



Practical advice & resources in managing pediatric allergies

Idonette van Zyl (RDSA)
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Introduction



“THE DIAGNOSIS OF FOOD ALLERGY IN A CHILD HAS AN IMPACT ON EVERY MINUTE OF EVERY DAY FOR THE CHILD AND THE CHILD’S FAMILY”

(MUÑOZ-FURLONG, 2003)

Food Allergy - Definitions

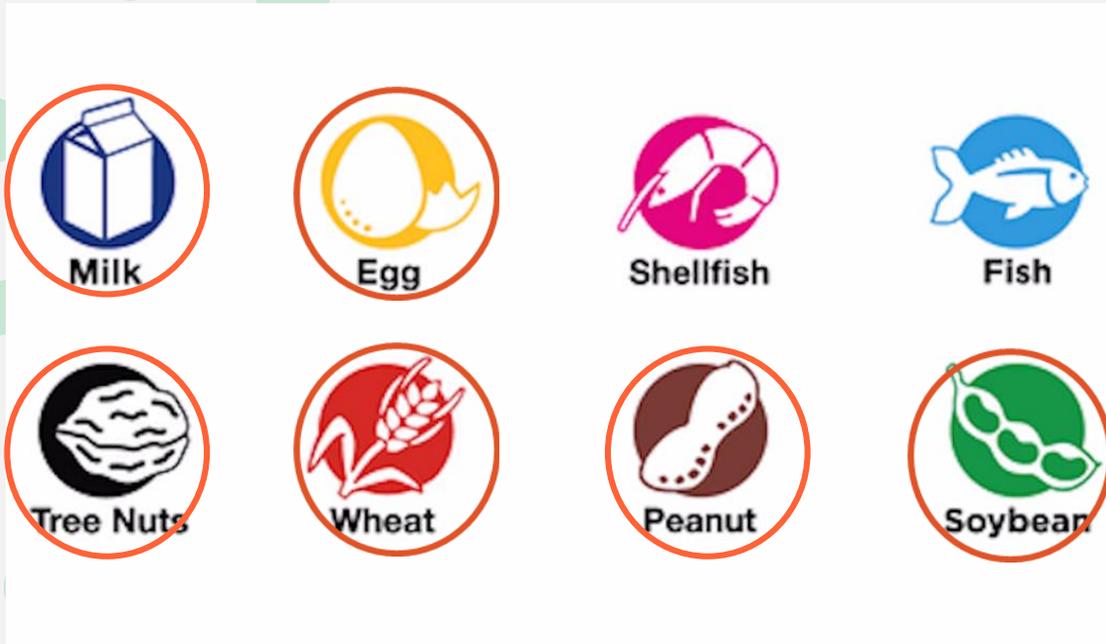
- **Food allergy (FA)** “an adverse health effect/clinical symptom arising from a specific immune response (IgE/non-IgE/mixed) that occurs reproducibly on exposure to a given food” (Boyce et al, 2010; Chafen et al., 2010; Sicherer & Sampson, 2014a)
- **Food** “any substance (whether processed, semi-processed, or raw), that is intended for human consumption, and includes drinks, chewing gum, food additives, and dietary supplements” (Boyce et al, 2011)

Food Allergy – Prevalence

- Large population studies and meta-analyses of studies, using **food challenges**, have shown a wide variation in FA **prevalence**, ranging from **1% to >10%**, depending on age of child and the region studied (Gray et al, 2014)
- FA estimated to affect nearly 5% of adults and **8% of children**, with growing evidence of an increase in prevalence (Sampson et al., 2014; Sicherer & Sampson, 2014b)
- Prevalence of FA in SA unknown, but currently being studied (Gray & Levin, 2014)

*Latest study in SA suggests IgE-FA rates of ~2.5% in urban children in SA
(Basera et al 2015, & personal communication Dr C Gray)*

Food Allergy – Common allergens



(www.foodallergy.org)

- **Most common food allergens in children:**
 - Cow's milk, Hen's egg, Peanut, Tree nut, Soya, Wheat, and Sesame (Gray & Levin, 2014)
- FA peaks during first 2 years of life, then diminishes towards late childhood as tolerance to several foods develops over time (Gray et al, 2014)
- Most children with FA will eventually tolerate milk, egg, soy, and wheat; far fewer will tolerate tree nuts and peanut
- Time course of FA resolution in children varies by food and may occur as late as the teenage years (Boyce et al, 2011)

