Food Allergy Update

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UMKC School of Medicine

BEST CHILDREN'S HOSPITALS U.S.News & WORLD REPORT RANKED IN 10 SPECIALTIES 2015-16

MAGNET RECOGNIZED AMERICAN NURSES CREDENTIALING CENTER

Case #1

- 4yo female develops hives and lip swelling 2 hours after ingesting peanut butter
- No known history of peanut allergy, previous ingestion with no reaction
- Mother calls to ask for advice
- What do we tell her to do?

Case #2

- 8yo female eats shrimp for the first time at dinner. 2 Hours later she goes to bed in normal state of health.
- The next day she wakes up feeling well and goes to school. At lunchtime she develops a flat red rash and vomiting
- Mother calls to ask if this is related to shrimp and what should she do
- What do we tell her?

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Case #3

- 6yo male rides the bus home from school and upon arrival at home starts vomiting and profuse sneezing
- Mother calls the nurse line for advice
- PMH: diagnosis of seasonal allergies and asthma
- What do we tell her to do?

Case #4

- 6 yo male rides the bus home from school and upon arrival at home starts vomiting and profuse sneezing
- Mother calls the nurse line for advice
- PMH: diagnosis of seasonal allergies, asthma and peanut allergy. Lunch was at 1100 and he has not ingested anything since. History confirmed by teacher, principal and bus driver
- What do we tell her to do?

Food Allergy

- An adverse reaction that is reproducible upon exposure to a given food
- The most common food allergens are:
  - Egg
  - Milk
  - Wheat
  - Soy
  - Peanuts and tree nuts
  - Fish and shellfish

Figure 1: The "Big Eight" Allergens: Tree Nuts, Peanuts, Soy, Egg, Milk, Fish, Wheat and Shellfish.

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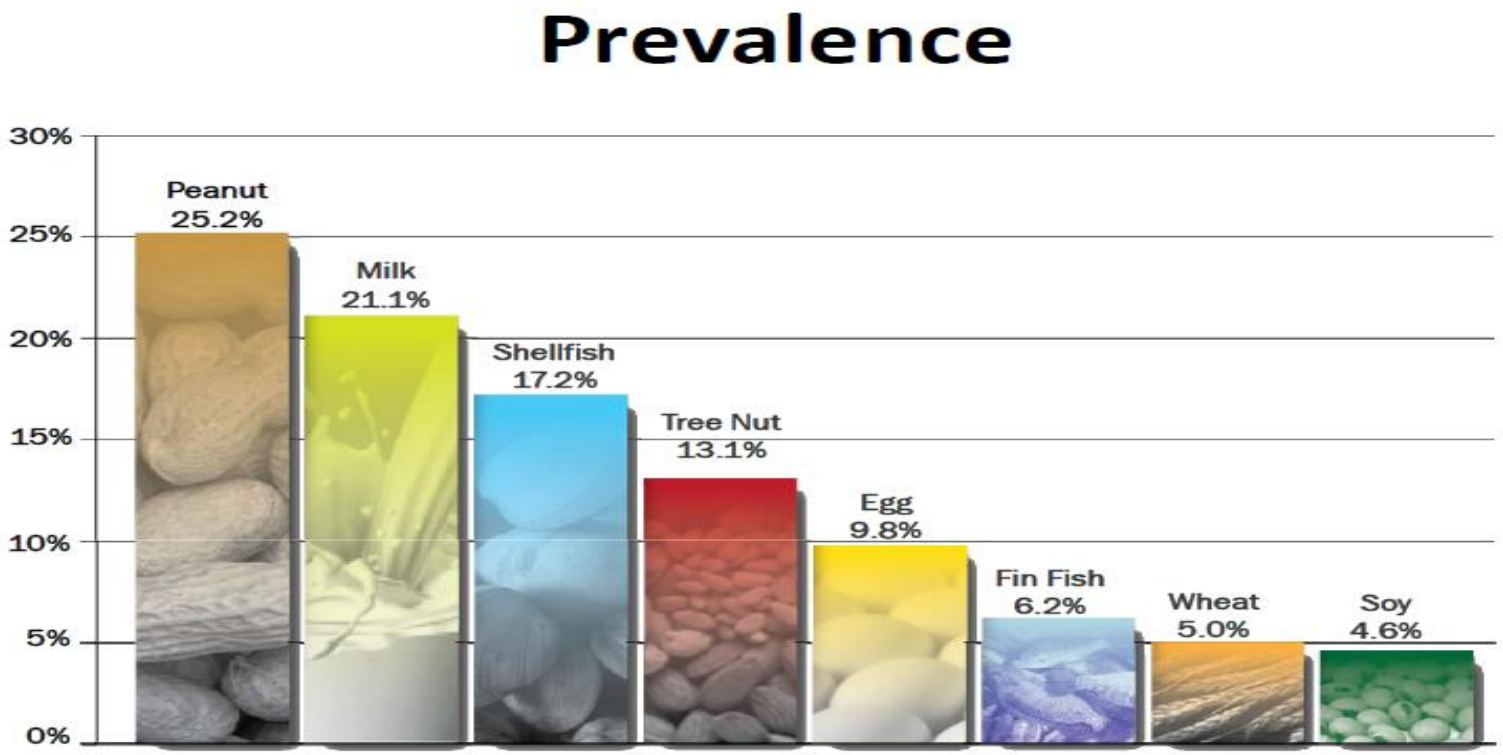
The Big 8



