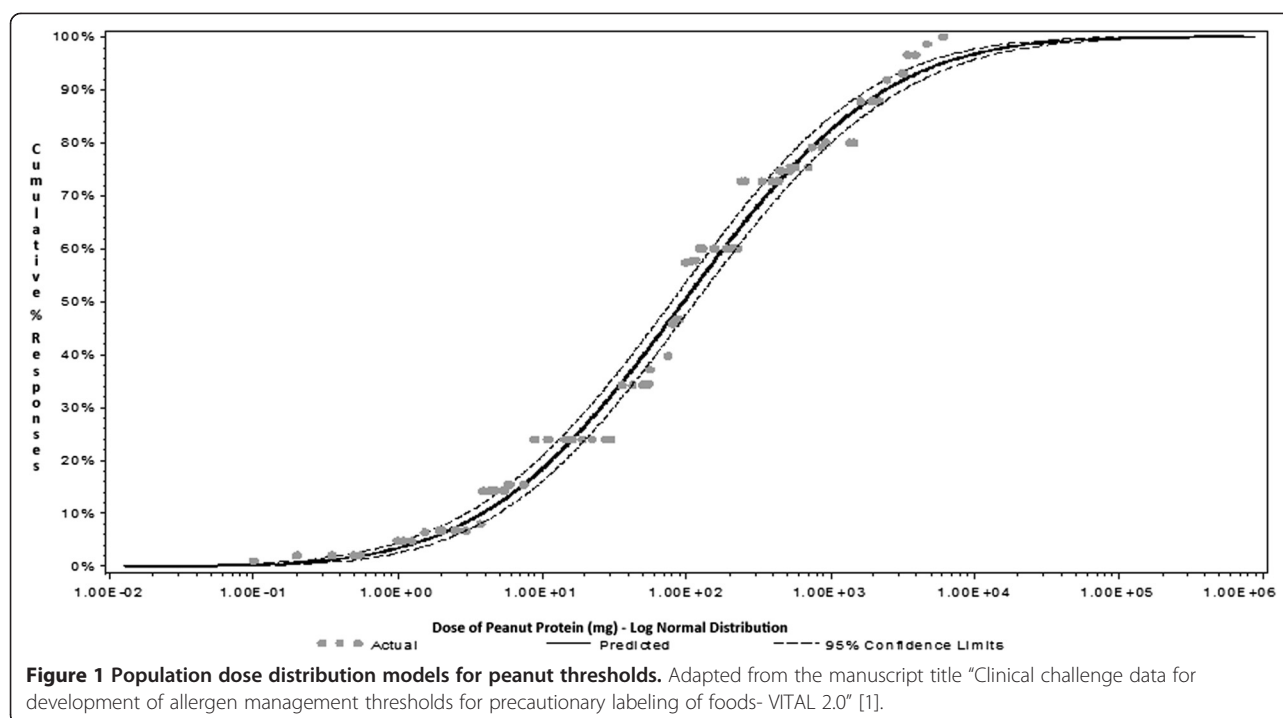
Introduction

The eliciting dose (ED) for a peanut allergic reaction in 5% of the peanut allergic population (ED05) has been estimated at 1.5 mg of peanut protein. This ED05 estimate was derived from the statistical dose-distribution of peanut allergic individuals (children and adults). All

individuals participated in oral food challenge (OFC) protocols that use graded, incremental doses administered at short, fixed time intervals, as shown in Figure 1, with a strong, monotonic relationship between dose and the proportion of study participants reacting at each actual or extrapolated dose [1]. It is not always possible to determine whether a reaction has occurred to a *discrete* threshold dose of allergen or alternatively has been the result of the *cumulative* dose consumed by the allergic

* Correspondence: J.Hourihane@ucc.ie

⁸Paediatrics and Child Health, University College, Cork, Ireland
Full list of author information is available at the end of the article



individual at the time of reaction. Statistical methods can be used to model the dose-distribution of the peanut-allergic population when the precise threshold dose is known to fall within a defined dosing interval but the exact threshold value is unknown [2,3]. Since the ED05 is derived from statistical dose-distribution models of the peanut-allergic population, it is important to clinically validate that this dose is predictive of the allergenic response in a further unselected group of peanut-allergic individuals.

This issue is of importance to all stakeholders in food allergy because over the last 10 years an increasing number of food manufacturers have incorporated voluntary allergen precautionary statements which advise the allergic consumer of the potential presence of allergens using "may contain allergen" statements which are not legislated for and are variable in content around the world [4]. Regulatory thresholds for allergen labelling currently do not exist in most countries, with the exception of Japan and Switzerland. Voluntary industry-led initiatives that use clinical thresholds as the basis for precautionary labelling decisions are based on ED estimates derived from multiple dosing food challenges. Although attempts to improve labelling have been introduced in some countries (e.g. Australia with Voluntary Incidental Trace Allergen Labelling VITAL 2.0), these are still hampered by being voluntary and currently are considered to lack credibility [5].

This study aims to assess the precision of the predicted ED05 using a single dose (6 mg peanut = 1.5 mg of peanut protein, approximately 1/100th of a peanut

kernel) challenge and to validate the modelling that has been used to develop precautionary labelling criteria for VITAL 2.0, as currently VITAL 2.0 uses ED01 (0.2 mg of peanut protein) to estimate its reference doses [6]. In addition this study will examine whether 95% of peanut-allergic consumers are tolerant of an amount that is more than 5 times higher than the VITAL ED01 threshold, thus suggesting if 95% of participants are tolerant to an ED05 then there would be an exceedingly low probability that they would react to an ED01. The ED05 has been chosen pragmatically as it will allow the study to proceed with the recruitment of an achievable number of peanut-allergic individuals to provide sufficient statistical power to validate the accuracy of the population threshold distribution of peanut allergic individuals (discussed in detail below). A validation study of the ED01 would have required a prohibitively large, much more expensive study. In contrast it would be feasible to study further the 5% of subjects who DO react at ED05, with lower doses, including the ED01.

