



Food Allergies and Intolerances Explained: Separating Fact from Fiction

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Disclosures

None pose any conflict of interest for this presentation.

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Objectives

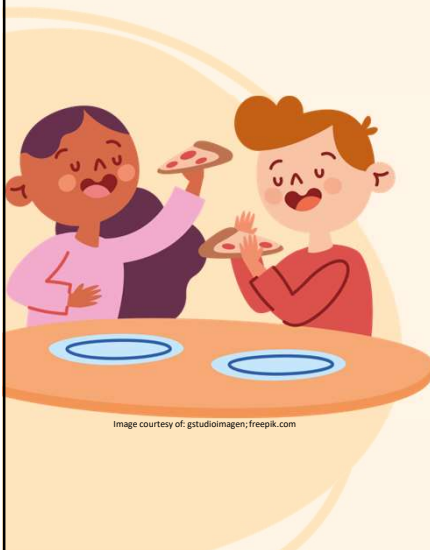


Image courtesy of: gstudiomagen;freepik.com



1. Define food allergies and food intolerances, and the most common food allergies and intolerances in the pediatric population.



2. Illustrate ways to help professionals and patients differentiate between food allergies and food intolerances.



3. Explain when the use of elimination diets is appropriate in pediatric patients and how to implement them safely.



4. Recognize the impact of dietary restrictions on food-related quality of life, mental health, and the family unit.

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Food Allergy vs. Intolerance

Allergy

Reproducible

Similar reaction each time, typically triggered by a food protein

Fast Onset of Symptoms

Usually within minutes to 2 hours
Can be more delayed, but less common

Impacts Respiratory, Skin, Cardiovascular, Neurologic, and GI
Hives, difficulty breathing, rash, itching, sneezing, coughing, hypotension, tachycardia, nausea, vomiting, sense of impending doom



Intolerance

May be More Variable

Reaction may be similar, or variable with ingestion. Typically triggered by a non-protein food component, i.e. carbohydrate

More Gradual Symptom Onset

Often can take hours, symptoms may onset gradually and progressively worsen

Mainly Impacts GI System

Gas, bloat, abdominal cramping, nausea, reflux, loose stool, and sometimes vomiting



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Food Intolerances vs Allergies

Adverse food reaction

Non-immune mediated

Immune mediated

Toxic

Pharmaco-logic

Metabolic

Other

IgE mediated

Non-IgE mediated

Mixed

Cell mediated

ASCIA. Allergy.Com. 2024.

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Food Allergies

Immune mediated

IgE mediated

Non-IgE mediated

Mixed

Cell mediated

ASCIA. Allergy.Com. 2024.

• IgE Mediated:

◦ "Classic" food allergy

- Immediate reaction (minutes to 2 hours), reproducible
- Symptoms: hives, wheezing, vomiting, cramping
- Examples: peanut allergy, cow milk allergy, egg allergy
- Diagnosis: clinical history, skin prick test, IgE testing, oral food challenge
- Management: avoidance, oral immunotherapy, sublingual immunotherapy, biologic medications

◦ Pollen food allergy syndrome (oral allergy syndrome)

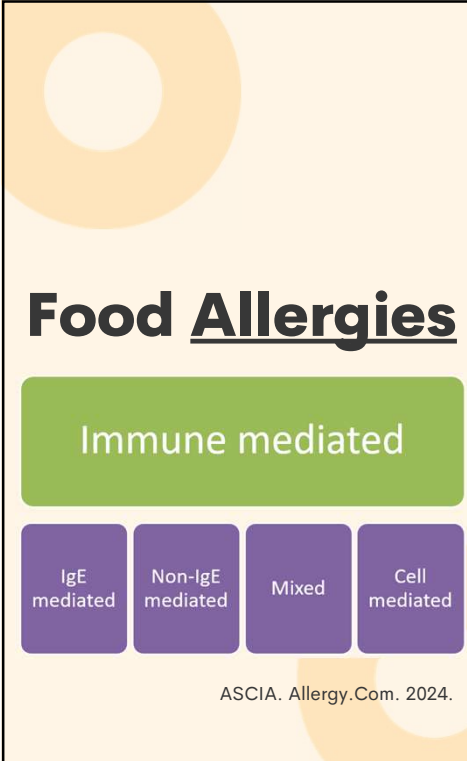
- Symptoms: Immediate, temporary, harmless oral itching
- Diagnosis: clinical history, skin prick test, IgE testing
- Management: avoidance, food modification (peel, cook)

◦ Alpha-gal syndrome (galactose- α -1,3-galactose)

- Reaction delayed 3-6 hours after ingestion of mammal meat
- Some react to mammalian milks
- Diagnosis: clinical history of tick bites, specific IgE
- Management: avoidance

Venter et al. Health Professional's Guide to Nutrition Management of Food Allergies. 2023.

