Food Allergy Diagnosis

- Savannah Sommerhalder, MD
- Allergy and Immunology



Disclosures

• No relevant disclosures

Objectives

Pathogenesis of food allergies

Epidemiology and natural history of food allergies

Decision making tree – when to test and white tests to utilize

Ability to identify IgE-mediated food allergies vs. non IgE-mediated food allergy or reactions.

Interpreting test results and determining when to challenge

Case 1: 6 y/o female



Chief Complaint: •

- Hives
- Severe AD
- Vomiting
- Lip Swelling
- At 18 months of life, first ingestion of liquid cow's milk resulted in diffuse body hives and vomiting.
 - Taken to the ED
 epinephrine, diphenhydramine, IM dexamethasone and albuterol nebs
 observed for 6 hours and discharged home.
 - Very picky eater only eats chicken nuggets, fries and cherry tomato. Never lightly cooked egg and unsure if he has ingested cooked egg.
 - Seen by an outside allergist who performed testing provided to you in clinic.

	PANEL	A - COMM	ON FOO	D ALLERG	Y	
A	ctive Test Panel?	Pro	wider 5	ielect:	Yes	/ No
Site	Allergen	ECW (mm)	Site	Alle	ECW (mm)	
1	+ Control		6	- Contr	-	
2	Cow's Milk	9	7	Cashew		-
3	Egg White	4	8	Codfish		
4	Soybean		9	Shrime	-	
5	Peanut	11	10	Whole	1	
A	tive Test Panel?	Pro	vider S	elect:	Yes	No
Site	Allergen	ECW (mm)	Site	Allergen		ECW (mm)
1	+ Control	4	6	- Contr	ol	0
2	Almond	0	7	Hazelnu	it	0
3	Brazil Nut	0	8	Pecan		4
4	Cashew	4	9	Black W	alnut	11
5	Pistachio	4	10	Provent at		

Collection Date & Time	06/27/2024 14:21
ALPHA-LACTALBUMI	
ALPHA-LACTALBUMI	3
ALPHA-LACTALBUMI	12.40
BETA-LACTOGLOBU	
BETA-LACTO CLASS	4
BETA-LACTOGLOBUL	40.60
CASEIN IgE	
CASEIN CLASS	6
CASEIN IgE	>100.00

EGG WHITE IgE WIT	
EGG WHITE CLASS	4
EGG WHITE IgE	39.50
IMMUNOGLOBULIN E	
IMMUNOGLOBULIN E	1159
MILKIgE WITH REFL	
MILK CLASS	6
MILK IgE	>100.00
OVALBUMIN IgE	
OVALBUMIN CLASS	4
OVALBUMIN IgE	18.70
OVOMUCOID IgE	
OVOMUCOID CLASS	4
OVOMUCOID IgE	42.00

Case 2: 3-year-old male



Chief Complaint:

Patient has had strict avoidance of peanuts and tree nuts for his

Sibling w/ peanut allergy

- lifetime. No known exposure.
- No history of hives, vomiting, asthma, eczema
- No hx of testing

Collection Date & Time	08/12/2024 13:58
INTERPRETATION	
INTERPRETATION	SEE COMM
PEANUT COMPONEN	
Ara h 1 (f422)	0.18
Ara h 2 (f423)	14.1
Ara h 3 (f424)	<0.10
Ara h 6 (f447)	9.73
Ara h 8 (f352)	<0.10
Ara h 9 (f427)	<0.10
TREE NUT ALLERGY	
ALMOND (F20) IGE	0.15
BRAZIL NUT (F18) IGE	<0.10
CASHEW NUT (F202) L.	<0.10
CLASS	3
HAZELNUT (F17) IGE	<0.10
MACADAMIA NUT (RF	<0.10
PEANUT (F13) IGE	15.70
PECAN NUT (F201) IGE	<0.10
PISTACHIO (F203) IGE	<0.10
WALNUT (F256) IGE	<0.10

