

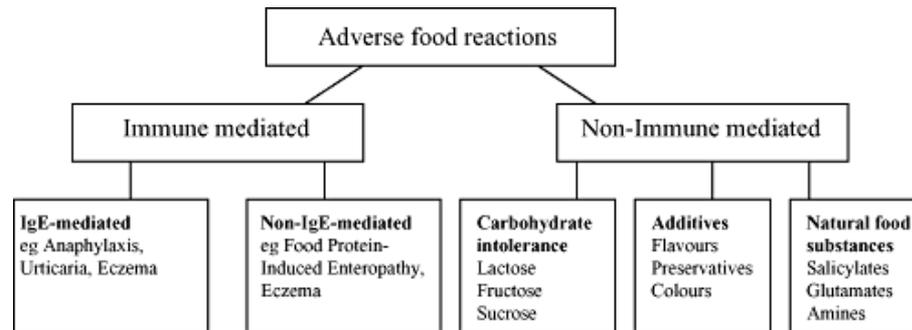
FOOD ALLERGY IN CHILDREN

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“Let them eat cake”



Types of adverse food reactions



IgE mediated food allergy

- Recognition
- Prevention
- Consensus Statement on the Management of IgE-mediated Food Allergy in New Zealand
 - Investigation
 - Management
- Eczema and food allergy

IgE mediated food allergy (FA)

- Adverse immunological reaction to a food protein resulting in an adverse reaction when exposed
- Sensitisation ≠ Allergy
- Important to distinguish from other food reactions
 - Eg lactose intolerance, celiac disease

IgE-mediated FA

- Presentation can involve:
 - Skin – urticaria, flushing, erythema, itching, angioedema
 - Gut – lip/tongue tingling/swelling, choking, vomiting, diarrhoea
 - Airway – coughing, sneezing, wheezing, laryngospasm
 - CVS – tachycardia, hypotension, collapse, death
- Onset usually within minutes-2 hours of exposure
- Resolution within 6-8 hours
- Can occur with first known exposure
- Late eczematous reactions – uncommon, uncertain significance

IgE-mediated FA

- IgE mediated FA is becoming more common
 - 10% one year olds react to one or more foods on challenge
 - Health Nuts study 2011
- Eczema is associated with FA
 - About 30% of children with eczema have a reaction on challenge
 - Pediatrics 101;3:e8 1998
- Even more commonly perceived as present
 - 80% of children attending Starship Dermatology with eczema have had dietary modifications

Food allergy prevention

- American Academy of Pediatrics 2000
 - Infants whose family history put them at risk of atopy:
 - Pregnancy – Mothers possibly should avoid peanuts
 - Lactation – Mothers should avoid peanut and tree nuts, and consider eliminating eggs, cow's milk, fish and possibly other foods
 - Solids – introduce after 6 months
 - Cow's milk delay >1 year
 - Eggs delay >2 years
 - Peanuts, tree nuts, fish >3 years