Gupta RS, Springston EE, Warrier MR, Smith B, Kumar R, Pongracic J, Holl JL. The prevalence, severity, and distribution of childhood food allergy in the United States. Pediatrics 2011 Jul; 128(1):e9-e17.

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Prevalence

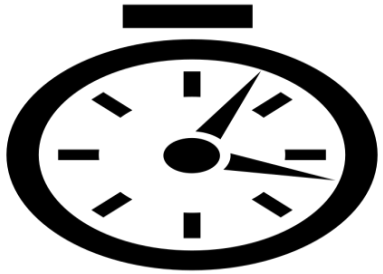
Variation by age:

	Peanut	Shellfish	Tree Nut	Milk	Egg	Wheat
						
0 – 2 years (n=5429)	22.2	7.5	5.4	31.5	15.8	4.0
3 – 5 years (n=5910)	30.3	12.9	14.3	22.1	13.7	5.0
6 – 10 years (n=9911)	25.5	17.1	14.3	19.6	11.1	5.0
11 – 13 years (n=6716)	28.1	20.4	15.2	17.7	6.6	8.2
≥ 14 years (n=10 514)	20.2	23.8	13.4	18.4	4.1	3.3

Gupta RS, Springston EE, Warrier MR, Smith B, Kumar R, Pongracic J, Holl JL. The prevalence, severity, and distribution of childhood food allergy in the United States. Pediatrics 2011 Jul; 128(1):e9-e17.

Onset of Symptoms

- **Timing of onset after ingestion**
  - Anaphylactic reactions will typically occur within the first 20 minutes, but can be as late as 2 hours of ingestion
  - Symptoms that occur after 12 hours are not typically related to an IgE mediated response



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Symptoms of an allergic reaction

- **Skin**
  - Hives, itchy rash, swelling of the face and extremities
- **Mouth**
  - Itching, tingling or swelling of lips, tongue and/or mouth
- **Gut**
  - Nausea, abdominal cramps, vomiting, diarrhea
- **Throat**
  - Tightening of throat, hoarseness, hacking cough
- **Lung**
  - Shortness of breath, repetitive coughing and wheezing
- **Heart**
  - Thready pulse, low blood pressure, fainting, pallor, blue skin
- **Other**
  - Sense of impending doom

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Anaphylaxis occurs when two or more body systems are involved or immediate respiratory symptoms develop

Frequency and Occurrence of Signs and Symptoms of Anaphylaxis

Signs and Symptoms	Percent
Cutaneous	
Urticaria and angioedema	85-90
Flushing	45-55
Pruritus without rash	2-5
Respiratory	
Dyspnea, wheeze	45-50
Upper airway angioedema	50-60
Rhinitis	15-20
Hypotension, dizziness, syncope, diaphoresis	30-35
Abdominal	
Nausea, vomiting, diarrhea, cramping pain	25-30
Miscellaneous	
Headache	5-8
Substernal pain	4-6
Seizure	1-2
Angor animi (sense of impending doom)	—

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Lieberman P, et al. *J Allergy Clin Immunol*. 2010;126:477-480.