Active Test Panel?		Provider Select:			Yes / No	
Site	Allergen	ECW (mm)	Site	Allerger	ECW (mm)	
1	+ Control		6	- Control		
2	Cow's Milk		7	Cashew		
3	Egg White		8	Codfish		
4	Soybean		9	Shrimp		
5)	Peanut	34	10	Whole Wi	heat	
	CANEL	C Peans	ATree M	fut (1 of 2)	References of	
Ac	tive Test Panel?	C Peans	A/Tree M	Nut (1 of 2)	Yes / No	
Ac Site	ctive Test Panel? Allergen	Pro Pro ECW (mm)	t/Tree M vider Si Site	lut (1 of 2) elect: Allerger	Yes / No ECW (mm)	
Ac Site	ctive Test Panel? Allergen + Control	Pro Pro ECW (mm)	t/Tree M vider Si Site 6	lut (1 of 2) elect: Allerger - Control	Yes / No ECW (mm)	
Ac Site	Allergen + Control Almond	Pro Pro ECW (mm)	t/Tree I vider Si Site 6 7	lut (1 of 2) elect: Allerger - Control Hazelnut	Yes / No ECW (mm)	
Ac Site 1 2 3	Allergen + Control Almond Brazil Nut	Pro Pro ECW (mm)	A/Tree M vider Si Site 6 7 8	lut (1 of 2) elect: Allerger - Control Hazeinut Pecan	Yes / No ECW (mm)	
Ac Site 1 2 3 4	Allergen + Control Almond Brazil Nut Cashew	Pro Pro ECW (mm)	t/Tree I vider Si Sibe 6 7 8 9	lut (1 of 2) elect: Allerger - Control Hazelnut Pecan Black Wal	Yes / No ECW (mm) Q Nut	

Case 3: 18 yo Male



Chief Complaint:

- No complaints wants to join the military and peanut allergy was listed in PCP document
- H/P: Reporting history of regular diet, although he generally avoids cow's milk if not cooked into something.
- Peanut makes his mouth and throat itchy
- Hx of peanut ingestion at age 12 resulted in anaphylaxis.
- Brings with him IgE test with multiple positives, including peanut

Collection Date & Time	08/13/2024 16:40
HAZELNUT (F17) IGE	
CLASS	2
HAZELNUT (F17) IGE	2.52
INTERPRETATION	
INTERPRETATION	SEE COMM
OVOMUCOID (F233) I	
CLASS	2
OVOMUCOID (F233) L.	1.07
OYSTER (F290) IGE	
CLASS	0
OYSTER (F290) IGE	<0.10
PEANUT (F13) IGE	
CLASS	3
PEANUT (F13) IGE	9.97
PECAN NUT (F201) I	
CLASS	0/1
PECAN NUT (F201) IGE	0.19
SALMON (F41) IGE	
CLASS	0
SALMON (F41) IGE	<0.10

Collection Date & Time	08/13/2024
ALLERGEN SPECIFIC	
ALLERGEN SPECIFIC	<0.35
CLASS	0
BRAZIL NUT (F18) IGE	
BRAZIL NUT (F18) IGE	0.53
CLASS	1
CASHEW NUT (F202)	
CASHEW NUT (F202) L.	3.65
CLASS	3
CODFISH (F3) IGE	
CLASS	0
CODFISH (F3) IGE	<0.10
CRAB (F23) IGE	
CLASS	0/1
CRAB (F23) IGE	0.20
EGG WHITE (F1) IGE	P
CLASS	2
EGG WHITE (F1) IGE	1.32
GULF FLOUNDER (F1	
CLASS	0
GULF FLOUNDER (F1	<0.10

SCALLOP (F338) IGE	
CLASS	0
SCALLOP (F338) IGE	<0.10
SHRIMP (F24) IGE	
CLASS	2
SHRIMP (F24) IGE	0.98
SOYBEAN (F14) IGE	
CLASS	2
SOYBEAN (F14) IGE	2.19
STRAWBERRY (F44) I	1
CLASS	2
STRAWBERRY (F44) I	1.33
TUNA (F40) IGE	
CLASS	0
TUNA (F40) IGE	<0.10
WALNUT (F256) IGE	
CLASS	2
WALNUT (F256) IGE	1.71
WHEAT (F4) IGE	
CLASS	3
WHEAT (F4) IGE	4.19