Dietary management of Food Allergies

- Despite the risk of severe allergic reactions and even death, there is

No current cure for FA

Management aims to reduce morbidity, mortality and **improve quality of life (QoL)**

- Avoidance of the implicated food/allergens via elimination diets
- Treatment of symptoms caused by accidental ingestion



Allergies - Impact on QoL

BOTH PATIENT AND FAMILY EXPERIENCE ↓QoL:

- Significant impact on general health perception, emotional impact on the parent, and limitation on family activities (Muñoz-Furlong, 2003)
- Great psychological and emotional distress, as well as depression (Cummings et al, 2010)
- High levels of anxiety across multiple areas of life activities, including general health, school, eating outside the home, and even activities within the family (Cummings et al, 2010)
- *Avery et al, 2003* used a food allergy-specific QoL scale and found that children with peanut allergy reported lower QoL scores than children with insulin dependent diabetes mellitus (IDDM)
- Bullying: research has shown > 45% have been bullied at some time as result of FA (Shemesh et al, 2013)

Allergy Symptoms – QoL

Think about:

Behaviour affected due to discomfort/pain/emotional and social impact

Eyes

Itchy eyes, watery eyes, prickly eyes, red eyes, swollen eyes, 'allergic shiners' – dark areas under the eyes due to blocked sinuses.

Airways

Wheezy breathing, difficulty in breathing, coughing (especially at night time), shortness of breath.

Digestion

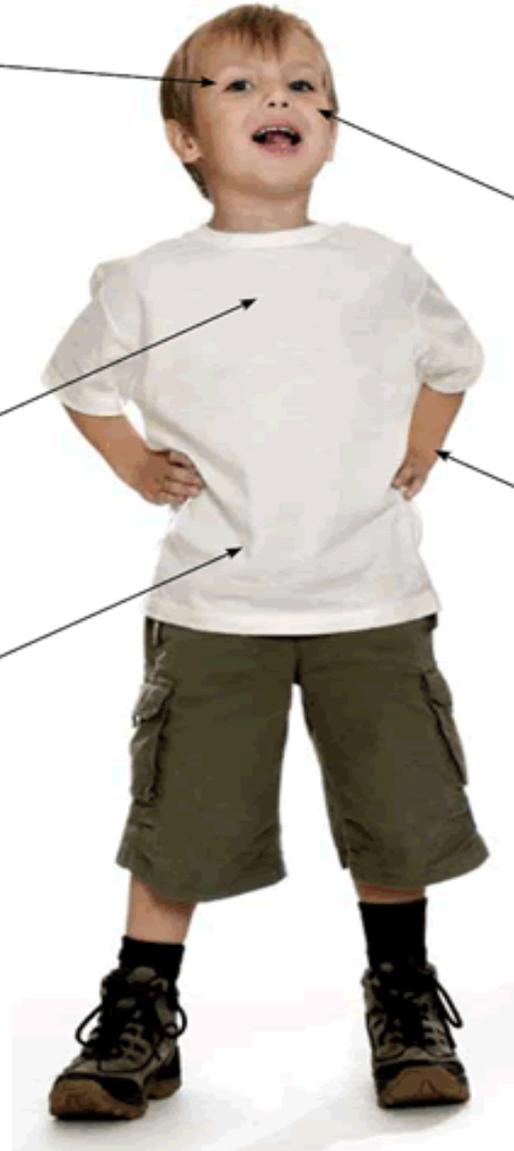
Swollen lips/tongue, itchy lips/tongue, stomach ache, feeling sick, vomiting, constipation, diarrhoea, bleeding from the bottom, reflux, poor growth.

Nose, Throat and Ears

Runny nose, blocked nose, itchy nose, sneezing, pain in sinuses, headaches, post-nasal drip (mucous drips down the throat from behind the nose) loss of sense of smell and taste, sore throat, swollen larynx (voice box) itchy mouth and/or throat, blocked ear and glue ear.

Skin

Urticaria – wheals or hives bumpy, itchy raised areas, rashes. Eczema - cracked, dry, or weepy, broken skin. Angiodema – swelling of the deep layers of the skin.



(www.allergyuk.org)

QoL- Life with an allergic child/children

Especially during time before proper diagnosis / during poor management

The parents' perspective:

- You as a parent blame yourself
- VERY challenging and HUGE struggle at times
- VERY lonely
- Physical and Emotionally draining
- Sleep deprivation
- Feeling of hopelessness
- Increased expenses!
- Constant concern for the child
- Concerned about impact on siblings

Be on the outlook for parental depression



QoL - Life with an allergic child/children

Parent's perspective cont.