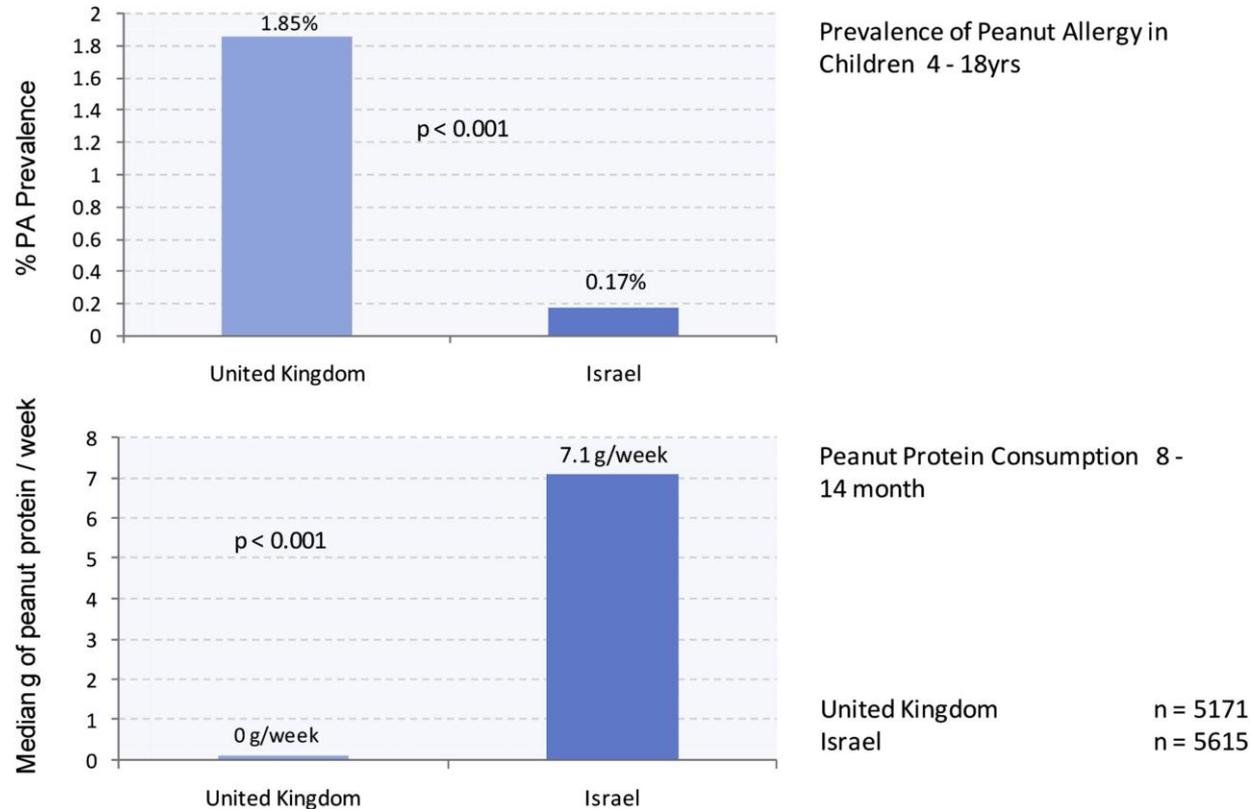
Food allergy prevention

- Studies eliminating food allergens in pregnancy, lactation and infancy have consistently failed to reduce long-term incidence of IgE-mediated FA in children
 - G Lack 2011