		-	14-10-	dent	Ca	Rin .
AC	tive Test Panel?	PTO	WIGHT DA	WC1	10	900
Site	Allergen	ECW (mm)	Site	AB	ngen	ECM (mm)
1	+ Control		8	- Cont	Ind	
2	Cow's Mik	12.5	-7	Cash		
3.)	Egg White	9	-8	Codfe	h	
P	Soybean	7	9	Shrim	p	
(5)	Peanut	131	TO	Whole	Wheat:	1

		PANEL	S-Eol			
-	tive Test Panel?	Pro	vider S	elect:	Yes	No
Sh	Allergen	ECW (mm)	Site	Allergan		ECW (mm)
1	Turkey	n (*** 1444)	6	Sweet P	dato	1.00
2	Beel		7	Corn		
3	Pork		8	Rice		
4	Chicken			Owl		
5	Lamb		10	Rye	_	

	PANEL	C - Peans	dill'ree P	fut (1 of 2	ņ	
A	tive Test Panel?	Pro	vider Se	elect:	The	No
Site	Allergen	ECW (mm)	Sile	AI	lergen	ECW (mm)
1	* Control	7	6	- Control		0
2	Almond	0	Ţ	Hazelnut		7
3	Brazil Nut	5	8	Pecar	٩	7
4	Cashew	11	9	Black Walnut		5
8	Pistachio	0	10	English		0

	PANEL) - Peore	di Tese P	Nut (2 of 2)		
M	tive Test Panel?	Pro	vider S	elect:	Ye	No
Site	Allergen	ECW (mm)	Site	Alle	rgen	ECW (mm)
1	Pearut		6	Green Pea		1.0.1
2	Sesame Seed		7	Cherry		
3	Coconut		1	Apple		
4	Soybean	1	3	Strawb	erry	9
5	Green Bean		10	Peach	10.0	1.000

	PANE	E-Oral /	Mergy S	lyndrome		
Ac	the Test Panel?	Pro	vider Se	elect.	Yes	/No
Site	Allergen	ECW (mm)	Site	Allerg		ECW (mm)
1	Avocado		6	Celery		
2	Banana		T	Cucumb	er	
3	Bell Pepper	-	8	Garlic	0.0	
0	Cantaloupe	7	9	Orange	_	
5	Carrot		10	Mustard		

How to Use Panels				
Indications	Panels to Use			
Food Sensitivity or Broad Food Allergy	All Panels subtracting the 7 duplicate pricks.			
Oral Allergy Syndrome	C, D&E			
EoE	A&B			
Sealood	F&G			
Peanut / Tree Nut Allergy	C&D			

	PA	NEL F-S) beetse	1 of 2)		
Ac	tive Test Panel?	Pro	wider Se	elect.	T	No.
Site	Atlergen	ECW (mm)	Site	AB	argen	ECW (mm)
1	+ Control	1.1.1	6	- Con	troi	100
-2	Black Bass-	-	\overline{O}	Halbu	t.	5
3	Galfish		1	Perch	_	-
(4)	Codfish	5.	G.	Salmo	n .	7
(3)	Flounder	7	(10)	Lake 1	Frout	

	PA	NEL G-S	bools	2 of 2)		
Ac	tive Test Panel?	Peo	wider S	elect:	Ye	No
Site	Allergen	ECW (mm)	Ste	A	lergen	ECW (mm)
Ð	Tune	7.	1	Lobel	6F-	-
-2	Mackerei	1	D	Shrim	1D	9
(3)	Clam	00		Crab		5
4)	Oyster	7	O	D. Pi	erony.	7
5	Scallop	5	(1)	D. Fa	rine	7



When should a patient be tested?



Which diagnostic tests should be used?



What is the utility of diagnostic testing to predict severity of future reactions?



ASCIA https://www.allergy.org.au/images/pcc/ASCIA_PCC_Food_intolerance_2019.pdf



ASCIA https://www.allergy.org.au/images/pcc/ASCIA_PCC_Food_intolerance_2019.pdf

IgE-Mediated Food Allergy

Food Allergy:

- An abnormal immune response which is reproducible with exposure to specific food.
- There must be an initial sensitizing event that primes the immune system for subsequent responses.