Patterns of Anaphylaxis

- Uniphasic
  - Symptoms resolve within hours of treatment
- Biphasic
  - Symptoms resolve after treatment but return 1 – 72 hours after treatment (usually1-3hours)
- Protracted
  - Symptoms do not resolve with treatment and last >24 hours

Anaphylaxis treatment

- Epinephrine is the first line treatment for anaphylaxis
- When in doubt- use Epinephrine. The more rapidly it is used the better the outcome
- Antihistamine should NEVER be first line treatment for anaphylaxis
- New instructions for Epipen Only: hold for count of 3!!

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Auto-injectors

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CMH food allergy plan

Food Allergy/Anaphylaxis Plan

ALLERGY TO: cashew and pistachios_

Reaction	System	Symptoms	Do the following
No Reaction		• Exposure to allergen but no symptoms	Observe
Mild Reaction	Nose Mouth Skin Abdomen	• Runny nose, sneezing • Itching, tingling or swelling of lips, tongue or mouth • Hives, itchy rash, swelling of face or extremities • Nausea, cramps, vomiting, diarrhea	Give antihistamine and Observe **Note**: Severity of symptoms can change quickly.
	Reaction involves 2 or more systems or it involves:		
Moderate to Severe Reaction	Throat Lung Heart	• Tightening of throat, hoarseness, cough • Labored breathing, wheezing • Fast pulse, fainting, blue skin	Use Epinephrine* and then give antihistamine Call 911

Medications: *May repeat epinephrine dose in 10 minutes if symptoms have not resolved.

Antihistamine: Benadryl (diphenhydramine) 50mg_

Epinephrine: Inject into the muscle of the thigh: (x) EpiPen (_) Epipen Jr. (_)AuviQ 0.3 (_) AuviQ 0.15

Emergency Contacts:

- Name: _____ Relationship: _____
  Home Phone Number: (_____) _____-_____ Work Phone Number: (_____) _____-_____
- Name: _____ Relationship: _____
  Home Phone Number: (_____) _____-_____ Work Phone Number: (_____) _____-_____

THIS PLAN SHOULD BE FOLLOWED EVEN IF PARENT/GUARDIAN CANNOT BE REACHED

_____ _____ _____
Signature/Relationship of Person Responsible for Healthcare Decisions | Printed Name | Date

_____ _____ _____
Signature of Provider | Printed Name | Date

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History taking

- Food Ingested
  - Amount, how and where prepared
  - Prior history of ingestion
- Symptoms development
  - Description and timing of onset
  - If a rash- location, flat or raised, itchy
- Treatment given
  - What medication, how much, time of ingestion
- Health prior to reaction

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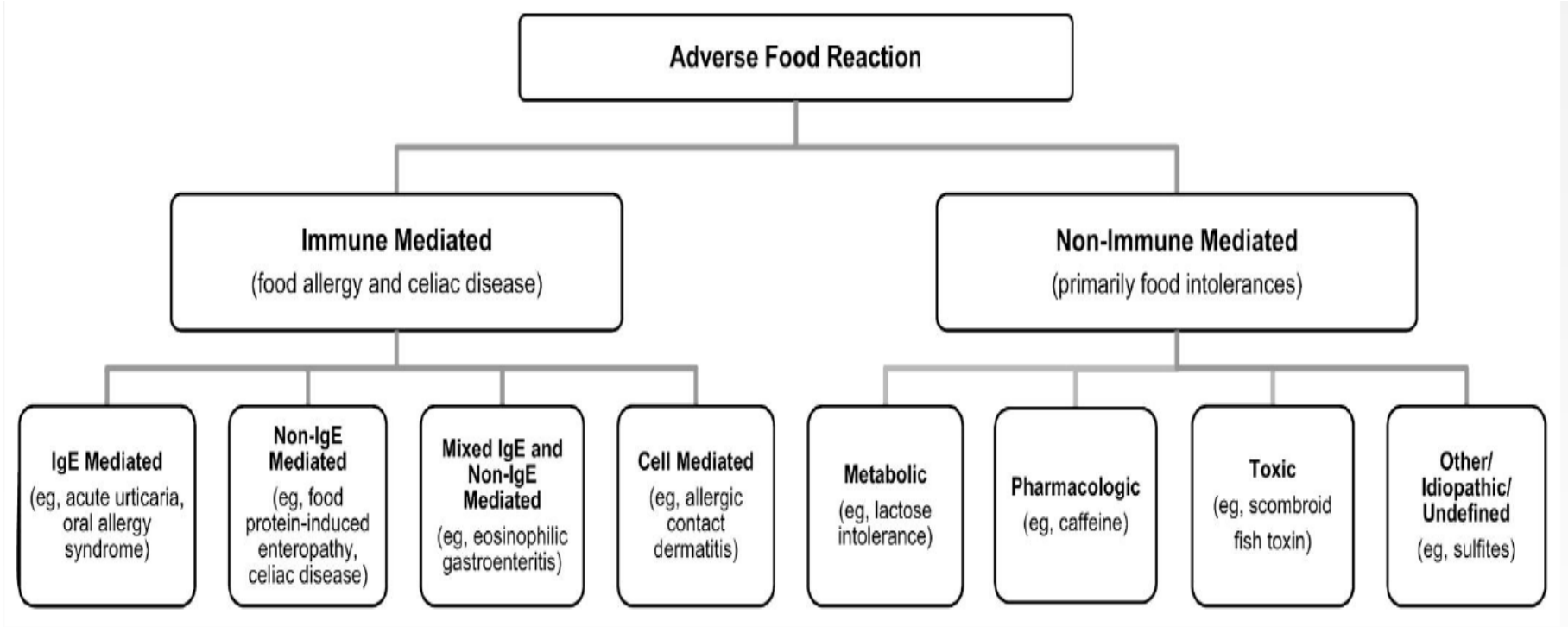
Immune vs. Non-Immune Mediated Reactions