- ? The paradigm of allergen avoidance to prevent FA is flawed

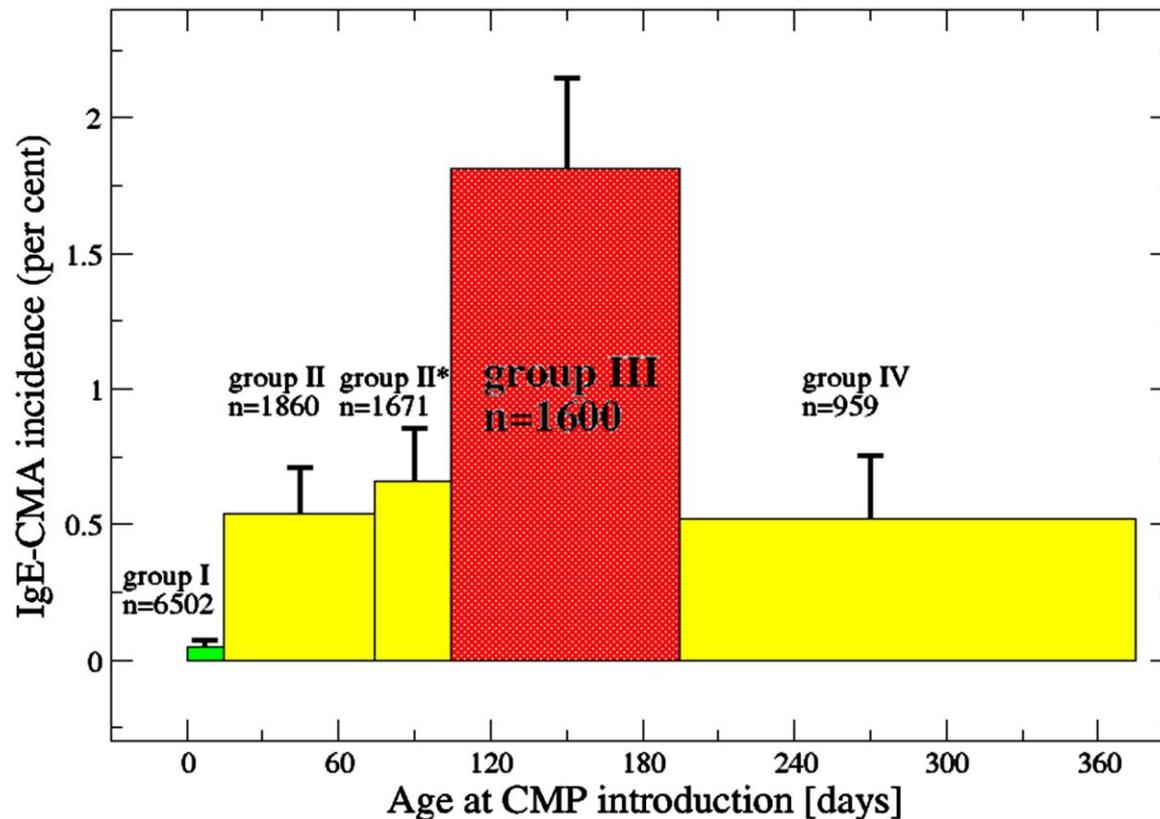
Peanut allergy

Early consumption of peanuts is associated with a low prevalence of peanut allergy



Cow's milk allergy

Early exposure to cow's milk is protective against IgE mediated allergy to cow's milk



Katz et al. J Allergy Clin Immunol 2010;126:77-82

Egg allergy

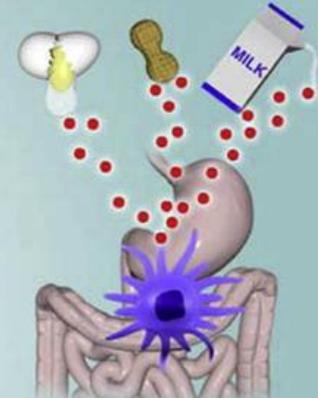
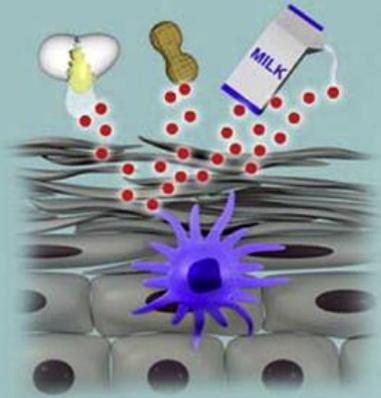
Early egg introduction is associated with lower prevalence of egg allergy at 1 year of age

Age of egg introduction (months)	Adj OR (95%CI)
4-6	1.0 P<0.001
7-9	1.3 (0.8-2.1)
10-12	1.6 (1.0-2.6)
>12	3.4 (1.8-6.5)