Offering support to these patients and parents are extremely important!

- Constantly thinking about food...planning (spontaneous family meals not possible)
- Most "convenience" food products contain soy, maize, cow's milk, wheat or egg
 - Use fresh ingredients
 - Time to prepare meals, as well as separate preparation for allergic child
- Will "they" believe me?
- Sometimes feel as if there is no progress
- Concerned about child's growth and development
- How can I keep this up?

Dietary management of Food Allergies cont.

- A **multidisciplinary** approach (specialist physicians, nurses, and dieticians)
 - Associated with reduction in number of subsequent allergic reactions (Lack, 2008)
 - Markedly improves patient and family knowledge
- Dietary restriction should be **individually tailored** to meet the nutritional needs of each patient by a registered dietician who is experienced in FA (Levin et al, 2014)
- Consultation with a dietician is critical to develop a plan to **avoid relevant food allergens** and **prevent secondary dietary deficiencies** (e.g. iron-deficiency) **and impaired growth in children** (Lack, 2008)

Dietary management of Food Allergies cont.

National institute of Allergy and Infectious diseases (NIAID) Expert Panel recommends:

- Individuals with either documented IgE-mediated and/or non-IgE mediated FA should avoid ingesting relevant allergen(s)
- **Nutritional counselling** and **regular growth monitoring** for **all** children with FA
- Products with confirmed allergens and precautionary labelling, such as “*may contain...*” be avoided
- Individuals with FA and their caregivers receive **education and training** on:
 - how to interpret ingredient lists on food labels
 - how to recognise labelling of the food allergens



Dietary management of Food Allergies cont.

Multiple FA

- Each allergen may have a different mechanism of reaction and manifest differently, and therefore may require different modalities of diagnosis and management (Levin et al, 2014)
- Management is more complex than management of single food allergies (Lack, 2008)

Aim to prevent nutrient deficiencies

- **It is possible:** Many foods can easily be avoided, without nutritional consequence (Prescott et al, 2010)

Dietary management of Food Allergies

– Nutritional deficiencies

- **Nutritional deficiencies** - great concern for allergic individuals
 - **Stunted growth and growth faltering**: potential issue for children diagnosed with FA, particularly those with CMPA and multiple food allergies
 - Canani et al, 2014 found children with FA (6 to 36 months) had lower **energy** and **protein, calcium, zinc, and PUFA** intakes, as well as significantly lower weight-to-length ratios compared with healthy controls
 - *With tailored dietary counselling, subjects experienced correction of nutritional deficiencies and improved anthropometrics*

Iron and Allergy

- Allergic disorders of the GIT may be associated with malabsorption and loss of protein and iron from the GIT (Vanderhoof & Kleinman, 2015)
- Poor fetal iron status has previously been hypothesised to be a risk factor to develop allergy (Weigert et al, 2015)
 - Poor maternal iron stores are associated with poor infant iron stores
- Iron deficiency due to insufficient intake of iron e.g. multiple food-allergies; meat-allergies e.g. beef; inappropriate substitutes e.g. rice milk as main infant feed <2y; avoidance of multiple foods with insufficient reintroduction etc.

Iron and Allergy – Strategy to improve safety of iron supplementation

- **Give iron and n-3 at different times**
- **Give iron and calcium at different times**
- **Vitamin C increases iron absorption**

- Pathogens grow on iron and compete with host for iron (McDermid & Prentice, 2006; Adetifa & Okomo, 2009; van Santen et al., 2013; Diaz-Ochoa et al., 2014; Franke et al., 2014)
- Oxidative stress is increased by (unbound) iron, consequently increasing inflammation (Lachili et al., 2001; Hurrell, 2011; Crist et al., 2013; Koskenkorva-Frank et al., 2013)
 - Malan et al., 2014 found that iron supplementation increased morbidity (mostly respiratory), but when iron was combined with DHA/EPA (n-3), this increase was prevented (Malan et al, 2014 & personal communication Dr. L Malan)

Cow's milk protein allergy (CMPA) - Treatment (Levin et al, 2014)

Breastfeeding (BF)

- Mothers of infants with CMPA who are BF should be supported and encouraged to continue BF
- In rare circumstances, elimination diet may need to be followed by the mother, under dietary guidance to ensure nutritional adequacy