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Food Allergies

Immune mediated

- IgE mediated
- Non-IgE mediated
- Mixed
- Cell mediated

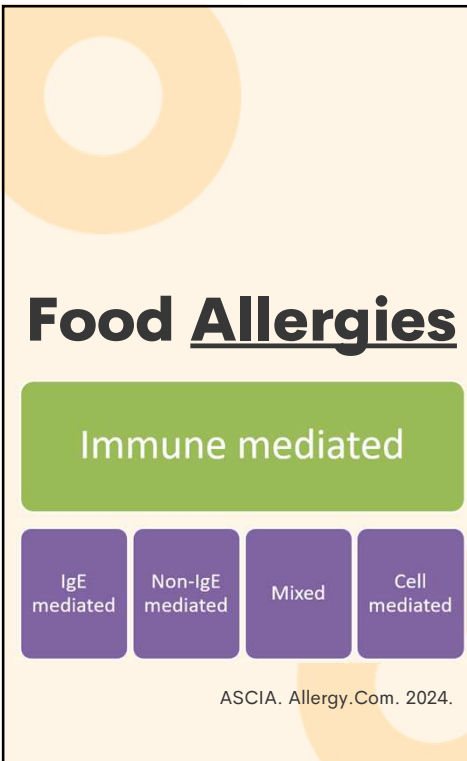
ASCIA. Allergy.Com. 2024.

• **Non-IgE Mediated:**

- **Food protein-induced enterocolitis syndrome (FPIES)**
 - Reaction delayed 1–4 hours after ingestion
 - Common triggers: cow's milk, rice, oats, egg, soy
 - Symptoms: pronounced vomiting, lethargy, weakness, pallor
 - Diagnosis: clinical history
 - Management: avoidance until outgrown
- **Food protein-induced proctocolitis (FPIAP)**
 - Blood in stool in otherwise healthy baby
 - Diagnosis: clinical history, guaiac for occult blood
 - Management: avoidance until outgrown

Venter et al. Health Professional's Guide to Nutrition Management of Food Allergies. 2023.

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Food Allergies

Immune mediated

- IgE mediated
- Non-IgE mediated
- Mixed
- Cell mediated

ASCIA. Allergy.Com. 2024.

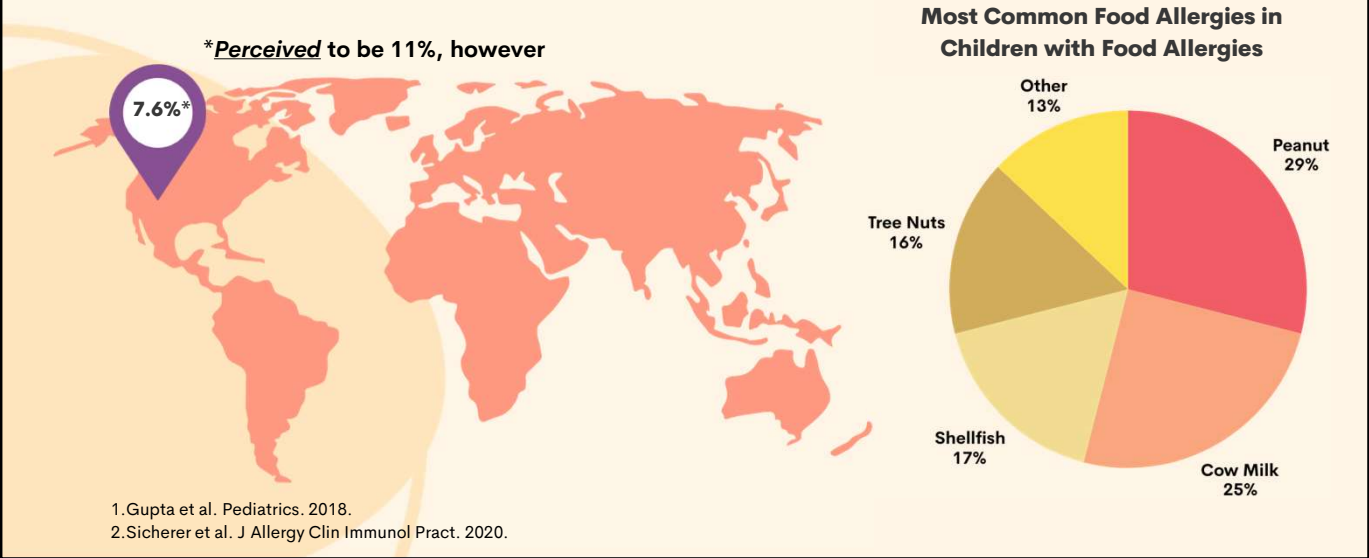
• **Mixed IgE & Non-IgE Mediated:**

- **Eosinophilic Esophagitis (EoE)**
 - Symptoms: Feeding difficulties, "picky eater," growth challenges, dysphagia, food impactions, prolonged mealtimes
 - Diagnosis: ≥ 15 eosinophils/high power field from esophageal biopsy on endoscopy
 - Management: swallowed steroids, diet elimination, biologics, proton pump inhibitors
- **Atopic dermatitis**
 - Symptoms: Recurring red and itchy rash with ingestion of food trigger that doesn't improve with skincare
 - Diagnosis: clinical history and skin exam
 - Management: skincare, moisturizing skin, topical steroids
- **Celiac disease**
 - Can be symptomatic (abdominal upset, diarrhea, constipation) or asymptomatic, nonspecific symptoms
 - Diagnosis: elevated TTG IgA, duodenal blunting on endoscopy
 - Management: lifelong gluten-free diet

Venter et al. Health Professional's Guide to Nutrition Management of Food Allergies. 2023.