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Boyce, et al. Guidelines for the Diagnosis and Management of Food Allergy in the United States: Report of the NIAID-Sponsored Expert Panel. JACI 126.6 (2010): S10

Diagnosis and Management of Food Allergies

- Guidelines for the Diagnosis and Management of Food Allergy in the United States: Report of the NIAID-Sponsored Expert Panel
  - Released in December 2010
  - In summary, the guidelines do the following:
    - Provide 43 concise recommendations to a wide variety of healthcare professionals on how to diagnose food allergy, manage ongoing food allergy, and treat acute food allergy reactions
    - Identify gaps in the current scientific knowledge to be addressed through future research
    - Identify and provide guidance to help standardize patient management
  - Available at http://www.niaid.nih.gov/topics/foodallergy/clinical/Pages/default.aspx

Dietary Restrictions

- The introduction of solid foods should NOT be delayed beyond 4-6 months. Potentially allergenic foods may be introduced at this time

- Restricting diet beyond 6 months of age can lead to inadequate nutrient intake, growth deficits, and feeding problems.

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Background to LEAP study

- 2000-2008 feeding guidelines suggest delaying introduction of peanut until age 3 to deter risk of developing peanut allergy
- 2008 DuToit et al: UK babies avoiding peanut until age 3 were 10 times more likely to develop peanut allergy than Israeli babies fed Bamba before 9 mo (but not a RCT)
- Could timing of introduction promote primary prevention?

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Du Toit G et al. N Engl J Med 2015;372:803-813

LEAP
(learning early about peanut allergy)

- Hypothesis: early introduction of peanut based products (before 11 months of age) would lead to the prevention of peanut allergy in high risk infants

- Eligibility:
  - Infants at least 4 months of age and less than 11 months of age
  - Severe eczema, egg allergy or both

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Du Toit G et al. N Engl J Med 2015;372:803-813

LEAP Enrollment

- 834 infants screened
  - 194 excluded (SPT >4mm or did not have severe eczema)
  - 640 underwent randomization
    - 542 negative skin prick
    - 98 positive skin prick (defined as 1-4mm wheal)
- Randomly assigned to peanut consumption or avoidance
- All subjects underwent oral challenge
  - Neg SPT given single dose of 2 g of peanut butter
  - Pos SPT given incremental doses up to 3.9g
- Infants who reacted were placed in the avoidance group

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Du Toit G et al. N Engl J Med 2015;372:803-813

Consumption vs. Avoidance

- Consumption group: fed 2g of peanut protein 3x a week until they reached 60 months of age
  - Bamba (peanut butter and puffed maize)
  - Smooth peanut butter

- Avoidance group: avoidance continued until 60 months of age

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Du Toit G et al. N Engl J Med 2015;372:803-813

LEAP Results

- Negative SPT group
  - 13.7% prevalence of peanut allergy in avoidance group
  - 1.9% in the consumption group
- Positive SPT
  - 35.3% in the avoidance group
  - 10.6% in the consumption group

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Du Toit G et al. N Engl J Med 2015;372:803-813

LEAP-ON

- Follow up study
- 556 of initial 628 patients were enrolled
  - 550 (280 in peanut avoidance and 274 in peanut consumption) had a peanut allergy outcome that could be evaluated
- 12 months of peanut avoidance at the end of the primary trial
- Peanut allergy more prevalent in peanut avoidance group than consumption group (18.6% vs. 4.8%)

Du Toit G et al. N Engl J Med; 2016. 374:1435-1443

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LEAP-On Conclusion

- Children at high risk for peanut allergy that had been introduced in 1st year of life and continued consumption for 5 years, followed by 12 month period of avoidance was not associated with an increase in prevalence of peanut allergy.