Formula Feeding (if BF not possible)

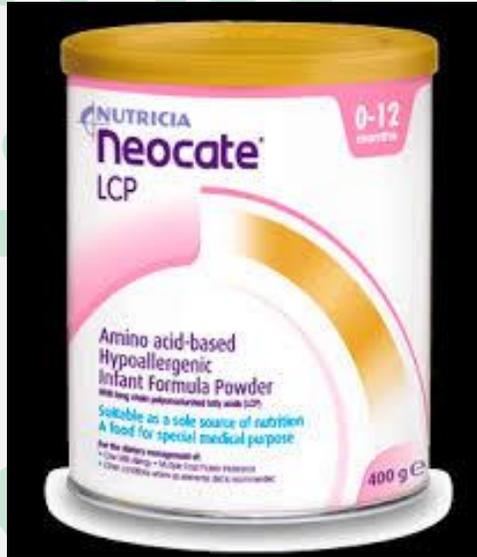
- Partially hydrolysed infant formulas not recommended for treatment of CMPA
- Extensively hydrolysed and amino-acid formulas for treatment
 - Extensively hydrolysed formula (eHF) in mild or moderate CMPA
 - Amino-acid based formula (AAF)

CMPA - Treatment

- **AAF** targeted at:

 - CMPA with severe or life-threatening symptoms
 - On-going symptoms on eHF
 - Severe growth faltering
 - In rare circumstances where stringent exclusion diet in BF mother has failed to resolve infant's symptoms
- No evidence for **soy-based** formula in prevention
 - May be useful in infants with CMPA (after 6 months of age in absence of soy allergy)
 - Increased risk of co-reactivity between CMPA and soya allergy in especially non-IgE-mediated allergy
- **Other**
 - **Mammalian milk** not suitable for CMPA due to extensive cross-reactivity
 - **Plant-based milk** (rice or oat milk) not nutritionally adequate and inappropriate as sole infant formula

AMINO ACID BASED FORMULA:



EXTENSIVELY HYDROLISED FORMULA:

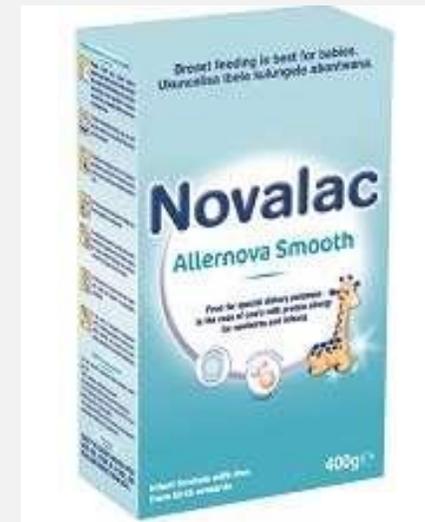
Whey based



Casein based



Casein based



Dietary management of Food Allergies cont.

Patients should be re-evaluated at regular intervals to see if they have developed tolerance (Levin et al, 2014)

- Younger children with milk, soya and egg allergy should be reviewed every 6 - 12 months. Older children every 1 - 2 years.
- Tree nut, fish and shellfish allergy may be lifelong, but re-evaluation should be done every 2 - 4 years to determine whether re-challenges are appropriate or exclusion should be continued

Dietary management of Food Allergies cont.

Think about

- Vacations / Restaurants
- Sharing food at home / school
- Parties at home / friends / school
 - Empower the child
- Unnecessary food avoidance due to fear of reaction
- “Food aversions”true allergy?
- Abnormal or unusual eating habits



Dietary management of Food Allergies cont.

Patient and Family must learn to:

- **Read food labels** = Cornerstone of FA management
- Adapt recipes
- Educate other family members, child care providers, and teachers
- Food-symptom diary very useful in recognising possible allergens and subsequent allergic reactions

Labelling



FACTS – Food & Allergy Consulting & Testing Services @ www.factssa.com

- Consults to the food industry on allergen management in the manufacturing environment
- Are intimately involved with the labelling regulations relating to allergens
- Offer training on the management of allergens in the manufacturing environment
- Have a lab that tests for the presence of allergens in foods

Labelling – Allergen regulations in SA

The following have been compiled with the help of **FACTS**

– **R.146 requires that the 8 common allergens be indicated in the ingredient list**