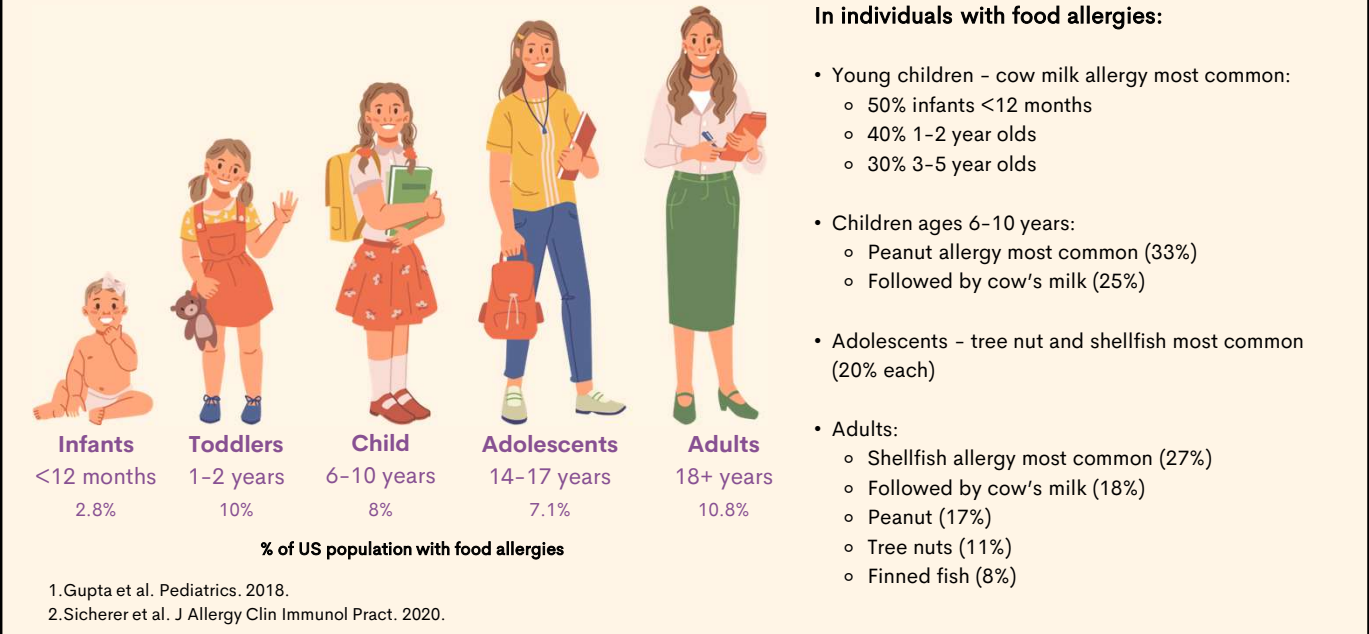
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Prevalence of Pediatric Food Allergies in the US

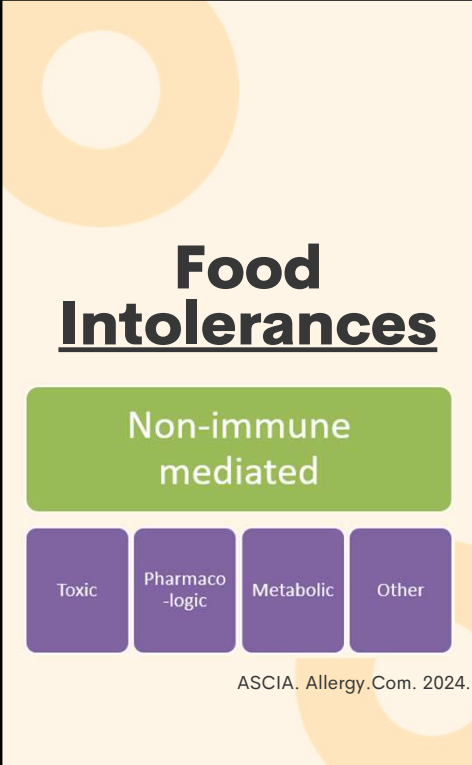


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Food Allergies Across the Lifespan



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Food Intolerances

Non-immune mediated

Toxic Pharmacologic Metabolic Other

ASCIA. Allergy.Com. 2024.