Food sensitivity:

• The presence of IgE-antibodies to a food, frequently in the absence of clinical reactivity.



peanuts





shellfish



tree nuts

fish



Food Allergy Epidemiology

- Food allergy affects 3-5% of adults and 6-8% of US children
 < 5 years of age worldwide.
- 90% of food allergies are caused by: cow's milk, egg, soybean, wheat, peanut, tree nut, fish and shellfish.
 - Only 2-5% of food proteins
- Food allergies have generally increased over the last 10+ years
 - Hypotheses for increases:
 - Hygiene hypothesis (probiotics beneficial?)
 - Vitamin D hypothesis?
 - Delayed food introduction?



National Academies Press (US) Finding a Path to Safety in Food Allergy Assessment of the Global Burden, Causes, Prevention, Management, and Public Policy, 2017

US Food Allergy Prevalence

Food	Infant/Child (%)	Adults (%)
Milk	2.5	0.3
Egg	1.5	0.2
Peanut	2.0	0.6
Tree Nuts	0.5	0.6
Fish	0.1	0.4
Shellfish	0.1	2.0
Wheat	0.4	0.3
Sesame	0.1	0.1

~70% of egg and milk allergic patients can tolerate foods baked with egg and milk



TMI but still pretty cool...



Nature Reviews Disease Primers volume 6, Article number: 95 (2020)

National Academies Press (US) Finding a Path to Safety in Food Allergy Assessment of the Global Burden, Causes, Prevention, Management, and Public Policy, 2017

Food Allergy History

- What is the suspected food trigger?
- Symptoms with exposure
 - Temporal relationship
- Was the patient further evaluated and how were they treated?
- Exercise or illness at the time of reaction?
- Have there been further ingestions?
- If egg or milk: can the patient tolerate baked egg or baked milk?
- Biphasic reaction?
- When was the last accidental exposure?
- Other food avoidances?
- Epinephrine access?



Food Allergy History

PAST MEDICAL HISTORY

History of atopic disorders

- AD
- Asthma
- Allergic rhinitis
- Eosinophilic esophagitis

Family History

- Parents or siblings with food allergies
- Social History
- Daycare, school
- \circ 504 plans

MEDICATIONS

- Epinephrine at home/daycare/school
- Allergy action Plan
- Antihistamine
- Current medications



Physical Exam

- General: weight, failure to thrive, lethargy
- Skin: Dryness, dermatographism, pallor, excoriations, eczematous skin changes, skin texture
- Respiratory: wheezing, prolonged expiration
- HEENT: turbinate hypertrophy, bridging mucous, cobblestoning, pale mucosa, Dennie Morgan Lines, Allergic shiners (infraorbital darkening)

1. Oral azathioprine for recalcitrant pediatric atopic dermatitis: Clinical response and thiopurine monitoring

Who are good candidates for testing?

- ✔ History of IGE-mediated reaction?
- Moderate-Severe atopic dermatitis?
- ✓ Sibling with IgE-mediated reaction

	24		Frequency, % (n)		
			Index child allergic to:		
	Any food (n = 642)	Peanut (n = 324)	Tree nut (n = 132)	Milk (n = 217)	Egg (n = 155
Sibling sensitized	l to:				
Any food	53.0 (340)	55.6 (180)	44.7 (59)	51.6 (112)	54.8 (85)
Peanut	24.6 (158)	22.8 (74)	28.0 (37)	23.5 (51)	31.6 (49)
Tree nut	16.7 (107)	16.4 (53)	21.2 (28)	15.2 (33)	21.3 (33)
Milk	35.4 (227)	37.4 (121)	38.6 (51)	27.2 (59)*	31.0 (48)
Egg	35.1 (225)	35.19 (114)	34.9 (46)	31.8 (69)	38.1 (59)
Soy	23.1 (148)	21.6 (70)	28.8 (38)	23.5 (51)	28.4 (44)
Wheat	36.5 (234)	36.7 (119)	43.2 (57)	33.6 (73)	37.4 (58)
Shellfish	14.8 (95)	14.8 (48)	18.2 (24)	11.5 (25)	15.5 (24)
Fish	3.9 (25)	4.3 (14)	6.1 (8)	3.2 (7)	2.6 (4)

The asterisk and dagger symbols indicate statistical significance for association between sensitization and index child allergy. *P < .01.