We feel it is important to standardise this approach at an international level since the findings in this study have consequences for the food manufacturing industry at a global level. Our plans to initiate this study have recently been supported in a review by a large multidisciplinary European group [7]. This may contribute to improvement of precautionary labelling thresholds to be set for use by regulators and manufacturers to protect the food allergic consumer.

Methods

Recruitment

This is a multi-centre study involving three teaching centres. A total 375 participants will be recruited (125 in each centre) during their follow-up appointments in the Department of Allergy in each respective centre.

Inclusion criteria

Each patient must meet all of the following criteria to be enrolled in this study.

- Age between 1 to 18 years old and
- Demonstrate evidence of peanut allergy as defined by either
 - (a) History of unequivocal exposure (including accidental) and typical acute allergic reaction within the preceding 2 years and positive peanut SPT/sIgE, or
 - (b) Positive oral food challenge with peanut performed within 2 years - either open oral food challenge or DBPCFC (Double-blind, placebo-controlled food challenges)
 - (c) Peanut never ingested, but sensitisation to peanut above the 95% positive predictive value (PPV) for clinical allergy, i.e. peanut serum IgE \geq to 15 kU/L (by CAP FEIA) and/or peanut SPT wheal size \geq to 8 mm within 2 months of the single dose challenge.

Exclusion criteria

Patients meeting any of the following criteria will be excluded from the study.

- Family or child does not consent to participate
- Medically unfit for challenge according to local unit OFC guidelines/protocol (e.g., high fever, unwell with intercurrent illness,
- Any objective sign of an acute allergic reaction
- Oral corticosteroids within 14 days prior to challenge
- Episode of anaphylaxis of any cause in 4 weeks prior to challenge
- Use of antihistamines within 5 days of oral food challenge
- Asthma that is not well controlled as demonstrated by FEV1 < 85% of predicted best.

Food Allergy related Quality of Life

Questionnaires-(FAQLQ)

Validated FAQL questionnaires will be self-administered prior to OFC and 1 month after challenge to assess whether the impact of this novel single dose OFC protocol is similar to that of "routine" diagnostic OFC, (Figure 2) (Additional files 1, 2 and 3).

Non-Responder Questionnaire (NRQ)

We aim to administer a non-responder questionnaire (NRQ): a set of questions intended to permit comparison of basic demographic and clinical allergy data in those choosing not to participate and in study participants (Additional file 4). The NRQ that we have developed is similar to the NRQ that was used by Osborne et al. (2010) [8].

Single dose Oral Food Challenge (OFC)

A standard OFC administers multiple doses over 45–120 minutes depending on the challenge protocol. We will give a single dose of peanut, taken in isolation, at the level of the predicted ED05 (6 mg whole peanut = 1.5 mg peanut protein) in the form of a cookie consisting of granulated sugar, brown sugar, all-purpose wheat flour, vegetable shortening, salt and baking soda. Peanut flour will be added at a level that represents 6 mg whole peanut equivalent to 1/100th of whole peanut. For subjects allergic to other cookie ingredients e.g. wheat, the peanut dose will be administered in a food known to be tolerated. The challenge materials are shelf-stable and are manufactured at The University of Nebraska and then distributed to participating clinic centres.

Criteria for a positive OFC result

Only objective criteria will be used in the validation of the ED05, since that dose was predicted on the basis of challenge-associated objective responses only. Objective criteria are outlined by Sampson et al. in the PRACTALL criteria [9] and have been validated in the Healthnuts study [10]. These criteria include urticaria, perioral or periorbital angioedema, vomiting, diarrhoea, respiratory or cardiovascular compromise (including anaphylaxis) and rhinoconjunctivitis. All objective signs will be quantitated in number, site and duration of presence. Participants in OFC often expect severe outcomes following ingestion; this may manifest as subjective symptoms. Subjective symptoms will be recorded but not used in the analysis of the reactions to validate the derived ED05 because the ED05 was developed only on the basis of objective reactions. Subjective symptoms to be recorded include: Headache, dizziness, bloating, abdominal pain, cramps, muscle aches, aching joints, anxiety, tension, agitation [11,12].

The prior agreed objective criteria for a positive OFC result are any objective signs occurring within 2 hours of ingestion. All objective signs will be recorded:

- 3 or more concurrent noncontact urticaria persisting for at least 5 minutes;
- perioral or periorbital angioedema;
- rhinoconjunctivitis
- diarrhoea
- vomiting (excluding gag reflex); or