Koplin et al J Allergy Clin Immunol 2010;126:807-13

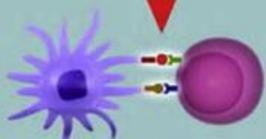
CUTANEOUS EXPOSURE

ORAL EXPOSURE



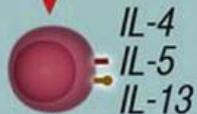
Skin

GI Track



Skin-draining lymph nodes

Mesenteric lymph nodes

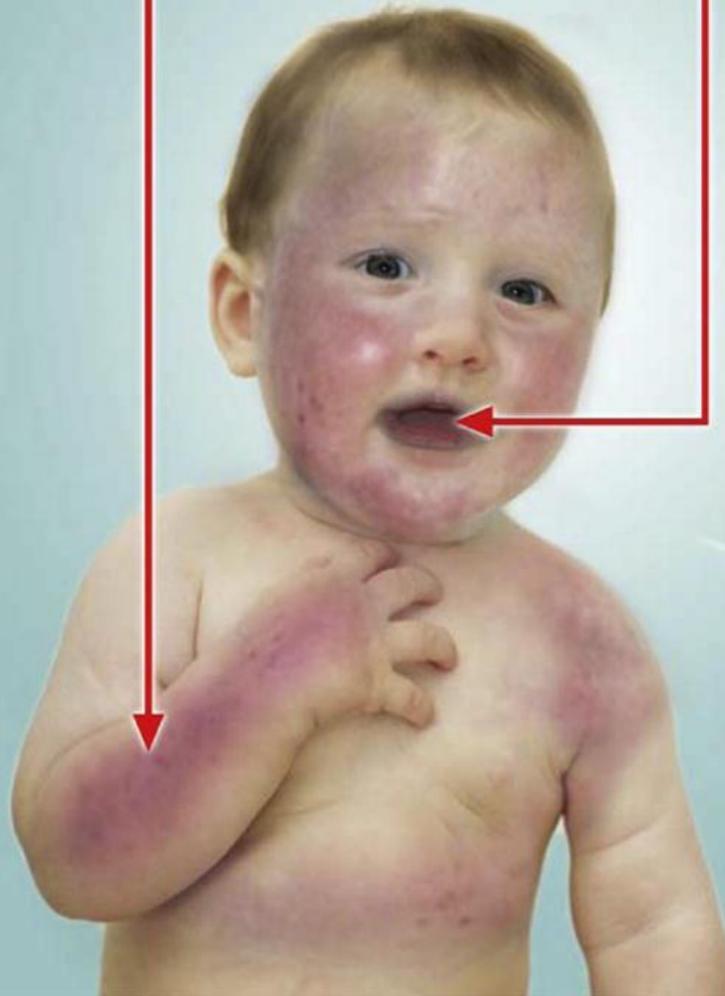


Th2 memory

Th1 memory Treg memory

ALLERGY

TOLERANCE



Food allergen exposure

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- American Academy of Pediatrics 2015....

THE MANAGEMENT OF IGE-MEDIATED FOOD ALLERGY IN NEW ZEALAND

CONSENSUS STATEMENT OF THE
NZ PAEDIATRIC SOCIETY
ALLERGY SPECIAL INTEREST GROUP

Aims of Consensus Statement

- Help recognition of IgE-mediated FA in children
- Correct diagnosis is essential for correct management
 - Safe management of food allergies
 - Avoid unnecessarily restrictive diets
- Recommendations around use of tests
- Recommendations for management

Diagnosis of FA

- History is of primary importance
 - Allergy = reaction
 - Sensitisation = positive SPT/ssIGE
- History of rapid onset reaction after exposure
 - Skin – urticaria, flushing, erythema, itching, angioedema
 - Gut – lip/tongue tingling/swelling, choking, vomiting, diarrhoea
 - Airway – coughing, sneezing, wheezing, laryngospasm
 - CVS – tachycardia, hypotension, collapse, death

Investigation of FA

- Investigations
 - Skin prick test (SPT)
 - Serum specific IgE (ssIgE, RAST, EAST)
 - Supervised food challenge
- Testing is used to confirm/refute history
 - History gives a pretest probability
 - Even a convincing history should be confirmed
- In considering which allergens to test:
 - In infants 75% of FA is to egg, cow's milk and peanut
 - Children with one FA are at increased risk of others
 - Eg 40% of children with cow's milk allergy are egg allergic on OFC,
 - Peanut allergy is associated with tree nut allergy
 - Testing large random panels of allergens is not recommended
 - Where a food is currently tolerated testing is not indicated

Investigations

Skin prick test

- Inexpensive
- Immediate results
- Can use actual food
- Unreliable with dermatographism and antihistamine use
- Interoperator variability

Specific IgE (RAST, EAST)

- Relatively expensive
- Change in level over time may predict tolerance
- Not available for all allergens
- Requires venepuncture