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Du Toit G et al. N Engl J Med; 2016. 374:1435-1443

2017 Addendum Guidelines for the Prevention of Peanut Allergy in the United States

- NIAID sponsored expert panel
- Released in January 2017
- Summary of guidelines available at
  - www.niaid.nih.gov/sites/default/files/peanut-allergy-prevention-guidelines-clinician-summary.pdf

Addendum guideline for the prevention of peanut allergy in the US

Summary of Addendum Guidelines

Addendum Guideline	Infant Criteria	Recommendations	Earliest Age of Peanut Introduction
1	Severe eczema, egg allergy, or both	Strongly consider evaluation with peanut-specific IgE and/or skin prick test and, if necessary, an oral food challenge. Based on test results, introduce peanut-containing foods.	4 to 6 months
2	Mild to moderate eczema	Introduce peanut-containing foods.	Around 6 months
3	No eczema or any food allergy	Introduce peanut-containing foods.	Age-appropriate and in accordance with family preferences and cultural practices

Guideline #1

- The EP recommends:
  - Infants with severe eczema, egg allergy or both have introduction of age-appropriate peanut-containing food as early as 4-6 months of age to reduce the risk of peanut allergy.
  - Peanut should not be the initial solid food introduced into an infant's diet.
  - Other solid food should be tried first to show the infant is developmentally ready.
  - Evaluation with peanut-specific IgE or skin prick testing be strongly considered before introduction of peanut to determine if peanut should be introduced, and if so, the preferred method of introduction.

Togias A. et al. JACI; Jan 2017. 139(1): 29-44

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Guideline #2

- The EP suggests:
  - Infants with mild to moderate eczema should have introduction of age-appropriate peanut-containing food as early as 4-6 months of age, in accordance with family preferences and cultural practices, to reduce the risk of peanut allergy.
  - Peanut should not be the initial solid food introduced into an infant's diet.
  - Other solid food should be tried first to show the infant is developmentally ready.
  - Infants in this category may have dietary peanut introduced at home without an in-office evaluation.
  - However, the EP recognizes that some caregivers and health care providers may desire an in-office evaluation

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Togias A. et al. JACI; Jan 2017. 139(1): 29-44

Guideline #3

- The EP recommends:
  - Infants without eczema or any food allergy have age-appropriate peanut-containing foods freely introduced in the diet
  - Can be introduced with other solid foods, and in accordance with family preferences and cultural practices.