- **Metabolic:**
 - **Examples:** lactose intolerance, congenital lactase deficiency, fructose intolerance, congenital sucrase-isomaltose deficiency (CSID)
- **Pharmacologic:** caffeine, theobromine, alcohol, salicylates
- **Toxic:** foodborne illness
- **Other:**
 - *Additives:* sulfites, food dyes, emulsifiers, food additives and preservatives
 - *Histamines* (i.e. scombroid poisoning, aged cheeses, wine, fermented foods)
 - *Fibers and carbohydrates:* FODMAPs, sugar alcohols, and sugar alternatives
 - Non-celiac gluten sensitivity vs fructan intolerance
 - ~~MSG~~: debunked!
 - *Others:* carbonated beverages

Venter et al. Health Professional's Guide to Nutrition Management of Food Allergies. 2023.

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Food Intolerances

Non-immune mediated

Toxic Pharmacologic Metabolic Other

ASCIA. Allergy.Com. 2024.

- **Food Intolerance Masqueraders:**
 - Undiagnosed underlying gastrointestinal condition (i.e. inflammatory bowel disease, *H. pylori*, etc.), post-infectious gastric dysmotility, irritable bowel syndrome (IBS)
 - Slow/fast gastric motility (i.e. gastroparesis, dumping syndrome)
 - Visceral hyperalgesia (increased sensation of pain)
 - Antibiotic-associated diarrhea
 - Medication side effects
 - Gut microbiome dysbiosis
 - Cannabinoid hyperemesis syndrome
 - Fear, anxiety, hypervigilance in general and/or with food
 - Gut-brain connection
 - Rushed eating
 - Aerophagia
 - And more!
- **Is it always the FOOD? (No)**
 1. Freisen et al. Nutrients. 2021.
 2. Siah and Kim. J Neurogastroenterol Motil. 2023.



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Food Intolerances

Non-immune mediated

Toxic


Pharmacologic

Metabolic

Other

ASCIA. Allergy.Com. 2024.

- **Food Intolerance Considerations:**
 - exist on a spectrum
 - dose dependent
 - symptoms more digestive in nature: nausea, vomiting, diarrhea, gas, bloating, discomfort
 - can be influenced by mood, restfulness, pace of eating, stress load, illness, and more
 - fear and the self-fulfilling prophecy
- Food intolerance, gut disorders, and food allergies can – and often do – coexist!



1.Freisen et al. Nutrients. 2021.
2.Siah and Kim. J Neurogastroenterol Motil.2023.

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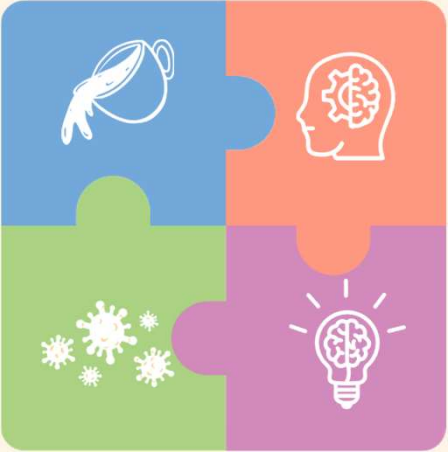
Food Intolerance Influencers

Digestive Influencers

Immunologic Processes

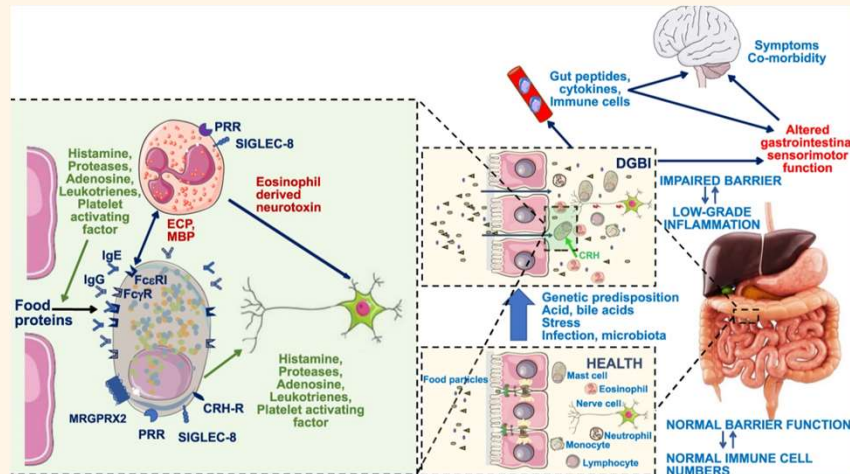
Mental Health

Health Beliefs & Knowledge



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Food Intolerance Influencers



Van Den Houte et al. Am J Gastroenterol. 2022.