	80		Frequency, % (n)		
	-		Index child allergic to:		
	Any food $(n = 642)$	Peanut (n = 324)	Tree nut (n = 132)	Milk (n = 217)	Egg (n = 155
Sibling allergic to):				
Any food	13.6 (87)	11.7 (38)	22.0 (29)†	12.9 (28)	17.4 (27)
Peanut	3.7 (24)	4.9 (16)	7.6 (10)	1.8 (4)	3.9 (6)
Tree nut	1.6 (10)	1.5 (5)	2.3 (3)	0.9 (2)	0.7 (1)
Milk	5.9 (38)	4.0 (13)*	6.1 (8)	8.3 (18)	12.3 (19)†
Egg	4.4 (28)	4.9 (16)	8.3 (11)†	4.6 (10)	5.8 (9)
Soy	0.9 (6)	0.3 (1)	0.8 (1)	0.9 (2)	1.3 (2)
Wheat	1.1 (7)	0.9 (3)	0.0 (0)	1.4 (3)	2.6 (4)
Shellfish	0.2 (1)	0.0 (0)	0.8 (1)	0.0 (0)	0.0 (0)
Fish	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)

TABLE III. Proportion of siblings who have a clinical food allergy

The asterisk and dagger symbols indicate statistical significance for association between sibling clinical allergy and index child allergy.

*P < .05.

 $\dagger P < .01.$

Class I Allergens

- Traditional allergens
- Heat resistant
- Acid stable
- Stable to proteases and water soluble
- Abundant in food
- Linear epitopes

Class II Allergens

- Plant-derived
- Heat labile
- Associated with pollen food allergy
- Conformational epitopes





Food Alle

ation

Evalu

Unreliable Testing

- Cytotoxic food testing
- Vega testing
- Kinesiology
- Allergy elimination techniques
- Iridology
- Pulse testing
- Alcat testing
- Reflexology
- Hair analysis
- IgG food antibody testing









Food Allergy Testing

Gold Standard: Double blind, placebo controlled oral food challenge.



+ SPT to foods and elevated serum IgE indicate presence of specific IgE antibodies (SENSITIZATION) but not severity of reaction (or clinical reactivity).

Increasing wheal diameter of SPT and increased level of serum sIgE is associated with a higher likelihood of clinical allergy but NOT severity of reaction.

SPT and sIgE values are NOT comparable between different foods

Fresh fruit testing is required frequently for OSA

NEVER use IDT for foods
increased risk of severe systemic reaction

Positive Predictive Value of Specific-IgE to Foods

Allergen	95% predictive level (kIU _A /L)	PPV
Egg	7	98
Infants ≤ 2 years	2	▶ 95
Milk	15	95
Infants ≤ 2 years	5	95
Peanut	14	100
Fish	20	100
Tree nuts	<u>~</u> 15	~ 95
Soybean	30	73
Wheat	26	74

Table 3 Predictive values for food allergen-specific immunoglobulin E (kU_A/L) and skin prick test wheal size (millimeters)

	Milk	Egg	Soy	Wheat	Peanut	Tree Nuts	Fish
Likely Reactive if ≥	15 (95%) ≤2 y: 5 (95%) SPT: ≥8 (95%) ²⁰	7 (98%) ≤2 y: 2 (95%) SPT: ≥7 (95%) ²⁰	65	80	14 (100%) 1 y: 34 (95%) 4 y: 2.1 SPT: ≥8 (95%) ^{20,65}	15 (95%)	20 (100%)
Possibly Reactive	-	SPT ≤3 (50%) ²⁰	30 (73%)	26 (74%)	SPT ≤3 (50%) ²⁰	-	-
Unlikely Reactive if <	0.35	0.35	0.35	0.35	0.35	0.35	0.35

Positive predictive values are indicated in parentheses.

Adapted from Sampson HA. Utility of food-specific IgE concentrations in predicting symptomatic food allergy. JACI 2001;107:891-6. Other references are noted in the table or text.