Togias A. et al. JACI; Jan 2017. 139(1): 29-44

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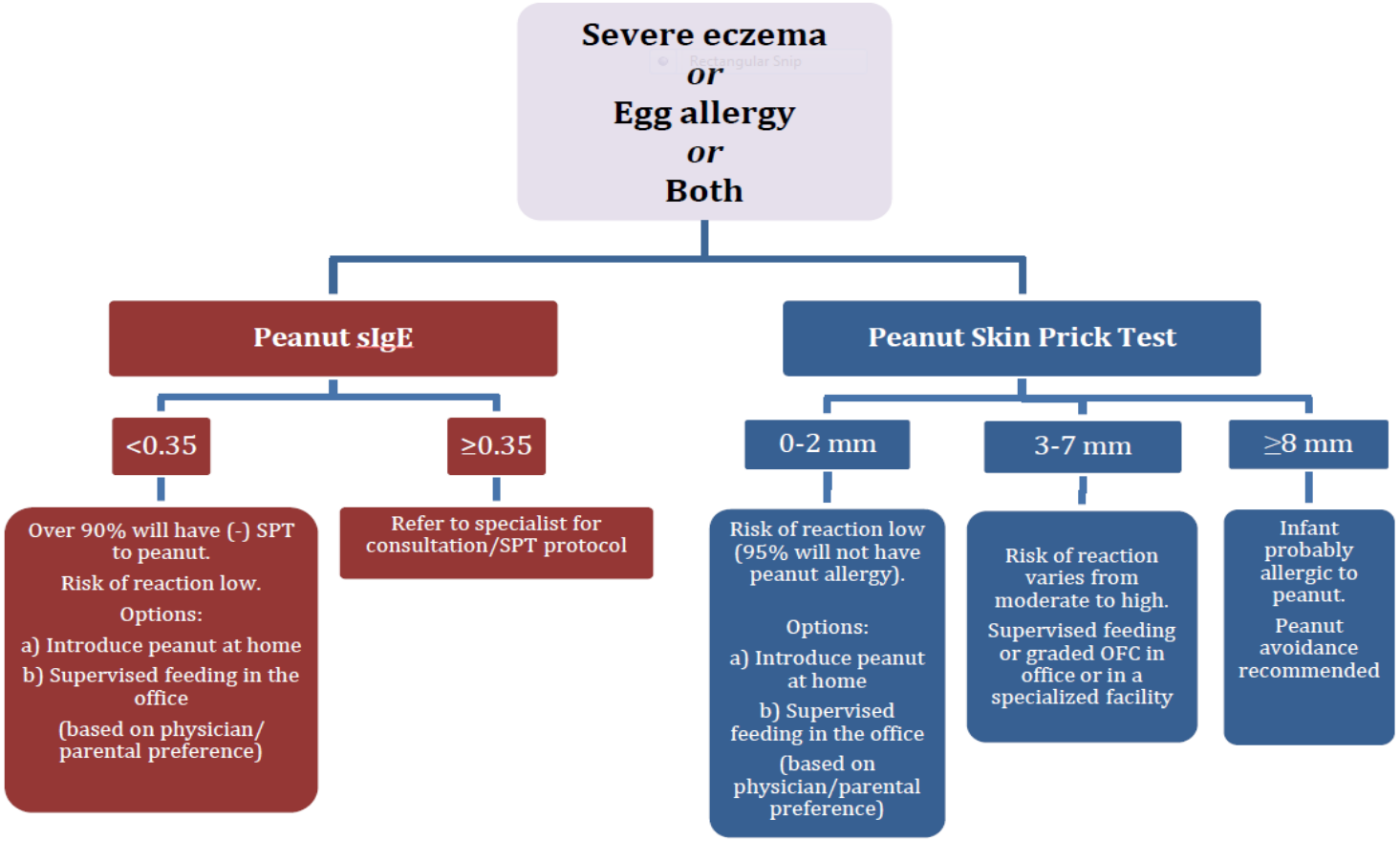
Algorithm for evaluation of children with severe eczema and/or egg allergy before peanut introduction



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Togias A. et al. JACI; Jan 2017. 139(1): 29-44

Handout for parents

Early Introduction of Peanuts

Allergy to peanuts is one of the most common food allergy. It tends to develop early in life and can persist through adulthood. Reactions can range from mild to life threatening. Current treatment of a peanut allergy is avoidance.

However research released in 2015, showed that early introduction of peanut containing food to infants considered at high risk was beneficial. High risk is described as those with severe eczema, egg allergy or both.

This sheet summarizes the 3 guidelines that you can discuss with your child's healthcare provider.

Low Risk:

If your infant has no eczema or any food allergy, then you can freely introduce peanut containing foods into their diet around 6 months of age, as part of family's diet and preferences.

Medium Risk:

If your infant has mild to moderate eczema, they are encouraged to eat peanut containing foods introduced into their diet around 6 months of age. This may be done at home or in the office setting, your health care provider will discuss this option with you.

Peanuts should be introduced when the family is comfortable introducing peanuts based family's dietary preferences.

High Risk:

If your infant has severe eczema, egg allergy or both, check with your PCP before feeding. They may either to do a blood test or send you to an allergy specialist for additional testing. The results will help determine if peanuts should be introduced into your infant's diet. If the test results determine that it is safe, this may be done at home or it may be recommended to do it in an office setting. Introduction can occur at 4-6 month of age. If test results are high, then avoidance may be recommended at this time.

