

# Fighting Food Allergy With Food: Eleven-Year Experience With Oral Immunotherapy For Food Allergy (OIT)

D.M. Pence<sup>1</sup>, R.L. Wasserman<sup>1,2</sup>, R.W. Sugerma<sup>1,2</sup>, Q. Kamili<sup>1,2</sup>, J.G. Rolen<sup>1</sup>, D.T. Lie<sup>1</sup>, M. Herbert<sup>3</sup>

<sup>1</sup>Allergy Partners of North Texas, <sup>2</sup>Medical City Children’s Hospital, <sup>3</sup>Medical City Dallas Hospital, Dallas, TX.

## ABSTRACT

**Rationale:** The components of agricultural products vary due to variations in growing conditions and harvest time. Protein concentration standardization of OIT foods appears to be a rational scientific approach to food allergy treatment. There is, however, no study demonstrating that variations in the concentrations of allergenic proteins during OIT are a cause of treatment associated adverse events (AEs).

**Methods:** Retrospective record review of patients receiving POIT approved by the North Texas IRB. OIT was administered according to modifications of previously reported protocols.

**Results:** 862 food allergic patients have been treated with eighteen different commercially available foods. For two foods, a single product was used for desensitization. Eight foods routinely used two different products, five foods used three products and three foods used more than three products. With the notable exception of wheat, OIT AEs were not associated with changes in food product.

**Conclusions:** The only common factor among the different products is an equivalent total protein content based on the [USDA Nutrient Database](#). If product variations don’t cause AEs, then the clinical impact of variations between different samples of the same product are trivial and don’t make a difference. OIT product standardization solves a theoretical problem that doesn’t exist in the real world. Requiring OIT product standardization will increase costs and postpone the availability of treatment. It is theoretically possible that variety in the foods used for OIT may provide a more appropriate desensitization reflective of the foods that may be encountered by desensitized patients.

## INTRODUCTION

- Desensitization by oral immunotherapy is effective for most patients.
- Allergy to many different foods has been successfully treated with OIT.
- Concerns have been expressed that because foods are biologic products, they are subject to natural variations in protein content due to growing conditions and processing methods. Therefore, foods used for OIT should be “standardized.”
- The only currently available “standardized” food was developed over more than ten years at a cost of hundreds of millions of dollars.
- Clinical experience demonstrates that standard, off-the-shelf food is satisfactory for OIT treatment.

## SUBJECTS

- We report data drawn from a retrospective chart review of 862 OIT-treated patients treated between 07/2008 and 07/2019.
- Patients with a proximate history of IgE mediated reaction to the OIT food were offered the opportunity to be treated with oral immunotherapy.
- No patient was excluded because of the severity of their previous reaction or the degree of positivity of the food specific IgE or skin prick test.
- In some circumstances, parents declined confirmatory challenges and patients were treated based on high food specific IgE alone.

## METHODS

- Retrospective record review of patients receiving food oral immunotherapy at the Dallas Food Allergy Center (Allergy Partners of North Texas).
- The record review was approved by the North Texas IRB.
- Food OIT was administered according to previously reported protocols or modifications of those protocols.
- One patient was pretreated with omalizumab. No other medications were used for food OIT pretreatment.
- All food preparations were made from commercially available food products.