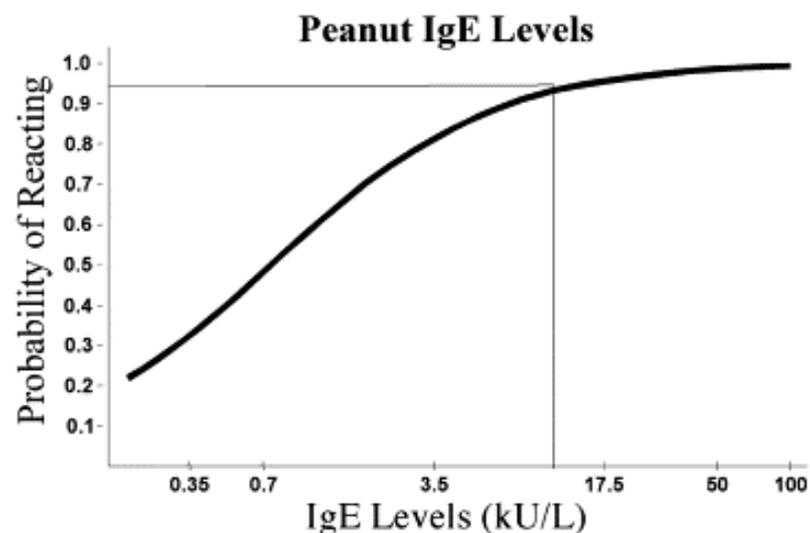
Interpreting results of tests

95% Predictive Level

Allergen	[kU _Δ /L]	PPV
Egg	7	98
- Infants ≤ 2 yrs ⁺	2	95
Milk	15	95
- Infants ≤ 2 yrs ⁺⁺	5	95
Peanut	14	100
Fish	20	100
Tree nuts ⁺⁺⁺	~15	~95
Soybean	30	73
Wheat	26	74

- ⁺ Boyano MT, et al. Clin Exp Allergy 2001; 31(9):1464-9.
⁺⁺ Garcia-Ara C, et al. J Allergy Clin Immunol 2001; 107(1):185-90.
⁺⁺⁺ Clark AT, Ewan P. Clin Exp Allergy. 2003; 33(8):1041-5

PPV = Positive predictive value



Increasing probability of clinical reactivity with increasing level of food-antigen specific IgE value; note: values <0.35 do not exclude allergic reactivity

For both SPT and sIgE it is possible to have weakly positive tests associated with clinical allergy, and strongly positive tests associated with tolerance. Neither predicts the severity of the reaction

Supervised open food challenge

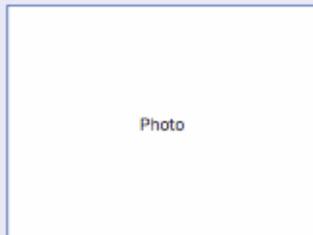
- DBPCFC is gold standard but rarely used in practice
- Food challenge is indicated when:
 - History of IgE-mediated FA but negative/weakly positive investigations
 - To clarify if sensitisation is clinically relevant
 - SPT and sIgE suggest tolerance has developed
- Usually not performed when probability of reaction is high

Management of IgE-mediated FA

- Allergen avoidance
- Provision of Adrenaline auto-injector
 - Risk analysis
- Written Action Plan
 - Australasian Society for Clinical Immunology and Allergy ASCIA
website: www.allergy.org.au

Name: _____

Date of birth: _____



Confirmed allergens:

Family/emergency contact name(s):

Work Ph: _____

Home Ph: _____

Mobile Ph: _____

Plan prepared by:

Dr _____

Signed _____

Date _____

Note: The ASCIA Action Plan for Allergic Reactions is for people with mild to moderate allergies, who need to avoid certain allergens. For people with severe allergies (and at risk of anaphylaxis) there are ASCIA Action Plans for Anaphylaxis, which include adrenaline autoinjector instructions.

MILD TO MODERATE ALLERGIC REACTION

- swelling of lips, face, eyes
- hives or welts
- tingling mouth
- abdominal pain, vomiting (these are signs of a severe allergic reaction to insects)

ACTION

- **For insect allergy, flick out sting if visible. Do not remove ticks**
- Stay with person and call for help
- Give medications (if prescribed)
dose:
- Contact family/emergency contact



Watch for any one of the following signs of Anaphylaxis

ANAPHYLAXIS (SEVERE ALLERGIC REACTION)

- difficult/noisy breathing
- swelling of tongue
- swelling/tightness in throat
- difficulty talking and/or hoarse voice
- wheeze or persistent cough
- persistent dizziness or collapse
- pale and floppy (young children)

ACTION

- 1 Lay person flat, do not stand or walk. If breathing is difficult, allow to sit**
- 2 Phone ambulance - 000 (AU), 111 (NZ), 112 (mobile)**
- 3 Contact family/emergency contact**