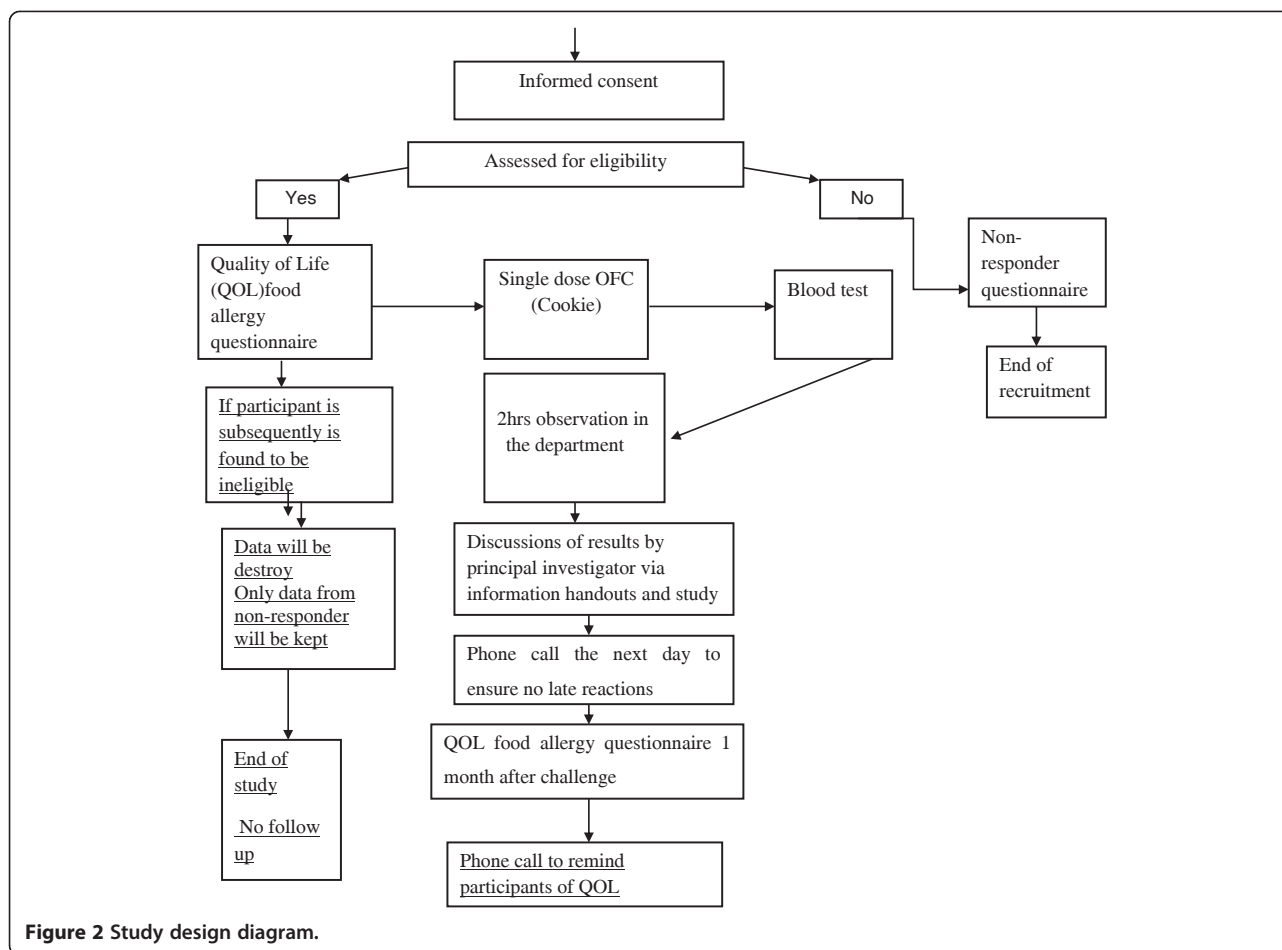


Figure 2 Study design diagram.

- evidence of circulatory or respiratory compromise (anaphylaxis eg, persistent cough, wheeze, change in voice, stridor, difficulty breathing, and collapse) [10].

Blood test

A blood sample (10 ml) will be taken for peanut component analysis and quantitative peanut-specific IgE fluoroenzyme immunoassays 20 minutes after OFC.

Sample size estimation

The population proportion of peanut allergic children who react to the nominal ED05 dose of peanut will be estimated, separately for each of the three participating centres, as the corresponding observed proportion of participants. If, based on these three proportions, there is strong evidence against the null hypothesis that the proportion reacting is the same in all three centres then centre-specific estimates will be reported, otherwise the proportion aggregated over all three centres will serve as a single centre-independent estimate. 95% confidence intervals for these population proportions will be calculated using the properties of the binomial distribution. Example of 95% confidence intervals for sample sizes 70,

100, 150, 200 and 375 if the estimated prevalence is equal to the nominal value of 5%, are displayed in Table 1. A sample size of 150 corresponds to a lower confidence limit of 2.3% and an upper confidence limit of 10%. While this implies that the population proportion may be as little as half or as much as double the observed proportion, this calculation is conservative since it uses the sample size expected in a single centre, not from the three centres

Table 1 Projected 95% confidence intervals for the prevalence of clinical reactivity in peanut allergic children and adults receiving the ED₀₅ dose (6 mg of whole peanut = 1.5 mg of peanut protein) for sample sizes ranging from 70 to 200

Sample size (of peanut allergic individuals)	Value of target prevalence (5% for the ED ₀₅)	Projected 95% confidence interval
70	5%	0.9% - 12%
100	5%	1.6% - 11%
150	5%	2.3% - 10%
200	5%	2.4% - 9%
375	5%	3.1% - 7.8%

combined, so it is sufficiently accurate to rule out gross incompatibility between the nominal and observed proportion of participants reacting.

Summary statistics will be used to compare the features of participants and non-participants, and of ED05-reactors and non-reactors. Variables to be examined will include clinical severity of previous reactions, age, sex, SPT wheal size and peanut component-specific IgE levels. Multivariable logistic regression analyses will be used to identify combinations of these features that identify the low-dose reactors.

Ethics/Patient safety

This Study has been approved by Cork University Hospital Research Ethics Committee (ECM 4 g), Royal Children's Hospital Human Research Ethics Committee (HRECApp 32166A), and Massachusetts General Hospital Research Ethics Committee (2012P002475). Written, informed parental and adolescent consent and assent from younger children will be recorded before participation in the PATS challenge. An External Safety Monitor has been appointed who is an experienced allergist, not otherwise involved in this study or related studies in the study centres.

Discussion

The estimation of the threshold dose for allergic reaction to peanut in peanut allergic subjects has potential value for public health measures. The use of statistical dose-distribution modelling based upon the results of low-dose clinical challenges of peanut-allergic individuals has been viewed as a strong approach to estimation of the population threshold for peanut [13,14].

However, the clinical determination of individual thresholds is based upon graded incrementally increasing challenge doses administered at convenient time intervals, sometimes as short as 15–20 minutes between doses. The individual threshold doses are frequently reported as cumulative doses because it is impossible to claim that each dose is fully assimilated before administration of the next dose [15].

Allen et al. (2013) used this approach to estimate a population threshold for the peanut-allergic population based upon challenges of 750 individuals. The ED05 from the log normal dose-distribution was 6 mg of whole peanut or 1.5 mg of peanut protein. Since cumulative doses were used in the evaluation of individual challenges and subsequent statistical dose-distribution modelling, it is important to validate the peanut ED05 using a single-dose approach. Peanut is the best-studied food allergen in terms of low dose OFC to date. This novel PATS approach could be adapted for other major food allergens, if this proposed clinical study supports the statistically determined ED05 based upon population dose-distribution modelling [1].