## RESULTS

### Foods Used For Oral Immunotherapy

Food	Escalation Dosing Foods	Maintenance Dosing Foods
<b>Peanut</b>	Peanut flour, Bamba, peanuts, M&M’s, Reese’s Pieces, Tru-Nut, PB2, flavored PN butter	Peanut flour, Bamba, peanuts, M&M’s, Reese’s Pieces, Reese’s Minis, Tru-Nut, PB2, PN butter
<b>Egg</b>	Liquid egg white	Liquid egg white, egg white powder
<b>Milk</b>	Whole milk	2%, whole milk
<b>Almond</b>	Almond milk, almonds	Almonds, butter, milk
<b>Brazil nut</b>	Brazil nut flour, nuts	Brazil nut flour, nuts, butter
<b>Cashew</b>	Cashew flour, nuts, butter, milk	Cashew flour, nuts, butter, milk
<b>Hazelnut</b>	Hazelnut flour, hazelnuts, butter, milk	Hazelnut flour, hazelnuts, butter, milk
<b>Macadamia nut</b>	Macadamia nut flour, macadamia nuts	Macadamia nut flour, nuts, butter
<b>Pecan</b>	Pecan meal, pecans	Pecan meal, pecans, butter
<b>Pistachio</b>	Pistachio flour, pistachios	Pistachio flour, pistachios, butter
<b>Walnut</b>	Walnut meal, walnuts, butter, milk	Walnut meal, walnuts, butter, milk
<b>Coconut</b>	Coconut flour, shredded coconut	Coconut flour, shredded coconut, milk
<b>Sesame seed</b>	Tahini, unhulled sesame seeds, flour	Tahini, unhulled sesame seeds, flour
<b>Sunflower seed</b>	*SunButter, flour, seeds	*SunButter, flour, seeds
<b>Chickpea</b>	Chickpea flour, chickpeas	Chickpea flour, chickpeas
<b>Soy</b>	Soy milk	Soy milk, soy beans
<b>Rye</b>	Rye flour, rye crackers	Rye crackers, flour, bread
<b>Wheat</b>	Vital wheat gluten replaces baked wheat products	Vital wheat gluten replaces baked wheat products

### Number Of Patients Treated With Each Food

Foods Used for OIT	Patients Treated
Peanut	535
Milk	141
Cashew	111
Egg	98
Walnut	68
Hazelnut	29
Sesame	18
Pecan	16
Wheat	16
Almond	11
Pistachio	8
Chickpea	4
Soy	4
Brazil nut	1
Macadamia nut	1
Coconut	1
Sunflower	1
Rye	1

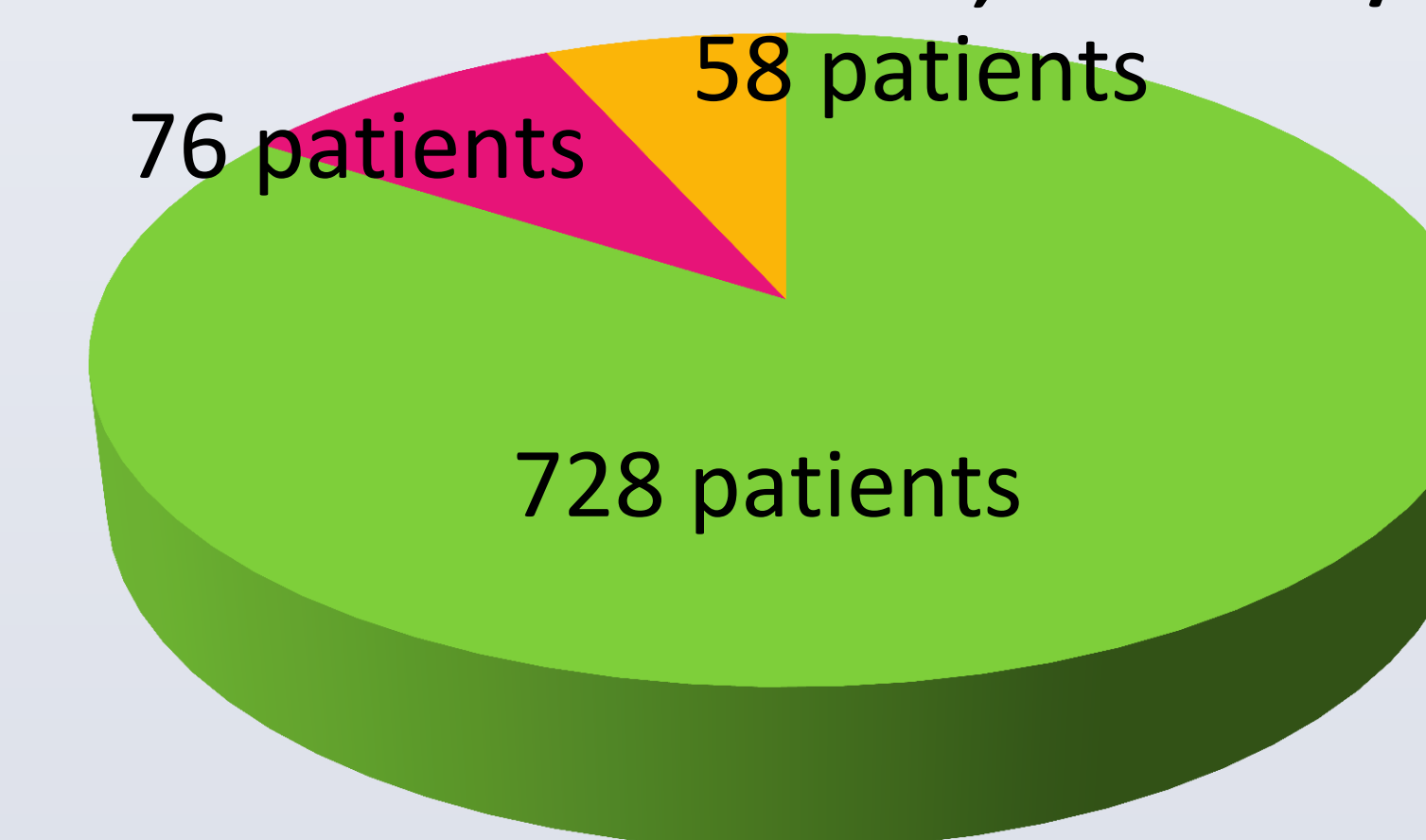
- The initial protocols were based on common eliciting doses for peanut and milk.
- As patients requested desensitization to additional foods, protocols for nuts and seeds were derived from the peanut protocol and protocols for other foods were derived from the milk protocol.
- OIT foods are considered equivalent based on their labeled protein content.
- Most OIT protocols involve the obligate use of more than one food as dosing amount changes.
- Flours and meals that are used for very low doses may be unpalatable as the dose increases.
- When the dose reaches more than 100mg of treatment food protein, taste aversion becomes an issue.
- Even when there is not overt taste aversions, the boredom of eating the same food every day makes adherence more difficult.
- Alternative forms of individual foods have been incorporated into protocols based on DFAC research and parental recommendations.