Additional information

Management of IgE-mediated FA

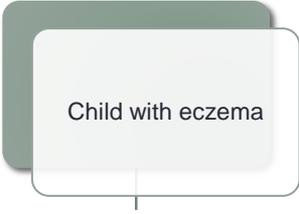
- Referral to Paediatrics recommended when:
 - History of definite or possible anaphylaxis
 - Where there is associated asthma
 - Where there is uncertainty about diagnosis or interpretation of results
 - Where a supervised food challenge is required
 - For dietetic support
 - cow's milk protein in young children
 - multiple food allergies
 - 'hard to avoid' foods eg wheat and soy
- Review for resolution
 - Testing SPT/ssIGE more than annually not recommended
 - Eventual referral for a food challenge may be necessary

Eczema and food allergy

- Eczema is a risk factor for IgE mediated FA
 - 30% moderate to severe eczema
- As many as 25% of patients with moderate to severe eczema have eczematous reactions on DBPCFC
- **HOWEVER:** Results of studies of benefit of food exclusion for treatment of eczema have been 'disappointing'
 - Little evidence to support exclusion diets for eczema in unselected patients
 - Some support (one study!) for egg exclusion in egg sensitised
 - Dietary exclusions for established atopic eczema. Bath-Hextall et al. Cochrane 2008

Eczematous food reactions

- RAST tests
 - Reported decision points for specific IgE are for immediate reactions
 - Positive predictive value of food sIgE is 33%
 - Low specificity, high rate of false positives
 - Negative predictive value of food sIgE is 75%
- SPT
 - Negative predictive value >90%
- Atopy patch testing
 - Utility still not proven
- 2 week diagnostic elimination diet
 - If no significant improvement in eczema food can be reintroduced