- A negative skin test virtually excludes IgE mediated food allergy Negative predictive value > 95%
- Positive predictive value < 50% with no clinical history Most people with positive skin tests to food are not allergic to those foods

BODE

Table 5-24.	Major Food Allergens		
Foods	Protein	Food Allergens	Notes
Milk	Caseins	Bos d 8	Major allergen, associated with more persistent allergy
	Whey (alpha- and beta- lactoglobulins)	Bos d 4-6	Heat labile, associated with baked milk tolerance
Egg white	Ovomucoid	Gal d 1	Associated with more persistent allergy, best predictor of reacting to heated egg
	Ovalbumin	Gal d 2	Heat labile, associated with baked egg tolerance and outgrowing egg allergy
	Ovotransferrin	Gal d 3	Heat labile
Peanut	Vicilin (seed storage protein)	Ara h 1	Major allergen, stable to heating
$\left(\right)$	Conglutin (seed storage protein)	Ara h 2, 6, 7	Major allergen, stable to heating
	Glycinin (seed storage protein)	Arah 3	Major allergen, stable to heating
	Profilin/Bet v 2 homolog	Arah 5	Heat labile
	Bet v 1 homolog	Ara h 8	Heat labile, associated with tolerance or mild oral allergy syndrome (OAS)
	Lipid transfer protein	Arah 9	Stable protein
	Oleosin	Ara h 10,11	
	Defensins	Ara h 12, 13	Associated with severe anaphylaxis
Soybean	Bet v 1 homologs	Gly m 3, 4	Associated with mild symptoms or oral allergy
	Storage proteins	Gly m 5,6	Associated with severe reactions
Wheat	Lipid transfer protein	Tri a 14	
	Seed storage protein	Tri a 19 (Omega-5- gliadin)	Major allergen, associated with anaphylaxis and wheat-dependent exercise induced anaphylaxis
Fish	Parvalbumin	Gad c 1, Gad m 1	
Shrimp	Tropomyosin	Pen a 1, Pen m 1	Important muscle protein in arthropods and other animals, results in cross reactivity between proteins found in shrimp, cockroach, and dust mites
Tree Nuts		•	
Cashew	Albumin	Ana o 3	Predictive of allergy
Hazelnut	Bet v 1 homolog	Cor a 1	Heat labile, associated with tolerance or mild OAS
	Lipid transfer protein	Cor a 8	Associated with severe reactions
	Globulin	Cor a 9	Associated with severe reactions
	Albumin	Cor a 14	Associated with severe reactions
Walnut	Seed storage proteins	Jug r 1, 4	Aesociated with severe reactions
	Bet v 1 homolog	Jug r 5	Associated with mild symptoms



Pollen-Food Allergy Syndrome (OAS)

- Present with oral or perioral pruritis during ingestion of raw food.
- Rare progression to severe systemic reactions
- Heat labile: heated form of fresh foods tolerated
- Respiratory tract sensitization to pollen allergens
 cross-reactivity to heat-labile allergens
 containing same allergen

1.Rodriguez J, Crespo JF, Lopez-Rubio, et al. Clinical cross-reactivity among foods of the Rosaceae family. J Allergy Clin Immunol 2000; 106:183. 2.Garcia Ortiz JC, Moyano JC, Alvarez M, et al. Latex allergy in fruit-allergic patients. Allergy 1998; 53:532

Homologous Allergens

Table 5-25. P	ollen-Food Re	elationships
Pollen	Allergen	Food
Birch (Bet v 1)	Rosaceae	Apple, peach, plum, pear, cherry, apricot, almond
	Apiaceae	Celery, carrot, parsley, caraway, fennel, coriander
	Fabaceae	Soybean, peanut
	Betulaceae	Hazelnut
Ragweed	Cucurbitaceae	Cantaloupe, honeydew, watermelon, zucchini, cucumber
	Musaceae	Banana
Mugwort	Apiaceae	Celery, carrot, parsley, caraway, fennel, coriander
	Brassicaceae	Mustard, cauliflower, cabbage, broccoli
	Liliaceae	Garlic, onion
Orchard	Cucurbitaceae	Cantaloupe, honeydew, watermelon
	Fabaceae	Peanut
	Solanaceae	White potato, tomato

Galactose-alpha-1,2-galactose

- Sensitization to alpha-gal through tick bite (Lone Star tick)
- Subsequent ingestion of mammalian meat containing alpha-gal results in DELAYED
 IgE-mediated symptoms



Exercise-dependent Anaphylaxis, Food Associated

- Exercise within 2-4 hours of ingestion of certain food resulting in anaphylaxis
- Wheat (omega-5-gliadin), celery, shellfish, tree nuts, other grains





To challenge or not to challenge?