## RESULTS

### Desensitization Rate By Food

	Started	Escalating	Discontinued/ Transferred care	Reached Maintenance	Reached maintenance (%)
<b>Egg</b>	82	12	9	61	89
<b>Milk</b>	127	3	32	92	75
<b>Peanut</b>	437	36	77	324	82
<b>Single tree nut</b>	64	12	9	41	83
<b>Multi food</b>	140	32	26	82	81
<b>Wheat/soy</b>	12	2	2	8	83
<b>Total</b>	862	97	157	608	82

### Patients Treated With 1, 2 or 3/3+ Foods



■ single food ■ 2 foods ■ 3 or more foods

## CONCLUSIONS

- Desensitization to allergenic foods by oral immunotherapy is effective for most patients. Commercially available, off-the-shelf food is safe and effective for the treatment of food allergy.
- Protein concentrations, determined by the manufacturers, are sufficiently accurate to establish clinical equivalence.
- Under most circumstances, different sources of food protein may be used interchangeably as long as the allergenicity of the protein is maintained (e.g., peanut should be roasted, wheat should be unbaked).
- \*Baking/cooking alters allergenicity and may make some foods unsuitable for OIT (e.g., baked wheat).
- Because of taste aversion and boredom, it is important to be able to use several foods during OIT to maintain adherence.
- So called “standardized foods” are a solution in search of a problem.

## CONTACT

Deanna M Pence, RRT; Richard L. Wasserman MD, PhD  
 Dallas Food Allergy Center, Allergy Partners of North Texas  
 Email: [dmpence@allergypartners.com](mailto:dmpence@allergypartners.com), [drrichwasserman@gmail.com](mailto:drrichwasserman@gmail.com)  
 Website: [www.Dallasallergy.net](http://www.Dallasallergy.net) Phone: 972-566-7788