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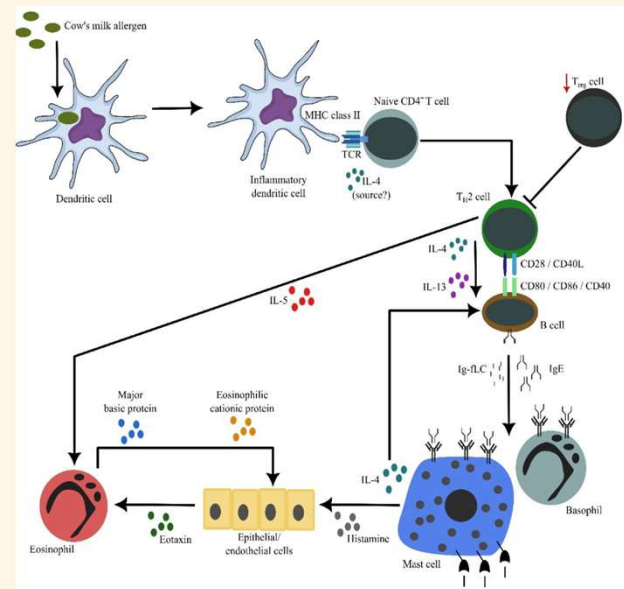
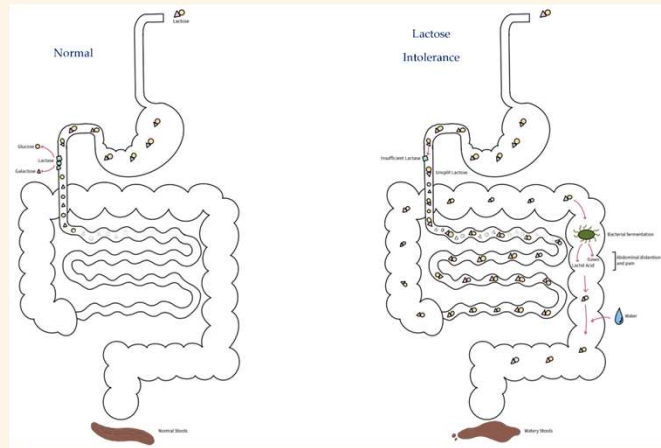
Lactose Intolerance

- Up to 65-70% prevalence worldwide
- Onsets around 5-6 years of age
- Geography: Southern Africa, Southwest Asia, Central Asia
- More prevalent in individuals of color
- Prevalence increases with age
- Different forms of lactase deficiency:
 - Primary
 - Secondary
 - Congenital
 - Developmental
- **Not the same as cow milk allergy!**
 - Misconceptions persist
 - 61% HCPs report differentiating lactose intolerance from cow milk allergy
 - But 23% agreed with statement "primary lactose intolerance in infancy is common"
- Diagnosis: hydrogen breath test, stool pH, dietary elimination, cow's milk tolerance test, lactose tolerance test

1. Legeret et al. Eur J Pediatr. 2023. 2. Malik and Panuganti. StatPearls. 2023. 3. Storhaug et al. Lancet Gastroenterol Hepatol. 2017. 4. Darma et al. Nutrients. 2024.

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Lactose Intolerance vs. Cow Milk Allergy



1. Darma et al. Nutrients. 2024. 2. Jo J, et al. Mediators Inflamm. 2014;2014:249784.

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There are two types of cow milk allergy

• IgE Mediated:

- Most common food allergy in children under age 6
- Symptoms more respiratory and dermatologic in nature (cough, sneeze, wheezing, anaphylaxis, rash), cardiac, neurologic, some digestive symptoms as well (nausea, vomiting)
- Typically outgrown by 2-5 years of age
- Management: dairy-free diet for child, dairy-free diet for lactating parent (if needed), specialized formula, possibly dairy ladder (if appropriate)

• Non-IgE-Mediated:

- Commonly seen in infancy, estimated 1.9-4.9% worldwide
- Symptoms more gastrointestinal in nature (reflux, constipation, diarrhea)
- Commonly outgrown by 12 months
- Management: dairy-free diet for baby, dairy-free diet for lactating parent (if needed), specialized formula



1. Di Costanzo et al. Pediatr Ann. 2021. 2. Darma et al. Nutrients. 2024. 3. Venter et al. Clin Transl Allergy. 2017.

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Human milk is suggested as the main source of nutrition for infants and is recommended for infants with CMA when possible

- All current guidelines support human milk as first line choice for the dietary management of CMA¹⁻³
- Aim to follow WHO guidelines:
 - 6 months exclusive breastfeeding
 - WHO suggests breastfeeding until 2 years of age
 - If parental elimination diet is advised, needs to be supervised^{1,2}
 - Not always needed (e.g. FPIES⁴)
 - Consider vitamin and minerals (i.e. calcium, vitamin D)^{1,2}



CMA = cow milk allergy; WHO = World Health Organization; FPIES = food protein-induced enterocolitis syndrome

1. McWilliam, et al. World Allergy Organ J. 2023; 16:100830. 2. Vandenplas, et al. J Pediatr Gastroenterol Nutr. 2024;78:386-413. 3. Muraro, et al. World Allergy Organ J. 2022;15:100687. 4. Nowak-Węgrzyn, et al. J Allergy Clin Immunol. 2017;139:1111-26.e4.