Child with eczema

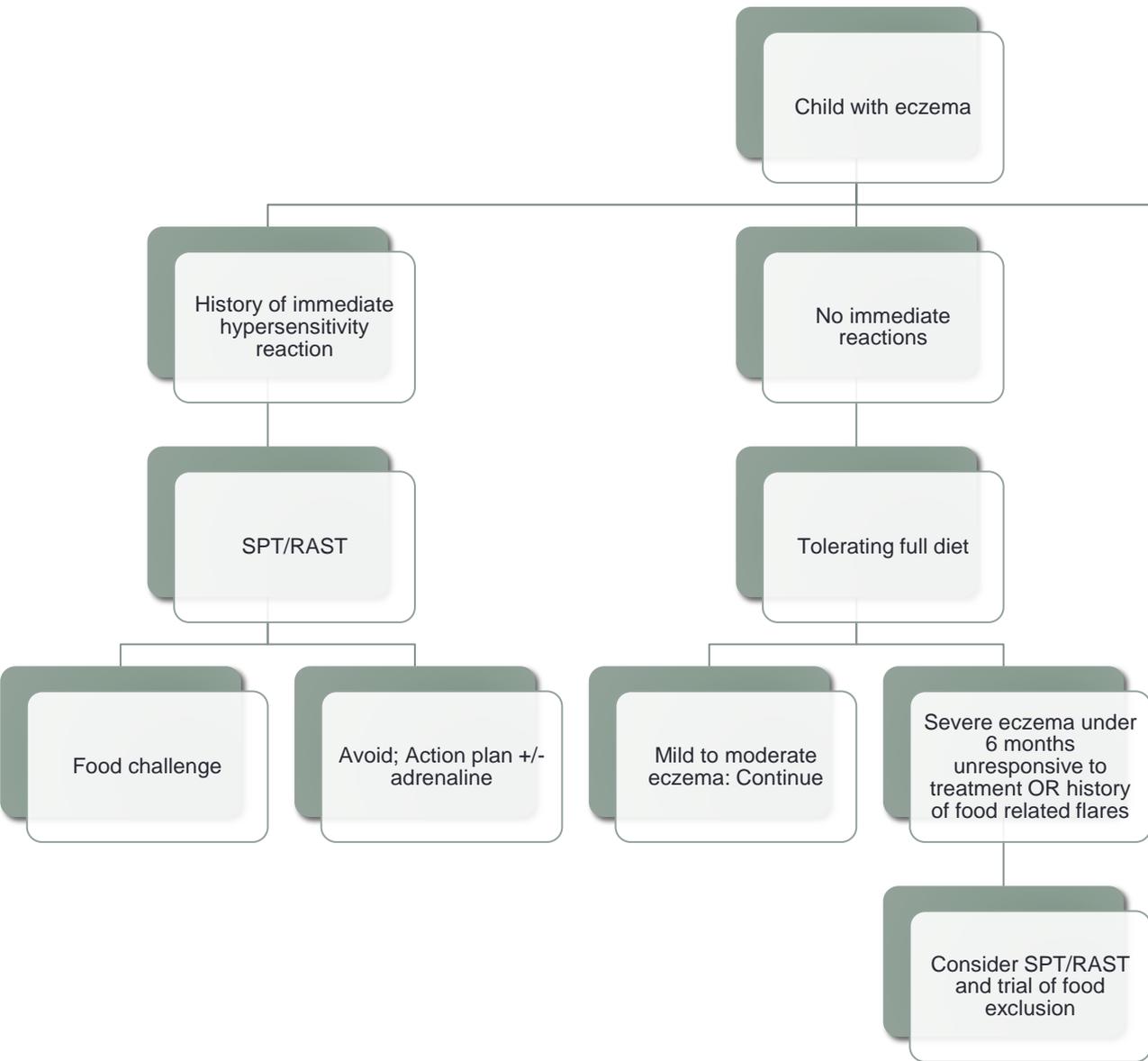
Child with eczema

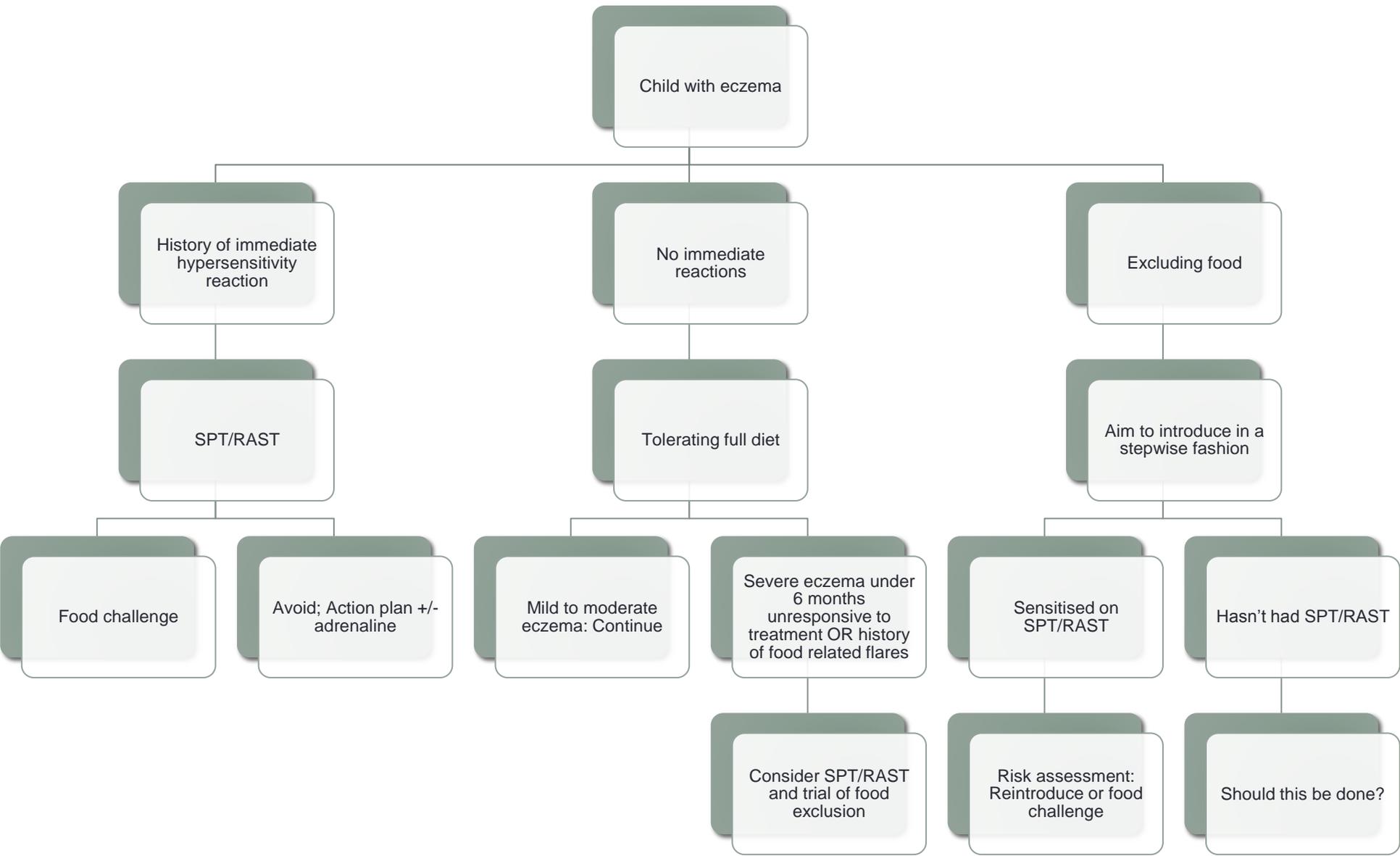
History of immediate hypersensitivity reaction