GOLD STANDARD FOR FOOD ALLERGY TESTING DOUBLE-BLINDED ORAL FOOD CHALLENGE.

- Serum IgE testing and/or skin prick test (SPT) results are not consistent with the patient history.
- When the patient and physician agree that the risk from history and the test results is outweighed by the benefit of possibly adding a food to the diet.
- Determining whether food allergens associated with chronic conditions such as atopic dermatitis (AD) or eosinophilic esophagitis will cause immediate reactions.
- Expanding the diet in persons with multiple dietary restrictions.
- Assessing the status of tolerance to cross-reactive foods.
- Assessing the effect of food processing on food tolerability (eg, fruits and vegetables with pollen food allergy syndrome [PFAS])

TABLE V. Age-appropriate portion sizes for open OFC

			Age				
Allergen	Food	Protein content per serving size	4-11 mo	1-3 y	4-8 y	9-18 y	19+ y
Egg	French toast (1 egg per 1 slice of bread)*	6 g if made with 1 large egg	¹ / ₂ -1 slice	¹ / ₂ -1 slice	1 slice	1-2 slices	1-2 slices
	Hard-boiled or scrambled egg	6 g/1 large egg	1/2-1 egg	1/2-1 egg	1 egg	1-2 eggs	1-2 eggs
Fish	Cooked fish [†]	6 g/1 oz	¹ / ₂ -1 oz	1 oz	l oz	2-3 oz	3-4 oz
Grains	Cooked cereal	5 g per 1/4 cup dry (oatmeal or Cream of Wheat)	¹ / ₄ cup	¹ / ₄ cup	¹ / ₃ - ¹ / ₂ cup	¹ / ₂ -1 cup	¹ / ₂ -1 cup
	Cooked pasta*/rice	3 g per 1/2 cup	¹ / ₄ cup	¹ / ₄ cup	1/3-1/2 cup	¹ / ₂ -1 cup	1/2-1 cup
	Infant cereal	1-2 g per 1/4 cup	1/4-1/2 cup	1/4-1/2 cup			
	Muffin or roll bread*	4-6 g/muffin or roll	1/4-1/2 piece	¹ / ₂ piece	1/2-1 piece	1 piece	1 piece
	Ready-to-eat cereal	2-6 g/1 cup	1/4-1/3cup	1/4-1/3 cup	1/2-3/4 cup	³ / ₄ -1 cup	³ / ₄ -1 cup
	Slice bread	2-4 g/slice	1/4-1/2 slice	¹ / ₂ slice	1/2-1 slice	1-2 slices	2 slices
Milk	Infant formula	2-3 g/5 oz	4-8 oz				
	Milk	8 g/8 oz		4-8 oz	4-8 oz	8 oz	8 oz
	Cottage cheese	10-14 g/4 oz	1/4-1/2 cup	1/4-1/2 cup	1/2-1 cup	1/2-1 cup	1 cup
	Hard cheese	6-8 g/l oz	1/4 - 1/2 oz	1/2 oz	1 oz	1 oz	1 ¹ / ₂ oz
	Yogurt (NOT Greek style)	8 g/8 oz	1/4-1/2 cup	1/4-1/2 cup	1/2-1 cup	¹ / ₂ -1 cup	1/2-1 cup
Peanut	Peanut (whole)	2 g/~8 peanuts			16 pieces	16 pieces	16 pieces
	Peanut butter	3 g/1 tbsp	1 rounded tbsp‡	1-2 tbsp	1-2 tbsp	2 tbsp	2 tbsp
	Peanut flour or peanut butter powder	3 g/1 tbsp original or 2.25 g/1 tbsp chocolate flavor	I rounded tbsp‡	1-2 tbsp	1-2 tbsp	2 tbsp	2 tbsp
	Peanut/chocolate candy cups (full-size)	0.875 g/1 cup		1-2 candy cups	1-2 candy cups	2-3 candy cups	2-3 candy cups
Shellfish	Shellfish§	5 g/1 oz	¹ / ₂ -1 oz	1 oz	l oz	2-3 oz	3-4 oz
Soy/legumes	Infant formula	2-3.1 g/5 oz	4-8 oz				
	Soy beverage	7 g/8 oz		4-8 oz	4-8 oz	8 oz	8 oz
	Cooked beans (kidney, black, chickpeas, lentils)	7-9 g per 1/2 cup	1/8-1/4 cup	¹ / ₄ cup	¹ / ₃ - ¹ / ₂ cup	¹ / ₂ -1 cup	1 cup
	Tofu	8 g/3 oz Firm tofu	1/2-1 oz	1 oz	l oz	2-3 oz	3-4 oz
	Yogurt	5 g/6 oz	1/4-1/2 cup	1/4-1/2 cup	1/2-1 cup	1 cup	1 cup
Tree nut	Almond	3 g/11 whole nuts			11 pieces	11 pieces	11 pieces
	Almond butter (Barney butter brand)	3 g/1 tbsp	l tbsp ‡	1-2 tbsp	1-2 tbsp	1-2 tbsp	1-2 tbsp
	Brazil nut	3 g/4.5 nuts			4 ¹ / ₂ pieces	4 ¹ / ₂ pieces	4 ¹ / ₂ pieces
	Cashew	3 g/10 whole nuts			10 pieces	10 pieces	10 pieces
	Coconut flour	3 g/1 tbsp	1 tbsp	1-2 tbsp	1-2 tbsp	2-3 tbsp	2-3 tbsp
	Coconut milk	3 g/3 oz		3 oz	3 oz	4-8 oz	4-8 oz
	Hazelnut	3 g/3 tbsp hazelnuts or hazelnut meal			3 tbsp	3 tbsp	3 tbsp
	Pecan (halves)	3 g/25 halves			10-25 halves	25 halves	25 halves
	Pine nuts	3.5 g/3 tbsp pine nuts			3 tbsp	3-4 tbsp	4 tbsp
	Pistachio	3 g/20 whole nuts			20 pieces	20 pieces	20 pieces
	Walnut (halves)	3 g/10 halves			10 halves	10 halves	10 halves