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When human milk is not available or needs to be supplemented...

INFANTS
<1 yr

Substitute formula:

- ✓ 1st line: Extensively hydrolyzed *OR* hydrolyzed rice^{*}
- ✓ 2nd line: Amino acid-based[†]
- ✓ 3rd line: Soy (if tolerant)

CHILDREN
>1 yr


- ✓ Substitute formula *OR*
- ✓ Plant-based beverage (PBB)
 - Several factors need to be considered prior to recommending
 - Adverse effects from inappropriate use of PBBs exist

^{*}Hydrolyzed rice formula is not currently available in the U.S. [†]Amino acid-based formula should be considered as first-line use in certain situations.

1. Bognanni, et al. World Allergy Organ J. 2024; 17:100888. 2. Venter, et al. World Allergy Organ J. 2024;17:100931.

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"Hypoallergenic" is a clearly defined and regulated term in the US

Formula type: (protein source)	Amino acid- based (AAF)	Extensively hydrolyzed (eHF)
Protein source	100% free amino acids	Cow milk
Peptide size, kilodaltons	N/A (free AAs ~0.12 ¹)	Most <1.5 ² Up to 5% >3.5 ³
Allergenicity		
Hypoallergenic? ²	☑ YES	☑ YES

"Hypoallergenic"/"HA"

- ≥90% of patients with CMA tolerate (with 95% confidence)²
- Europe: Formulas labeled "HA" are partially hydrolyzed and should not be used for cow milk allergy (CMA)⁴

1. <https://www.seas.upenn.edu/~cis535/Fall2004/HW/GCB535HW6b.pdf>, July 3, 2018. 2. American Academy of Pediatrics Committee on Nutrition. Pediatrics. 2000;106:346-9. 3. Lowe, et al. Expert Rev Clin Immunol. 2013;9:31-41. 4. Bahna. Ann Allergy Asthma Immunol. 2008;101:453-9.

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Clinical Process



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Allergy-Focused Clinical & Diet Intake

- Go through allergies reported with fine-tooth comb – who diagnosed?
- Symptoms: timing, onset, severity, consistency
- Presence of other atopic conditions
- Food suspects, amounts, other suspects
- Management options attempted and outcomes

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Sources of Health Information

- Trusted healthcare provider
- Unreputable practitioners and testing (i.e. food intolerance or muscle testing)
- Family and friends
- Social media

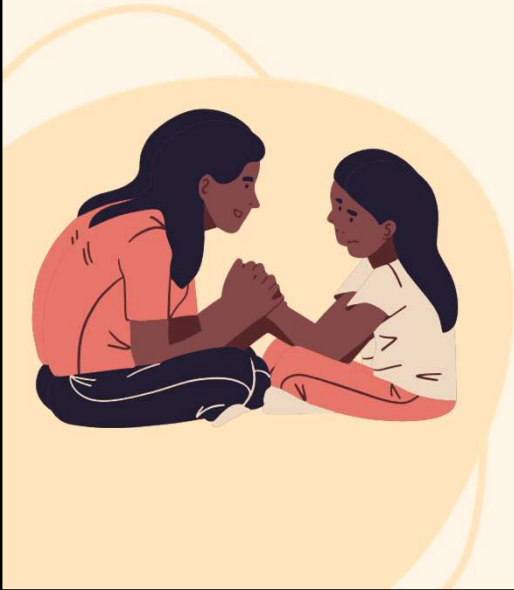
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Diet & Lifestyle Counseling

- Assess current restrictions, nutritional gaps, barriers faced
- Presence of food anxiety, disordered eating, eating disorders?
- Weight, growth, and body image
- Psychosocial wellbeing: school support, friends, and family
- Prioritizing the least restricted diet

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Balancing Facts with Empathy & Compassion: Meeting Patients Where They Are



- Our patients are doing their best
- Many come in feeling anxious, fearful, overwhelmed, and desperate
- Sometimes the most therapeutic part of the visit is your:
 - Presence
 - The energy and environment you cultivate
 - How you co-regulate
- As you provide clinical education, pause and:
 - Check in with your patient
 - Ask permission frequently
 - Ask if you're moving too fast
 - Does your patient seem overwhelmed, or relaxed?
 - Speak in simple, developmentally appropriate terms
- Acknowledge their experience, the "good" and the "bad"
- Consider cultural humility, socioeconomic status, bandwidth, and time wealth

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Life Stage Considerations

Challenges vary across the lifespan



Sicherer et al. J Allergy Clin Immunol Pract. 2020.