SPT/RAST

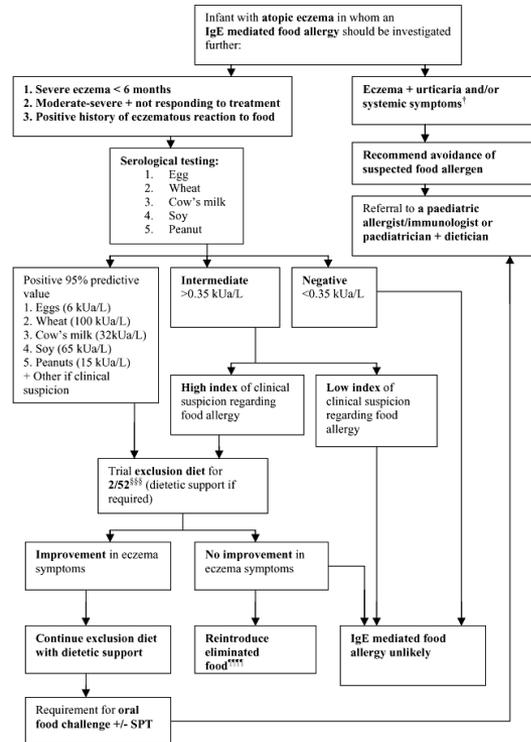
Food challenge

Avoid; Action plan +/- adrenaline





Food allergy testing in infantile eczema: A clinical approach and algorithm



[†] Infants with recurrent urticaria (or other symptoms to suggest immediate hypersensitivity reaction such as vomiting, cough, wheeze) gastrointestinal symptoms (diarrhoea, vomiting, bloody stools), failure to thrive or chronic respiratory symptoms. Rarely, a Primary Immunodeficiency Disorder (PID) requires exclusion in infants with eczema and systemic manifestations.

^{§§} Cut off values predict acute IgE mediated reactions and were not designed to predict delayed eczematous reaction. However, specific IgE testing is commonly used in allergy practice and recommended in ASCIA guidelines in the evaluation of children with eczema.

^{§§§} In breast fed infants, consider modification of mother's diet with dietician support if indicated

^{¶¶¶} Parents should be warned about the small risk of severe allergic reaction upon re-introduction of food, and to cease re-introduction if allergic symptoms occur.

FA in children with eczema

- Take a history
- Immediate IgE-mediated FA
 - Confirm with SPT/ssIgE
 - Avoid +/- dietetic/paediatric support
 - Written action plan +/- adrenaline
- Parental concern that food is triggering eczema
 - Manage the eczema
 - SPT/ssIgE often 'false' positive
 - Trial of an exclusion diet may be undertaken in severe early onset eczema unresponsive to treatment
 - If an exclusion diet is undertaken this should be considered a trial with a plan to reintroduce
 - Important that families are made aware of potential risk of food exclusion