The plan to approach all peanut allergic subjects in 3 distinct geographical regions the varied or permissive entry criteria and the analysis of the non-participants will address the most common criticism of OFC studies: how representative of the general peanut allergic population are the subjects who volunteered? Peanut allergic subjects who have food challenges are highly selected and they may not represent the whole spectrum of reactivity to peanut in peanut allergic subjects [16].

The strict requirement for only objective signs being used to determine a case is important, because subjective reactions are known to resolve during a routine OFC that is continued until objective signs are recorded [10,17].

Peanut allergic patients are usually advised to avoid foods that are labelled as “may contain” peanut. A recent study by Madsen et al. (2012) has showed that it is understood and accepted by clinicians, patients and food producers that zero risk is not a realistic or attainable option [18]. However clinical risk communications that are not specific may increase anxiety and risk taking behaviours without increasing awareness, confidence or safety [7].

Currently there is no standard approach being used by all manufacturers in relation to precautionary labelling. This may be due, in part, to the lack of agreement among the scientific community regarding clinically safe threshold levels. If this current study validates the ED05 this will aid the scientific and medical communities and also the manufacturing industry in the use of quantitative precautionary labelling, backed with sound scientific evidence for the establishment of safe threshold levels for 95% of the peanut allergic community.

The PATS study offers a new clinical paradigm and methodology with regards to assessing clinical risk; this current study may potentially define the 5% of patients who are most highly sensitive. Validated questionnaires assessing FAQL have shown patients gain nearly as much from a “failed” OFC as they do from a “passed” OFC, probably due to decreased uncertainty about the next and future reactions [19] and we hypothesise that individual families may also show such an improvement after a PATS single dose challenge. This tangible impact could promote adoption of PATS single dose peanut challenges in units not currently performing diagnostic OFC. If this proposed clinical study supports the statistically determined ED05 based upon population dose-distribution modelling of peanut, it may show promise for clinical validation of other allergenic food sources where sufficient threshold data is available to model the population dose-distribution. Eventually a single-dose diagnostic OFC using other food allergens may be adopted as well.

Clinicians may be able to use PATS single dose OFCs as they are easier to perform than routine diagnostic OFC or DBPCFC and they could contribute to the complex analysis of risk that clinicians currently make in a

heuristic fashion that varies between practitioners. Currently clinicians make value judgements about whether they believe a child to be exquisitely sensitive to a food or not and therefore what to advise with regards to avoiding trace amounts of allergen in food (i.e. foods with precautionary labelling).

The single dose protocol does not replace current clinical food challenges which are for the diagnosis of food allergy but would provide extra clinical information of patients' level of risk and could help inform consumer choices and physician advice to patients regarding precautionary labelling [20,21]. This project may offer a practical way to discern whether allergic patients can safely ingest foods with labels such as "may contain traces", although this outcome would require collaboration with the food industry and more uniform adoption of criteria for use of precautionary labels as proposed in the Australian VITAL strategy.

Conclusion

The PATS single dose OFC, based upon the statistical dose-distribution analysis of past challenge trials, promises an efficient approach to identify the most highly sensitive patients within any given food-allergic population. The peanut protocol described herein will evaluate the practicality of this approach and allow assessment of its safety. The validation of the ED05 originally statistically determined from the dose-distribution analysis would be a major benefit of the study as it would serve to inform governments in the application of a more transparent and sensible approach in the use of precautionary labelling. It will also aid public health agencies in the establishment of approaches to allergen management that will protect the vast majority of food-allergic consumers/patients.

Additional files

Additional file 1: Food Allergy Quality of Life Questionnaire –Parent Form (0–12 years).

Additional file 2: Food Allergy Quality of Life Questionnaire–Child Form (8–12 years).

Additional file 3: Food Allergy Quality of Life Questionnaire–Teenager Form (13–18 years).

Additional file 4: Peanut single dose study, non-participant questionnaire.

Competing interests

GZ declares that he has no competing interests. JH has received speaker honoraria and travel support from Stallergenes, Nutricia, Mead Johnson, Pfizer, Astra Zeneca, and MSD. He has received research funding from Danone and Stallergenes. KA has received speaker's honorarium from Pfizer, Abbott and Danone. ST declares that he has no competing interests. WS, JB, LG, MM, MT, JN, ADG declares that he has no competing interests.

Authors' contributions

GZ made substantial contribution to the conception, design and revising the manuscript. KA is local clinical PI on the study and made substantial

contributions to the development of the study design and protocol made substantial contribution to the conception and design of the manuscript. ST devised the original research concept with JH, JB and others and has revised the manuscript critically for important intellectual content. WS has revised the manuscript critically for important intellectual content. JB devised the original research concept with JH, ST and others and has revised the manuscript critically for important intellectual content. MT has contributed to refinement of the study protocol and review of manuscript LG reviewed the epidemiological study design, proposed the statistical analysis plan and contributed to the writing and revision of the paper. MM has contributed to the revision of the paper. JN has contributed to the drafting of the manuscript. ADG contributed to study design and has contributed in drafting and revising the manuscript. JH is lead clinical PI on the study and developed the original research concept with ST. He made substantial intellectual contribution to the manuscript, has been involved in drafting and giving final approval of the version to be published. All authors read and approved the final manuscript.

Authors' information

Giovanni Zurzolo is a PhD scholar and is funded by the Victoria University. Professor Katrina J. Allen, paediatric gastroenterologist and is funded by the Viertel Senior Medical Research Fellowship. Steve Taylor is a Professor at the University of Nebraska-Lincoln and co-Director of Food Allergy Research & Resource Program (FARRP), a food industry-funded consortium with 70 supporting food companies. Wayne Shreffler is the Chief of Pediatric Allergy and Immunology at MGH and Associate Professor of Pediatrics at Harvard Medical School. Joseph Baumert is an Assistant Professor at the University of Nebraska-Lincoln and co-Director of Food Allergy Research & Resource Program (FARRP). A/Prof Mimi Tang is the Director of the Department of Allergy and Immunology, Royal Children's Hospital, Melbourne. A/Prof Lyle Gurrin is a Senior Lecturer in Biostatistics at The Centre for Molecular, Environmental, Genetic and Analytic (MEGA) Epidemiology. A/Prof Michael Mathai is a Senior Lecturer at The College of Health and Biomedicine at Victoria University. Julie Nordlee work's at FARRP at the University of Nebraska-Lincoln. Audrey DunnGalvin is a Lecturer in Clinical Psychology in UCC, Cork. Jonathan Hourihane is a Professor of Paediatrics and Child Health in UCC, Cork.