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Management Options for Food Allergies & Intolerances



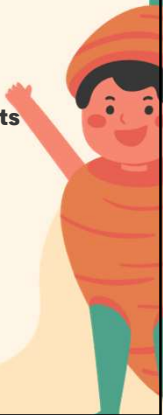
Controlled Exposures



Dietary Elimination



Medications & Supplements



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Elimination Diets

Food Allergies

IgE-Mediated

Elimination of offending food, i.e. cow's milk, egg, soy, wheat, peanut, tree nuts, sesame, finned fish, crustaceans



Non-IgE-Mediated

FPIES: avoid offending food, such as cow's milk, rice, oat, soy, or other
FPIAP: avoid dairy

Mixed IgE & Non-IgE-Mediated

EoE: 6-, 4-, and 2-food elimination diet, elemental diet
Celiac disease: lifelong, strict gluten-free diet



Food Intolerances

Targeted Elimination Diet or Enzyme Supplementation

Lactose-free or low fructose diet, lactase supplement, or other supplement for individuals with confirmed or suspected intolerances

Low FODMAPs Diet

For individuals with IBS and/or suspected food intolerances. A "gentle," less restrictive version also exists

Condition-Driven Diets

Specific carbohydrate diet, exclusive or partial enteral nutrition, GAPS, Feingold, and others.



FPIES = food protein-induced enterocolitis syndrome; FPIAP = food protein-induced allergic proctocolitis; EoE = eosinophilic esophagitis; FODMAPs = fermentable oligosaccharides, disaccharides, monosaccharides, and polyols; IBS = irritable bowel syndrome; GAPS = gut and psychology syndrome

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Aligning Dietary Management

Right Management Option

Is this the right option for this patient?

Right Patient

Is this the best-fit approach for this patient and family?



Right Time

Is this the best time to pursue this management option?

Right Reasons

Are our reasons for choosing this option sound and safe?

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Which Patient is the Best Fit for Dietary Management?

Supportive Factors

- Stable weight and growth status
- Neutral / positive relationship with food and body image
- Current diet not significantly limited
- Strong support system
- Reliable food access
- Time wealth
- Culturally and socioeconomically inclusive guidance and resources
- Child and family aligned
- Access to multidisciplinary team, especially pediatric RD



Image courtesy of: Amethyst Prime; flaticon.com

Unsupportive Factors

- Weight or growth challenges
- Psychological distress (anxiety, depressive symptoms)
- Body image dissatisfaction
- Disordered eating behaviors
- Barriers to food access
- Pre-existing dietary restrictions (picky eating, ARFID, food allergies, religious)
- Female identifying patients
- Adolescent age

ARFID = avoidant/restrictive food intake disorder
Kalami et al. J Pediatr Gastroenterol Nutr. 2024

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Role of the RD



- Ensure access to RD, especially for multi-food elimination
- RD's role:
 - Assess
 - Understand food and disease beliefs
 - Educate
 - Provide practical guidance
 - Troubleshoot and refine
 - Reassess
 - Ensure nutritional safety
 - Analyze need for nutrition supplements (targeted micronutrients, specialized formulas, etc.)
 - Screen for disordered eating, food anxiety, etc.
 - Collaborate with multidisciplinary team
 - Continuously re-assess safety, emotions around diet
- Assessment timing, about 60-90 minutes
- Teaching sessions, 60-90 minutes, often multiple needed
- Ongoing follow ups, 30-60 minutes

RD = registered dietitian

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Nutritional Risks with Elimination Diets



Table 4
Nutritional gaps and possible replacement strategies in diets excluding the eight most common IgE-dependent food allergens.

Allergen	Deficiency	Substitute
Cow's Milk	Calcium, vitamin D, protein, phosphorus, magnesium, potassium, vitamin B12, zinc	Almond milk, oat milk, coconut milk, rice milk, cashew milk, hems milk, macadamia milk
Wheat	Fiber, folate, vitamin B12, selenium, manganese, phosphorus, copper	Rice, quinoa, millet, amaranth, buckwheat, sorghum, teff
Egg	Retinol (vitamin A), riboflavin, thiamin, vitamin B6, vitamin B12, biotin, folate, pantothenic acid, potassium, magnesium, phosphorus, iron, selenium, zinc, iodine	Tofu, mashed banana, yogurt, buttermilk, chia seeds
Tree Nuts	Protein, fat, MUFA, PUFA, linoleic acid, carbohydrates, fiber, calcium, iron, magnesium, phosphorus, potassium, sodium, selenium, zinc, copper, vitamin C, thiamine, riboflavin, niacin, pantothenic acid, vitamin B6, folate, vitamin B12, vitamin A, β -carotene, lycopene, lutein, zeaxanthin, vitamin E	Pumpkin seeds, sunflower seeds, chickpeas, sesame seeds, olives, avocado
Peanut	Protein, fat, fiber, magnesium, folate, vitamin E, copper, arginine	Sunflower seeds, sesame seeds, flax seeds, tree nuts (almonds, cashews, walnuts)
Fish	Omega-fatty acids, proteins, iron, zinc, copper, vitamin B12, vitamin D	Walnuts, flaxseed oil, soy oil, canola oil, egg, sesame butter, leafy green vegetables (spinach, spirulina)
Shellfish	Omega-fatty acids, proteins, irons, zinc, copper, vitamin B12	Coldwater fish (salmon, tuna, mackerel, sardines), egg, nuts, seeds
Soy	Protein, fat, fiber, vitamin C, vitamin K, thiamine, riboflavin, folate, iron, magnesium, phosphorus, potassium, zinc, manganese, copper, vitamin E, niacin, vitamin B6, pantothenic acid	Fresh vegetables, plant proteins, grains



Gargano et al. Nutrients. 2021.