Infants should never be given whole peanuts due to choking hazard. Introduce other solid foods before trying peanut containing foods

Information provided by US Department of Health and Human Services

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Feeding instructions for parents

Introducing Peanuts into your infant's diet

1. Feed your infant at home on a day they are well
2. Start small, offer a tiny bite of peanut serving first
3. Wait 10 minutes and if no reaction is noted then continue feeding at a normal feeding pace

Options for feeding:

1. Thinned smooth peanut butter
    a. Mix 2 teaspoons mixed with hot water or breastmilk (2-3 teaspoons)
    b. Stir until peanut butter dissolved and well blended
    c. Let Cool, more liquid can be added if still too thick
2. Smooth peanut butter puree
    a. Mix 2 teaspoons of peanut butter with known tolerated pureed fruits or vegetables (2-3 teaspoons). More can be added if still too thick
3. Peanut flour or peanut butter powder
    a. Mix 2 teaspoons of peanut flour or powder to tolerated pureed fruit or vegetable (6-7 teaspoons). More can be added if still too thick
4. Bamba Peanut Puffs
    a. Can be found in specialty grocers or ordered online
    b. 21 pieces will need to be eaten

What are symptoms of a reaction?

1. Mild symptoms:
    - A new rash or a few hives (red raised bumps) around the mouth or face
2. More severe symptoms:
    - Lip swelling
    - Vomiting
    - Widespread hives (red raised bumps over the body)
    - Face or tongue swelling
    - Difficulty breathing
    - Wheeze
    - Repetitive coughing
    - Change in skin color (pale/blue)
    - Sudden tiredness/lethargy/seeming limp

If you have concerns about your infant's response to peanuts, seek medical attention/call 911

Information provided from Journal of Allergy and Clinical Immunology January 2017

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Breast feeding and allergies

- Does food cross over from breast milk to baby and could it cause symptoms?
- Yes, previous studies have identified peanut protein in breast milk after maternal consumer of peanuts*
- Recommend keeping food diary and symptom diary if correlation is noted, remove food from diet

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*JAMA. 2001 Apr 4;285(13):1746-8

Atopic Dermatitis and food allergies

- Retrospective chart review of 298 patients that had a concern for food triggered AD
- 19% with no previous history of immediate reactions, developed new immediate reactions after the initiation of an elimination diet
  - 70% were cutaneous reactions; 30% were anaphylaxis
  - Cow's milk and egg most common foods
- Avoidance of food was associated with an increase risk of developing immediate reactions
- Conclusion: strict elimination diet need to be thoughtfully prescribed

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Chang A, et al. J Allergy Clin Immunol 2015; 135(2): AB264

Oral allergy syndrome

- Cross reactivity between pollens and fresh fruit and vegetables
- Symptoms are typically limited to mouth
- Treatment consists of antihistamine
- Foods usually tolerated if baked

Ragweed→ bananas, melons (watermelon, cantaloupe, honeydew), zucchini and cucumber
Birch→ apples, pears, peaches, apricots, cherries, plums, prunes, nectarines, kiwi, carrots, celery, potatoes and peppers
Grass→ peaches, celery, melons, tomatoes, oranges

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Carbohydrate galactose- alpha-1, 3 galactose (alpha gal)

- Delayed anaphylaxis to mammalian meat (beef, pork, lamb)
- Prior history of tick bite (lone star tick)
- Eat red meat and reaction occurs about 2-6 hours later
  - Urticaria and GI symptoms are common but delayed onset
- Allergy found on IgE testing to alpha-gal
- With avoidance of future tick bites, it may resolve in 1-2 years

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Case #1

- 4yo female develops hives and lip swelling 2 hours after ingesting peanut butter
- No known history of peanut allergy, but eaten it before with no reaction
- Mother calls to ask for advice
- What do we tell her to do?

Case #2

- 8yo female eats shrimp for the first time at dinner. 2 Hours later she goes to bed in normal state of health.
- The next day she wakes up feeling well and goes to school. At lunchtime she develops a rash and vomiting
- Mother calls to ask if this is related to shrimp and what should she do
- What do we tell her?

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Case #3

- 6yo male rides the bus home from school and upon arrival at home starts vomiting and profuse sneezing
- Mother calls the nurse line for advice
- PMH: diagnosis of seasonal allergies and asthma
- What do we tell her to do?

Case #4

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- Mother calls the nurse line for advice
- PMH: diagnosis of seasonal allergies, asthma and peanut allergy. Lunch was at 1100 and he has not ingested anything since. History confirmed by teacher, principal and bus driver
- What do we tell her to do?

Thank You

Questions?

Contact Information:

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