*Allergen regulations according to the regulations on labelling and advertising of foodstuffs (**R.146**) under the foodstuffs, cosmetics and disinfectants act, 1972 (act no. 54 of 1972), published on 1 March 2010 (Regulations have been amended in November 2011 and January 2012)*

The 8 common allergens include:

- 1. egg, 2. cow's milk, 3. crustaceans and molluscs (shellfish), 4. fish, 5. peanut, 6. soybeans, 7. tree nuts and 8. any significant cereals (wheat, rye, barley and oats)

Labelling – Important terminology

- **Allergen Cross-contamination:** presence of any common allergen not intentionally added to a foodstuff, which is present in such a foodstuff as a result of cultivation, production, manufacturing, processing, preparation, treatment, packing, transport, or holding of foodstuff, or as result of environmental contamination
- **Allergen Control Program:** program for identification and control of allergenic ingredients and for the prevention of allergen cross-contamination at every stage of the manufacturing process, from harvesting through to packaging and retailing
- **May contain:** According to R.146 the only precautionary labelling statement allowed is “May contain...”, therefore “made in a factory...” is not allowed anymore

Labelling – “May Contain”

INGREDIENTS:

Cake Mix: Cake Wheat Flour (Wheat Gluten, Wheat), Sugar, Corn Starch, Raising Agents, Emulsifier, Whey Powder (Cow's Milk), Modified Maize Starch, Skimmed Milk Powder (Cow's Milk), Salt, Flavouring, Stabilisers. **White Icing Mix:** Icing Sugar Compound (Sugar, Anticaking Agent), Flavouring, Colourant (E171). **Colour Mixes:** Sugar, Colourants (E171, E122, E127, E133, E104, E110).

Contains Allergens: Wheat Gluten, Wheat, Cow's Milk.
May Contain: Soya.

- “May contain” is only allowed when there is in fact a risk of cross-contamination of any of the common allergens.
 - An allergen control program should be implemented in case of possible risk of cross-contamination (*as to avoid cross-contamination as far as possible*), and only if all attempts have been made to avoid cross-contamination, but the risk persists, is it allowed to use “may contain” on a label
- Therefore products with “may contain” has to be avoided with confirmed FA to the specified allergen e.g. peanuts

Labelling – Hidden Allergens in foodstuffs (R.146)

Cow's Milk



Label terminology that may indicate the presence of milk protein

- * Artificial butter flavour
- * High protein flavour
- * Butter
- * Lactalbumin
- * Butter fat
- * Lactalbumin phosphate
- * Buttermilk solids
- * Lactose
- * Caramel colour
- * Milk derivate
- * Caramel flavouring
- * Casein
- * Natural flavouring
- * Caseinate
- * Rennet casein
- * Cheese
- * Sour cream (or solids)
- * Cream curd
- * Sour milk solids
- * De-lactosed whey
- * Whey or whey powder
- * Dry milk solids
- * Whey protein concentrate
- * Milk solids

Substitutes for dairy

Substitutes for cow's milk

- Soya/Fortified rice milk
- Oat / nut milk

Substitutes for cheese

- Dairy-free cheese

Substitutes for yoghurt

Soya or Pea yoghurt

Substitutes for butter

- Vegetable oil for baking
- Dairy-free margarine (*read label* as some contain milk-solids)

Fresh or
Powdered*
(most are calcium
fortified)

*Some contain
casein (*read label*)

Calcium (citrate/carbonate) supplements

(*assess need*)

- Take in split doses (best absorbed in doses $\leq 500\text{mg}$)
- Take separately from iron or iron rich meals

Substitutes for dairy – some examples



READ LABELS, esp. IN MULTIPLE ALLERGIES

Labelling – Hidden Allergens in foodstuffs cont. (R.146)

Egg



Label terminology that may indicate the presence of egg protein

- * Albumin
- * Lysozyme
- * Binder
- * Ovalbumin
- * Coagulant
- * Ovomucin
- * Emulsifier
- * Ovomuroid
- * Globulin
- * Ovovitellin
- * Lecithin
- * Vitellin
- * Livetin