Acknowledgement

This project is funded by Food Allergy Research & Resource Program (FARRP). Dr Dean Tey who is a consultant Paediatrician at the Department of Allergy at the Royal Children's Hospital Melbourne for his contribution to the manuscript. The Murdoch Childrens Research Institute is supported by funding from the Victorian Government's Operational Infrastructure Support Program. Also to Victoria University for providing funding for the publishing of this manuscript.

Author details

¹Murdoch Childrens Research Institute, Melbourne, Australia. ²Biomedical and Lifestyle Diseases Unit, School of Biomedical and Health Sciences, Victoria University, Melbourne, Australia. ³Department of Allergy and Immunology, Royal Children's Hospital, Melbourne, Australia. ⁴University of Melbourne Department of Paediatrics, Melbourne, Australia. ⁵Food Allergy Research and Resource Program, University of Nebraska, Lincoln, Nebraska. ⁶Food Allergy Centre and the Centre for Immunology and Inflammatory Disease, Massachusetts General Hospital/Harvard Medical School, Boston, USA. ⁷Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Australia. ⁸Paediatrics and Child Health, University College, Cork, Ireland.

Received: 6 June 2013 Accepted: 14 August 2013

Published: 12 September 2013

References

1. Allen KJ, Remington BC, Baumert JL, Crevel R, Houben GF, Brooks-Taylor S, et al: **Clinical challenge data for development of allergen management thresholds for precautionary labeling of foods- VITAL 2.0.** *J Allergy Clin Immunol* 2013: In press.
2. Taylor SL, Crevel RWR, Sheffield D, Kabourek J, Baumert J: **Threshold dose for peanut: risk characterization based upon published results from challenges of peanut-allergic individuals.** *Food Chem Toxicol* 2009, **47**(6):1198–1204.
3. Taylor SL, Moneret-Vautrin DA, Crevel RWR, Sheffield D, Morisset M, Dumont P, et al: **Threshold dose for peanut: risk characterization based upon**

- diagnostic oral challenge of a series of 286 peanut-allergic individuals. *Food Chem Toxicol* 2010, **48**(3):814–819.
4. Zurzolo GA, Mathai ML, Koplin JJ, Allen KJ: **Precautionary allergen labelling following new labelling practice in Australia.** *J Paediatr Child Health* 2013, **49**(4):E306. E10.
 5. Zurzolo G, Koplin J, Mathai M, Mimi T, Allen K: **Perceptions of precautionary labelling among parents of children with food allergy and anaphylaxis.** *Med J Aust* 2013, **198**(11):621–623. Epub 2013/08/08.
 6. Allergen, Bureau: *Summary of the VITAL scientific expert panel recommendations*; 2011. Available from: <http://www.allergenbureau.net/downloads/vital/VSEP-Summary-Report-Oct-2011.pdf>.
 7. Madsen CB, Hattersley S, Allen KJ, Beyer K, Chan CH, Godefroy SB, et al: **Can we define a tolerable level of risk in food allergy? Report from a EuroPrevall/UK Food Standards Agency workshop.** *Clinical & Experimental Allergy* 2012, **42**(1):30–37. n/a-n/a.
 8. Osborne NJ, Koplin JJ, Martin PE, Gurrin LC, Thiele L, Tang ML, et al: **The HealthNuts population-based study of paediatric food allergy: validity, safety and acceptability.** *Clinical & Experimental Allergy* 2010, **40**(10):1516–1522.
 9. Sampson HA, Gerth van Wijk R, Bindslev-Jensen C, Sicherer S, Teuber SS, Burks AW, et al: **Standardizing double-blind, placebo-controlled oral food challenges: American academy of allergy, asthma and immunology–European academy of allergy and clinical immunology PRACTALL consensus report.** *J Allergy Clin Immunol* 2012, **130**(6):1260–1274.
 10. Koplin JJ, Tang MLK, Martin PE, Osborne NJ, Lowe AJ, Ponsonby A-L, et al: **Predetermined challenge eligibility and cessation criteria for oral food challenges in the HealthNuts population-based study of infants.** *J Allergy Clin Immunol* 2012, **129**(4):1145–1147.
 11. DunnGalvin A, Hourihane JB: **Developmental Aspects of Health Related Quality of Life (HRQL) in Food Related Chronic Disease: the example of food allergy.** In *Handbook of Behavior, Food and Nutrition*. Edited by Preedy VR, Watson RR, Martin CR. New York: Springer; 2011:3077–3098.
 12. DunnGalvin A, Hourihane JOB: **Chapter 3 developmental trajectories in food allergy: a review.** In *Advances in food and nutrition research*. Edited by Steve LT. Waltham, Massachusetts, USA: Academic Press; 2009:65–100.
 13. Kruizinga AG, Briggs D, Crevel RWR, Knulst AC, Bosch LMC, Houben GF: **Probabilistic risk assessment model for allergens in food: sensitivity analysis of the minimum eliciting dose and food consumption.** *Food Chem Toxicol* 2008, **46**(5):1437–1443.
 14. Madsen CB, Hattersley S, Buck J, Gendel SM, Houben GF, Hourihane JOB, et al: **Approaches to risk assessment in food allergy: report from a workshop “developing a framework for assessing the risk from allergenic foods”.** *Food Chem Toxicol* 2009, **47**(2):480–489.
 15. Mills ENC, Valovirta E, Madsen C, Taylor SL, Vieths S, Anklam E, et al: **Information provision for allergic consumers – where are we going with food allergen labelling?** *Allergy* 2004, **59**(12):1262–1268.
 16. Marklund B, Wilde-Larsson B, Ahlstedt S, Nordstrom G: **Adolescents’ experiences of being food-hypersensitive: a qualitative study.** *BMC Nurs* 2007, **6**:8. Epub 2007/10/10.
 17. Hourihane JOB, Bedwani SJ, Dean TP, Warner JO: **Randomised, double blind, crossover challenge study of allergenicity of peanut oils in subjects allergic to peanuts.** *BMJ* 1997, **314**(7087):1084.
 18. Madsen CB, Crevel R, Chan C-H, Dubois AEJ, DunnGalvin A, Flokstra-de Blok BMJ, et al: **Food allergy: stakeholder perspectives on acceptable risk.** *Regul Toxicol Pharmacol* 2012, **57**(2–3):256–265.
 19. DunnGalvin A, Cullinane C, Daly DA, Flokstra-de Blok BMJ, Dubois AEJ, Hourihane JOB: **Longitudinal validity and responsiveness of the Food Allergy Quality of Life Questionnaire – Parent Form in children 0–12 years following positive and negative food challenges.** *Clinical & Experimental Allergy* 2010, **40**(3):476–485.
 20. DunnGalvin A, Gaffney A, Hourihane JOB: **Developmental pathways in food allergy: a new theoretical framework.** *Allergy* 2009, **64**(4):560–568.
 21. DunnGalvin A, Hourihane JOB: **Self-assessment of reaction thresholds in food allergy: a new theory of risk taking which changes over time.** *J Allergy Clin Immunol* 2009, **123**(2):S142.

