AAAAI Work Group Report

Dietary Therapy and Nutrition Management of Eosinophilic Esophagitis: A Work Group Report of the American Academy of Allergy, Asthma, and Immunology

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Eosinophilic esophagitis (EoE) is a chronic/immune-antigen-mediated disease characterized clinically by symptoms related to esophageal dysfunction and histologically by eosinophil-predominant inflammation. Dietary elimination therapy has been shown to be an effective, drug-free prescription for the treatment of EoE. A range of different dietary elimination therapies have been used. Regardless of the elimination diet chosen, dietary therapy requires in-depth nutrition assessment and management. Elimination diets are not without risk and may impact nutritional status, eating pleasure, and overall quality of life. With adequate guidance, dietary therapy can be effective and nutritionally balanced, and the adverse impact on lifestyle can be minimized. This work group report addresses the potential challenges of implementing an elimination diet for the management of EoE and provides instructions and tools for physicians, dietitians, and other allied health professionals to help guide them in planning elimination diets for both children and adults. **© 2016 American Academy of Allergy, Asthma & Immunology** **(J Allergy Clin Immunol Pract 2017;5:312-24)**

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Abbreviations used
AAF- Amino acid-based formula
BMI- Body mass index
ED- Elemental diet
EEsAI- Eosinophilic Esophagitis Activity Index
EoE- Eosinophilic esophagitis
FALCPA- Food Allergen Labeling and Consumer Protection Act
MNT- Medical nutrition therapy
PAL- Precautionary allergen labels
PEESS- Pediatric Eosinophilic Esophagitis Symptom Score
PFAS- Pollen food allergy syndrome
QoL- Quality of life
SFED- Six-food elimination diet
TCS- Topical (swallowed) corticosteroids
TDED- Test-directed elimination diet

Eosinophilic esophagitis (EoE) is a chronic/immune-antigen-mediated disease characterized clinically by symptoms related to esophageal dysfunction and histologically by eosinophil-predominant inflammation.[1] There are currently an estimated 56.7 cases per 100,000 in children and adults in the United States, and like other allergic disorders, the prevalence of EoE appears to be increasing.[2]

Treatment goals for EoE are resolution of clinical symptoms and esophageal eosinophilic inflammation, maintenance of remission to prevent potential complications such as esophageal strictures and/or fibrosis, correction and prevention of nutritional deficiencies, prevention of treatment-related complications, and maintenance of quality of life (QoL).[3] Three distinct forms of therapy have been recommended for treating EoE: esophageal dilation (adults), medications, and elimination diets (children and adults).[1,4] Dilation, although effective, does not address the underlying inflammation in the esophagus, and therefore is not considered an effective long-term therapy. There are currently no FDA-approved medications for the treatment of EoE. Off-label use of swallowed topical corticosteroids (TCS) has been shown to effectively treat EoE[5,6] although the long-term efficacy and safety of TCS is not yet established and prolonged use is required, but often unwanted, for maintenance of disease remission.[7,8] By contrast, dietary elimination therapy has been shown to achieve both histologic and clinical remission in children and adults and offers the potential for long-term remission without the risk of drug-related side effects.[9]

Implementing dietary therapy can be a challenge. There are currently no tests that accurately identify food triggers in EoE, and implementing an efficacious and nutritionally sound diet is difficult but possible with adequate dietetic guidance. The choice of a specific dietary therapy regimen is individualized and dictated by patient and provider preferences, and feasibility from medical, nutritional, and practical standpoints for each patient is addressed elsewhere.[10]

Although access to an experienced dietitian may help patients plan for a nutritionally sound and gratifying diet, as well as improve their diet adherence, the reality is that many patients with EoE and their physicians do not have access to dietitians with EoE expertise. This work group report addresses the potential challenges of implementing a chosen dietary therapy for the management of EoE and provides tools and guidance for effective implementation to physicians and allied health professionals caring for children and adults with EoE. The report, however, is not intended to replace nutrition assessment, dietary therapy implementation, and monitoring by a registered dietitian.

DIETARY THERAPY OPTIONS

If selecting a dietary therapy, it is recommended that practitioners consider the use of targeted or empiric elimination diets or elemental diet for successful EoE therapy.[8,11]

Elemental diet

The elemental diet (ED) consists of an amino acid-based formula (AAF) free from intact proteins or peptides and has been found to result in remission in the majority of children with EoE.[12-14] Based on a recent meta-analysis of reported dietary therapies used to treat EoE, the ED was the most effective therapy with a histologic disease remission rate of 90.8% (7 studies; 95% CI, 84.7-95.5) in children and adults and was as effective as steroid treatment in EoE symptom resolution.[15] Currently, major allergy and gastroenterology societies suggest the use of an AAF over an extensively hydrolyzed formula for the management of an ED[4,16,17] (see Table I for the available AAF in the United States).

Before embarking on an ED, individual goals should be customized to meet energy, protein, vitamin, and mineral needs of the patient (see Table II for dietary reference intakes and common sources of key nutrients). Close attention should be paid to the nutrient content of the chosen formula, as micronutrient and macronutrient content varies between manufacturers of an AAF (Table I). AAFs also vary in taste. Some manufacturers offer a flavored version or a variety of flavors, although other flavorings such as pure vanilla extract or sugar or corn syrup-based artificial flavorings (eg, strawberry flavored syrup) may also be added to the AAF by the patient or family.