Substitutes for Egg in recipes

Egg serves as a Binder or Leavening agent in recipes

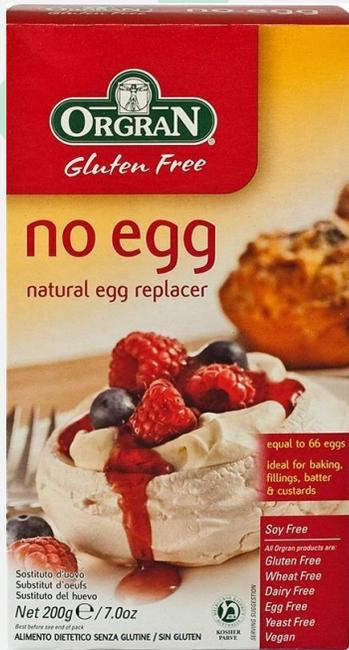
Replace every one (1) egg with:

Binder:

- 15 ml cornflour / custard powder
- 30 ml cake flour
- 75 ml apple puree / apricot puree
- ½ - 1 medium ripe mashed banana
- 60 ml apple sauce
- 1 tablespoon ground flax seed mixed with 3 tablespoons warm water; let stand 1 minute before using

Leavening Agent

- 10 – 15 ml baking powder
- 2 – 3 ml bicarbonate of soda + 4 – 6 ml cream of tartar
- ½ - 1 tbsp vegetable oil mixed with ½ - 1 tbsp water and 1 teaspoon baking powder



Labelling – Hidden Allergens in foodstuffs cont. (R.146)

Wheat



Label terminology that may indicate the presence of wheat protein

- * All-purpose flour
- * Bleached and unbleached flour
- * Bulgur (cracked wheat)
- Bran
- * Couscous
- * Durum wheat/flour
- * Enriched flour
- * Farina
- * Gelatinised starch# (or pre-gelatinised)
- * Gluten or Vital gluten
- * Graham flour
- * High protein flour
- * Kamut
- * Malt
- * Miller's bran
- * Modified food starch or modified starch#
- * Semolina
- * Spelt
- * Starch
- * Vegetable gum#
- * Vegetable starch#
- * White flour

May indicate the presence of soy protein or may be manufactured from cassava (tapioca), maize or rice.

Substitutes for wheat in recipes

For every 250 ml (120 g) cake flour (wheat)

- 180 ml (90g) potato flour
- 200 ml (100g) buckwheat flour
- 250 ml (120g) millet flour
- 250 ml (120g) barley flour
- 275 ml (200g) oatmeal
- 325 ml (120g) rolled oats
- 180 ml (90g) corn flour
- 200 ml (100g) fine maize meal
- 250 ml (125g) rye flour
- 200 ml (100g) rice flour
- 200 ml (100g) sago flour
- 180 ml (90g) soya flour
- 200 ml (100g) tapioca flour

Pre-mixed wheat-free baking flours are available

Note: Texture in baked products differ from wheat



Labelling – Final note

- SA labelling legislation very compatible with international labelling standards, even better than some (*although not all SA companies comply*)
- If companies don't comply: correct label (warning), remove product from shelf / fine
- All imported products, sold and advertised in SA, should comply with SA labelling legislation
- E-numbers are international (use international list)

Read food labels and advise on alternative products!

Practical Advice

- The success of allergen avoidance when shopping for food or eating outside the home, depends on the **individual's way of managing the allergy**
 - We as health care professionals should empower our patients (**especially the children themselves**)

The patient

- When limited number of foods allowed → increase variety within allowed food e.g. Rice: rice milk, rice cakes, rice-flour baked products, cooked rice, baked rice-pudding, rice pasta etc.
- Enquire from restaurants about preparation methods (cross-contamination), ingredients etc. (usually very helpful)
- Adapt recipes (many recipes available)



Practical Advice – The patient cont.

- Read **ALL** labels (food, drinks, medicine, herb and spices, supplements, chewing gum etc.)
 - Do not assume that any product is safe / unsafe (**regularly check labels, products change**)
 - Food labelling sometimes misleading / incomplete/absent
 - *Challenges arise with products without ingredient list (rather avoid)*
- Same product might contain different ingredients, depending on packaging
- Academy of Nutrition and Dietetics recommends to **read label for potential allergens 3 x for every item, every time**
 - Once at purchase, again when storing, and a final time before preparing or eating



Helpful
Tips

Practical Advice

For The Health Care Professional

- Home-visits help with identification of allergens on labels, and education
 - *Otherwise let patient bring supplements and foods to you*
- Keep a file/container with food labels (update regularly)
- Compile a file/folder with alternative “free-from” products (update regularly)
- Have adequate resources to help your client/patient
- Contact food/supplement companies to enquire about ingredients
- MONITOR your client/patient regularly → educate...educate...educate!!

Thank you



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