doi:10.1186/1710-1492-9-35

Cite this article as: Zurzolo et al.: Peanut Allergen Threshold Study (PATS): validation of eliciting doses using a novel single-dose challenge protocol. *Allergy, Asthma & Clinical Immunology* 2013 **9**:35.

Submit your next manuscript to BioMed Central and take full advantage of:

- **Convenient online submission**
- **Thorough peer review**
- **No space constraints or color figure charges**
- **Immediate publication on acceptance**
- **Inclusion in PubMed, CAS, Scopus and Google Scholar**
- **Research which is freely available for redistribution**

Submit your manuscript at
www.biomedcentral.com/submit



The Royal Children's Hospital Melbourne
50 Flemington Road
Parkville Victoria 3052 Australia
TELEPHONE +61 3 9345 5522
www.rch.org.au



FAQLQ-PF

Food Allergy Quality of Life Questionnaire – Parent Form (0-12 years)

Food Allergy Quality of Life Questionnaire-Parent Form (FAQLQ-PF) Children aged 0-12 years

Instructions to Parents

- The following are scenarios that parents have told us affect children's quality of life because of food allergy.
- Please indicate how much of an impact each scenario has on **your child's quality of life** by placing a tick or an x in one of the boxes numbered 0-6.

Response Options

0 = not at all
1 = a little bit
2 = slightly
3 = moderately
4 = quite a bit
5 = very much
6 = extremely

All information given is completely confidential.

This questionnaire will only be identified by a code number.

There are 4 sections to this questionnaire : A, B, C, and D.

- If your child is aged 0 to 3 years, please answer Section A
- If your child is aged 4 to 6 years, please answer Section A and Section B
- If your child is aged 7 years and over, please answer Section A, Section B, and Section C.

Section D : For all age groups.

SECTION A : For all age groups

Not at all Extremely
—————→

Because of food allergy, my child feels.....

	0	1	2	3	4	5	6
1 Worried about food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Different from other children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Frustrated by dietary restrictions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Afraid to try unfamiliar foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Concerned that I am worried that he/she will have a reaction to food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Not at all Extremely
—————→

Because of food allergy, my child.....

	0	1	2	3	4	5	6
6 Experiences physical distress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Experiences emotional distress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Has a lack of variety in his her diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Not at all Extremely
—————→

Because of food allergy, my child has been negatively affected by.....

	0	1	2	3	4	5	6
9 Receiving more attention more attention than other children of his/her age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Having to grow up more quickly than other children of his/her age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 His/her environment being more restricted than other children of his/her age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Not at all Extremely
—————→

Because of food allergy, my child's social environment is restricted because of limitations on.....

	0	1	2	3	4	5	6
12 Restaurants we can safely go to as a family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13 Holiday destinations we can safely go to as a family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Not at all Extremely
—————→

Because of food allergy, my child's ability to take part has been limited.....

	0	1	2	3	4	5	6
14 In social activities in other people's houses (<i>sleepovers, parties, playtime</i>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION B : For children aged 4 to 12 years.

Not at all Extremely
—————→

Because of food allergy, my child’s ability to take part has been limited.....

	0	1	2	3	4	5	6
--	----------	----------	----------	----------	----------	----------	----------

15 In preschool/school events involving food (<i>class parties/treats/lunchtime</i>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Not at all Extremely
—————→

Because of food allergy, my child feels.....

	0	1	2	3	4	5	6
--	----------	----------	----------	----------	----------	----------	----------

16 Worried when going to unfamiliar places	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 Concerned that he/she must always be cautious about food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 ‘Left out’ in activities involving food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19 Upset that family social outings have been restricted by the need to plan ahead.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 Concerned about accidentally eating an ingredient to which he/she is allergic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 Worried when eating with unfamiliar adults/children	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22 Frustrated by social restrictions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Not at all Extremely
—————→

Because of food allergy, my child.....

	0	1	2	3	4	5	6
--	----------	----------	----------	----------	----------	----------	----------

23 Is more worried in general than other children of his/her age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24 Is more cautious in general than other children of his/her age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25 Is not as confident as other children of his/her age in social situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26 Wishes his/her food allergy would go away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION C : For children aged 7 to 12 years

Not at all Extremely
—————→

Because of food allergy, my child feels.....

	0	1	2	3	4	5	6
--	----------	----------	----------	----------	----------	----------	----------

27 Worried about his/her future(opportunities, relationships)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28 Many people do not understand the serious nature of food allergy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29 Concerned by poor labelling on food products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30 Food allergy limits his/her life in general	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Thank you for completing the questionnaire. I would be grateful if you would now answer some questions on your child's food allergy.

SECTION D: For all age groups

Part 1 : My child's food allergy.