Oral Food Challenge

Four Dose Protocol	Six Dose Protocol
Divide the serving as outlined below. Dose 1 = 1/12 th of the total serving Dose 2 = 1/6 th of the total serving Dose 3 = 1/4 of the total serving Dose 4 = 1/2 of the total serving 1 2 4 3	Dose 1 = 1% of total dose Dose 2 = 4% of total dose Dose 3 = 10% of total dose Dose 4 = 20% of total dose Dose 5 = 30% of total dose Dose 6 = 35% of total dose

FIGURE 1. Dosing options for an in-office open OFC.¹ The clinician may choose to perform a 4-dose OFC or a 6-dose OFC depending on the prechallenge probability of reacting and inherent patient risk factors. Doses are typically administered 15 to 30 minutes apart.

PRACTALL Protocol



Natural History of Food Allergies

Cow's milk	50% by 5 yrs (85% by 5 yrs)
	64% by 12 yrs
	79% by 16 yrs
Soy	45% by 6yrs (85% by 5 yrs)
-	69% by 10 yrs
Faa	12% by 6 yrs (85% by 5 yrs)
L88	37% by 10 yrs
	68% by 16 yrs
Wheat	29% by 4 yrs
	65% by 12 yrs
Peanut	20% by 5 yrs
– .	10% by age 14 yrs
Iree nut	



* To minimize a delay in peanut introduction for children who may test negative, testing for peanut-specific IgE may be the preferred initial approach in certain health care settings. Food allergen panel testing or the addition of sIgE testing for foods other than peanut is not recommended due to poor positive predictive value.

** skin prick test

*** oral food challenge

Questions? dr.sommerhalder@aspireallergy.com



Thank You!