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Elimination Diet Considerations

- **Food-related quality of life (QoL)**
 - Caregivers may underestimate psychosocial impact of diet elimination
 - Families are resilient! But exhaustion can and does happen
 - Feasibility and sustainability
- **Mental health**
 - Presence of anxiety, depressive symptoms, disordered eating, or other mental health concerns
 - Connected with mental health provider?
- **Family unit**
 - Consider dietary patterns and needs of family and siblings
 - Food-related family activities (i.e. Friday night pizza and ice cream parties)
 - Caregiver QoL and family functioning worse in families with child on an elimination diet for non-IgE mediated allergies compared to those with sickle cell disease and intestinal failure

Sicherer et al. J Allergy Clin Immunol Pract. 2020; Meyer et al. World Allergy Organ J. 2017.

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The Importance of Multidisciplinary Care

“

Medical

- Diagnosis
- Medical education
- Counseling
- Management options
- Ongoing follow up
- Referrals

“

Nutritional

- Nutrition assessment
- Counseling & education
- Food-related QoL
- Disordered eating, body image
- Ongoing follow up
- Referrals

“

Mental Health

- Mental health assessment
- Support with anxiety, depressive symptoms, food allergy-related trauma
- Disordered eating, body image
 - Impact on relationships
- Coping and lifestyle tools
- School and work accommodations

QoL = quality of life

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Avoidant/Restrictive Food Intake Disorder (ARFID)



Complex and Intersectional

Food neophobia, ARFID, and life with food allergies intersect



Negative Food Experiences

Food-allergic reactions, pain, fear of negative food experiences, restrictive diets, hypervigilance around food, fear of burdening others



Medical, Nutritional, and Emotional

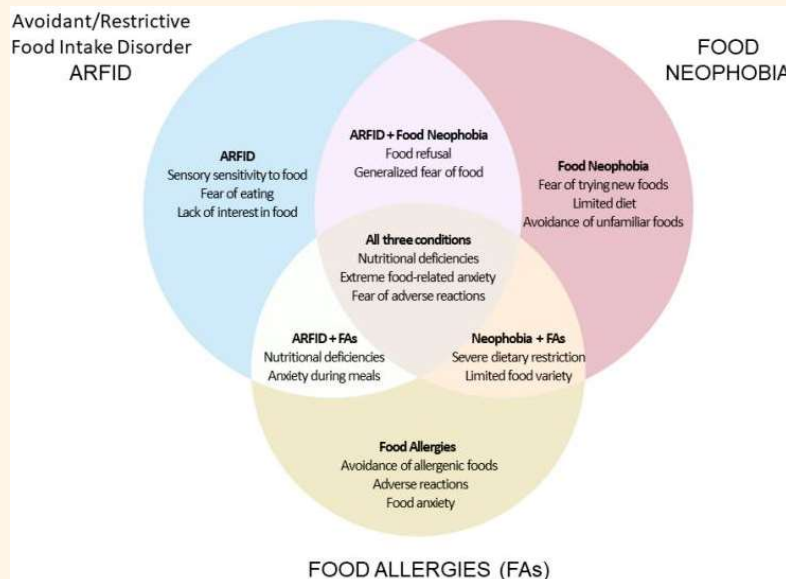
Can impact weight and growth, increase risk of nutritional deficiencies, stunting, and developmental delays. Co-occurs with anxiety conditions.



Nocerino et al. Nutrients 2024.

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ARFID, Food Neophobia, and Food Allergies



Nocerino et al. Nutrients 2024.

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SUMMARY

- Food allergies and intolerances significantly impact children and adults
- Misconceptions regarding the differences food allergies and intolerances persist in healthcare
- Cow milk allergy and lactose intolerance are frequently mistaken for another
- As clinicians, our job is to:
 - Identify allergy vs. intolerance
 - Gently educate appropriately
 - Minimize restriction
 - Ensure medical, nutritional, and emotional safety
- Ultimate goal = support QoL and help our patients thrive



QoL = quality of life

Image courtesy of: gstudioimagen, freepik.com

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Clinician Resources

Food Allergies and Related Conditions	Eosinophilic GI Disorders (EGIDs)	FPIES (Food Protein-Induced Enterocolitis Syndrome)	Celiac Disease
FARE®: 9-month training program for food allergy professionals 	American Partnership for Eosinophilic Disorders (APFED) 	The FPIES Foundation 	Celiac Disease Foundation® 
Kids with Food Allergies 	Campaign Urging Research for Eosinophilic Disease (CURED) 	International FPIES Association (I-FPIES) 	
Health Professional's Guide to Nutrition Management of Food Allergies 			

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