Q1. What sex are you ? Male Female

Q2. What sex is your child? Male Female

Q3. What age is the child with food allergy? Years _____ Months _____

Q4. What type of food(s) is your child allergic to? Tick where applicable.

Peanut Nut Milk Egg

Wheat Soya Sesame Fish

Shellfish Fruits Vegetables Other

Please specify 'Other'

Q5. After ingesting which food, did your child have his/her most severe reaction?

Q6. Has your child had an anaphylactic reaction? Yes No

Q7. If 'Yes', how recent was the reaction? Tick where applicable.

Very recently

6 to 12 months ago

Approximately 1 yr ago

Approximately 2yrs ago

More than 2 years ago

Q8(a). Has your child been issued with an anapen/epipen? Yes No

Q8(b). Does the provision of an anapen/epipen cause?

(1) Reassurance ...

For you

For your child

(2) Anxiety ...

For you

For your child

Q9. Who diagnosed your child with food allergy? Tick where applicable

G.P.

Consultant Allergist

Consultant Paediatrician

Dermatologist

Dietician

Alternative Practitioner

Q10. What Symptoms does your child have? Tick where applicable.

Itching in the mouth	<input type="checkbox"/>	Throat tightening	<input type="checkbox"/>	Urticaria/Hives	<input type="checkbox"/>
Itching in the throat	<input type="checkbox"/>	Difficulty swallowing	<input type="checkbox"/>	Skin swelling	<input type="checkbox"/>
Itching in the ears	<input type="checkbox"/>	Hoarseness	<input type="checkbox"/>	Nausea	<input type="checkbox"/>
Itching of the lips	<input type="checkbox"/>	Difficulty breathing	<input type="checkbox"/>	Abdominal cramps	<input type="checkbox"/>
Runny nose	<input type="checkbox"/>	Shortness of breath	<input type="checkbox"/>	Vomiting	<input type="checkbox"/>
Stuffy nose	<input type="checkbox"/>	Wheeze	<input type="checkbox"/>	Diarrhoea	<input type="checkbox"/>
Sneeze	<input type="checkbox"/>	Cough	<input type="checkbox"/>	Light-headedness	<input type="checkbox"/>
Itchy eyes	<input type="checkbox"/>	Itching of the skin	<input type="checkbox"/>	Palpitations	<input type="checkbox"/>
Tears	<input type="checkbox"/>	Redness of the skin	<input type="checkbox"/>	Inability to stand	<input type="checkbox"/>
Red eyes	<input type="checkbox"/>	Increase eczema	<input type="checkbox"/>	Loss of consciousness	<input type="checkbox"/>

Q11. How often does your child meet another child with food allergy?

Never

Rarely

Sometimes

Often

SECTION E: For all age groups

Part 2 : You and your child's worries about food safety

Please answer the following questions with reference to the 6-point scale on the right

- 0 = extremely unlikely**
- 1 = very unlikely**
- 2 = somewhat unlikely**
- 3 = likely**
- 4 = quite likely**
- 5 = very likely**
- 6 = extremely likely**

Q1. What chance do you think your child has of?

	Question	6-point Scale						
		0	1	2	3	4	5	6
1accidentally ingesting the food to which they are allergic ?							
2having a severe reaction if food is accidentally ingested ?							
3dying from his/her food allergy following ingestion in the future ?							
4effectively treating him/herself, or receiving effective treatment from others (including Epipen administration), if he/she accidentally ingests a food to which he/she is allergic ?							

Q2. What chance does your child think he/she has of?

	Question	6-point Scale						
		0	1	2	3	4	5	6
1accidentally ingesting the food to which they are allergic ?							
2having a severe reaction if food is accidentally ingested ?							
3dying from his/her food allergy following ingestion in the future ?							
4effectively treating him/herself, or receiving effective treatment from others (including Epipen administration), if he/she accidentally ingests a food to which he/she is allergic ?							

Q3. How many foods does your child have to avoid ?

0-2	
3-6	
7-10	
10+	

SECTION F: For all age groups

Part 3: Your concerns as a parent

Q1. How would you describe ...

(A) Your general health?

Excellent
Very Good
Good
Fairly Good
Not So Good
Poor
Very Poor

(B) Your child's general health?

Excellent
Very Good
Good
Fairly Good
Not So Good
Poor
Very Poor

Q2. Because of food allergy, how much worry/concern does each of the following cause you?

(A) your child's physical health

None at all
A little bit
Some
Quite a bit
A lot

(B) your child's emotional well-being

None at all
A little bit
Some
Quite a bit
A lot

Q3. What level of stress does your child's food allergy cause ...

(A) You?

None at all
A little bit
Some
Quite a bit
A lot

(B) Your Partner?

None at all
A little bit
Some
Quite a bit
A lot

(C) Your Family?

None at all
A little bit
Some
Quite a bit
A lot

Q4. How much has food allergy limited the type of activities.....

(A) you can do as a family ?

None at all
A little bit
Some
Quite a bit
A lot

(B) your child can take part in ?

None at all
A little bit
Some
Quite a bit
A lot

Thank you for taking the time to complete this questionnaire. Your participation is most appreciated.

The Royal Children's Hospital Melbourne
50 Flemington Road
Parkville Victoria 3052 Australia
TELEPHONE +61 3 9345 5522
www.rch.org.au



FAQLQ-CF

Food Allergy Quality of Life Questionnaire – Child Form (8-12 years)

The questions are about the influence of your food allergy on your quality of life. It is important that you fill in the answers yourself. You may ask your parents for help, but they are not allowed to tell you which answer to give. Answer every question by putting an 'x' in the proper box. You may choose from the following answers.



How ***troublesome*** do you find it, because of your food allergy, that you ...



1	must always watch what you eat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	can eat fewer things?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	are limited in buying things you like?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	have to read labels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	have to refuse food when you do things with others?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	can less easily stay for a meal with someone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	can taste or try fewer things when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	have to tell beforehand about what you are not allowed to eat when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	have to check yourself whether you can eat something when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	hesitate eating certain foods when you don't know if it is safe?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	must watch out when touching certain foods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	don't get anything when someone is giving treats at school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

 not
  barely
  a little bit
  fairly
  quite
  very
  extremely

How troublesome is it, because of your food allergy, ...









- | | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 13 that the ingredients of a food change? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14 that the label states: "May contain (traces of)...."? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15 that you have to explain to people around you that you have a food allergy? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16 that people around you forget that you have a food allergy? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17 that others can eat the food you are allergic to when you do things with other people? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18 that you don't know how things taste which you can't eat? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

How frightened are you because of your food allergy ...









- | | | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 19 of an allergic reaction? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20 of eating the wrong food by accident? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21 to eat something you have never eaten before? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Answer the following questions:









- | | | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 22 How <u>concerned</u> are you that you will never get rid of your food allergy? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23 How <u>disappointed</u> are you when people don't take your food allergy into account? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24 How <u>disappointed</u> do you feel because you have a food allergy? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

The following four questions are about the chance that you think you have of something happening to you because of your food allergy. Choose one of the answers. This is followed by two more questions about your food allergy. Answer every question by putting an 'x' in the box next to the proper answer.

0	1	2	3	4	5	6
never	very small	small	fair	big	very big	always
(0% chance)	chance	chance	chance	chance	chance	(100% chance)

How big do you think the chance is that you ...	0	1	2	3	4	5	6
1 will accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 will have a severe reaction if you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 will die if you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 can not do the right things for your allergic reaction should you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. How many foods are you unable to eat because of your food allergy?

- almost none
- very few
- a few
- some
- many
- very many
- almost all

6. Everyone does things with other people, such as;

- playing with friends,
- going to a birthday party,
- visiting,
- staying over with someone for a meal or eating out.

How much does your food allergy affect things you do with others?

- so little I don't actually notice it
- very little
- little
- moderately
- a good deal
- a great deal
- a very great deal

The Royal Children's Hospital Melbourne
50 Flemington Road
Parkville Victoria 3052 Australia
TELEPHONE +61 3 9345 5522
www.rch.org.au



FAQLQ-TF

Food Allergy Quality of Life Questionnaire – Teenager Form (13-18 years)

The following questions concern the influence your food allergy has on your quality of life. Answer every question by marking the appropriate box with an 'x'. You may choose from one of the following answers.

0	1	2	3	4	5	6
not	barely	slightly	moderately	quite	very	extremely

How <u>troublesome</u> do you find it, because of your food allergy, that you ...	0	1	2	3	4	5	6
1 must always be alert as to what you are eating?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 are able to eat fewer products?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 are limited as to the products you can buy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 must read labels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 have the feeling that you have less control of what you eat when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 are less able to spontaneously accept an invitation to stay for a meal?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 are less able to taste or try various products when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 must check yourself whether you can eat something when eating out?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9 hesitate eating a product when you have doubts about it?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 must refuse treats at school or work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11 must be careful about touching certain foods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12 must carry an epinephrine auto injector (e.g. EpiPen, Twinject, Anapen)? (If you don't have an epinephrine auto injector mark an 'x' here <input type="checkbox"/>)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

0 **1** **2** **3** **4** **5** **6**
 not barely slightly moderately quite very extremely

How <u>troublesome</u> is it, because of your food allergy, ...	0	1	2	3	4	5	6
13 that the ingredients of a food change?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14 that the label states: "May contain (traces of)...."?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15 that the labeling of the bulk packaging (for example box or bag) is different than the individual packages?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16 that you have to explain to people around you that you have a food allergy?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17 that during social activities others can eat the food to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18 that during social activities your food allergy is not taken into account enough?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How <u>frightened</u> are you because of your food allergy ...	0	1	2	3	4	5	6
19 of an allergic reaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20 of accidentally eating the wrong food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21 to eat something you have never eaten before?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Answer the following questions:	0	1	2	3	4	5	6
22 How <u>discouraged</u> do you feel during an allergic reaction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23 How <u>disappointed</u> are you when people don't take your food allergy into account?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The following four questions are about the chance that you think you have of something happening to you because of your food allergy. Choose one of the answers. This is followed by two more questions about your food allergy. Answer every question by putting an 'x' in the box next to the proper answer.

0	1	2	3	4	5	6
never (0% chance)	very small chance	small chance	fair chance	great chance	very great chance	always (100% chance)

How great do you think the chance is that you ...	0	1	2	3	4	5	6
1 will accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 will have a severe reaction if you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 will die if you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 can not effectively deal with an allergic reaction should you accidentally eat something to which you are allergic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5. How many products must you avoid because of your food allergy?

- almost none
- very few
- a few
- some
- many
- very many
- almost all

6. How great is the impact of your food allergy on your social life?

- negligibly small
- very small
- small
- moderate
- great
- very great
- extremely great

Additional file 1 Peanut single dose study, non-participant questionnaire

Dear Parent/Guardian,

This questionnaire is voluntary and the information that you provide will be used to help us determine if those that choose to participate are different to those that choose not to.

Name of Child

- 1) How was your child diagnosed with peanut allergy?
Positive SPT but never ingested
Positive SPT and history of reaction
- 2) If your child has a history of reaction what is the most severe reaction to peanut ingestion your child has had:
- (a) 1 or more of the following: hives, face swelling, vomiting, diarrhoea, eczema flare
- (b) Any of the above plus any of one of the following: coughing, wheezing, difficulty breathing, throat or tongue swelling, change in voice, collapse
- 3) When was your child's last ingestion reaction?
- Within the last 1 year
Within the last 5 years
Never
- 4) How many reactions to peanut has your child had?
- 5) Are you currently ignoring precautionary labelling when feeding your child?
- Yes No
- 6) Why have you decided not to participate (tick as many as apply)
- Wish to continue to avoid precautionary labelling
Frightened of a serious reaction to the single-dose challenge
Have had anaphylaxis in the past
Don't have time
Other - please specify

I hereby give permission for the Peanut Allergy Threshold Study staff to examine my child's clinical notes and to use peanut allergy-related information from these notes in the study. These details will be anonymised and can only be used in such a way as to not be traceable specifically back to my child.

Signed _____

Relation to Child Mother /father/ legal guardian

Witnessed by _____ (Research staff)