Young children on EDs require special attention. Major developmental milestones for feeding are achieved within the first 3 years of life, and feeding skills are acquired and honed through the presentation of foods.[18] Removing all foods during this period may impact taste preferences and impede or delay the acquisition of feeding skills.[18] When prescribing a formula-only diet for a child in this age group, a baseline feeding evaluation can be helpful in assessing the likelihood for success of later food reintroduction.[19] Modifying the ED by adding 1 or 2 foods (eg, apple or sweet potato) may help to preserve and/or develop oral motor skills and improve food acceptance. Even if only a limited number of foods are permitted in a child's ED, preparing the foods in a number of ways (pureed, mashed, cubed, fried, etc.) can vary texture experiences. The help and advice of a dietitian is particularly useful at this stage to show how a limited number of foods can be offered in a variety of ways. Flavorings and ingredients such as pure vanilla extract (or alcohol-free vanilla extract), sugar/corn syrup-based artificial flavorings (eg, strawberry-flavored syrup), distilled white vinegar, salt, sugar, pure maple syrup, plain lollipops (containing acceptable artificial flavorings), and refined (as opposed to expeller pressed, pressed, or extruded) vegetable oils may also be used for varied taste experience and do not add any significant intact proteins that

TABLE I. Amino acid-based formulas available in the United States

Formula*	Indication/unique characteristics	Standard dilution (kcal/oz)	Protein (g)/100 kcal	CHO (g)/100 kcal	Fat (g)/100 kcal	Calcium (mg)/100 kcal	Vitamin D (IU)/100 kcal	Osmolality (mOsm/kg H_2O)
Alfamino Infant	For ages 0-12 mo; 43% MCT	20	2.8	11	5	119	56	330
Elecare Infant	For ages 0-12 mo; 33% MCT	20	3.1	10.7	4.8	116	60	350
Neocate Infant	For ages 0-12 mo; 33% MCT	20	2.8	10.8	5.1	116	73	340
PurAmino	For ages 0-6 mo; or as supplement to diet up to 24 mo.	20	2.8	10.6	5.3	94	50	350
Alfamino Junior	For ages 1-13 y; unflavored; 65% MCT	30	3.3	12.2	4.4	120	80	590
Elecare Junior	For ages 1 and up; unflavored and vanilla; 33% MCT	30	3.1	10.7	4.9	117	60	590
Neocate Junior	For ages 1 and up; unflavored, chocolate, tropical. With prebiotics: unflavored, vanilla, strawberry; 35% MCT	30	3.5	11	4.7	120	79	Unflavored: 590 Flavored: 650-700
Eo28 Splash	For ages 1 and up as supplement to elimination diet; RTF box with straw; 3 flavor varieties; 35% MCT	30 (RTF)	2.5	14.6	3.5	62	31	820
Neocate Splash Unflavored	For ages 1 and up; RTF box; appropriate as sole nutrition source; 35% MCT	30 (RTF)	3.0	10.5	5.1	118	80	670
Neocate Nutra†	For age 6 mo and up; semisolid medical food; not suitable as sole nutrition source; 4% MCT	175 kcal per 37 g serving	1.7	14.3	4.0	141	36	N/A

CHO, Carbohydrate; *MCT*, medium chain triglycerides; *RTF*, ready-to-feed.
*Formulas are nationally specific and nutrition content may vary. Please check your local product nutrition handbook.
†Neocate Nutra is a hypoallergenic semisolid food suitable for spoon-feeding. It is not elemental and it is not a complete formula.

would potentially trigger EoE (see Supplement E1 in this article's Online Repository at www.jaci-inpractice.org). In adults, black and green tea is allowed. Modifying the ED by adding 1 or 2 foods has its disadvantages however if the modified ED does not result in remission of EoE, as it leaves open to question whether the ED itself was a failure or whether one or more of the added foods was a trigger.

Although the ED has been shown to result in substantial histologic improvement for both children and adults,[4,13,14] the difficulty in sustaining this diet may make it a less desirable choice for chronic therapy. An ED may be a useful starting point for motivated patients with EoE to gain remission, and may be followed by the reintroduction of foods. ED therapy may require nasogastric or gastrostomy tube feedings to achieve formula intake goals to meet nutritional needs.

Empiric elimination diet

The empiric elimination diet eliminates common food allergens without needing to perform prior testing such as skin prick tests, atopy patch tests to foods, or food-specific serum IgE levels.[20] Kagalwalla et al[20] conducted a retrospective evaluation of a 6-food elimination diet (SFED) in children, empirically eliminating milk, wheat, egg, soy, peanut/tree nuts, and fish/shellfish, and reported a histologic response rate of 74% (n = 35) (see Supplement E2 in this article's Online Repository at www.jaci-inpractice.org). Similar findings in adults were also reported in a nonrandomized, prospective study (70%; n = 50).[21] These investigators found by the process of sequential food reintroduction and repeat endoscopies with esophageal biopsies examining for EoE relapse the most commonly implicated foods to be cow's milk (74% and 50% of children and adults, respectively), wheat (26% and 60%), egg (17% and 10%), soy (10% and 10%), and peanut (6% and 5%).[20,21] Another adult study reported histologic disease remission in 73% of adults with EoE after the elimination of milk, wheat, egg, soy, legumes, rice, corn, peanuts, fish, and shellfish (n = 67) with the common triggers identified on reintroduction to be milk (61%), wheat (28%), eggs (26%), and legumes (23%).[22] Using meta-analysis, Arias et al[15] reported the combined histologic disease response rate in 7 studies using SFED to be 72.1% (95% CI, 65.8-78.1). The response rate to this diet was similar in the pediatric (72.8%) and adult (71.3%) populations.

Variations of the empiric elimination diet have been reported, such as a 4-food elimination diet in adults (milk, egg, wheat, and legumes)[23] and milk elimination in children.[24] Prospective studies in children are underway using 4-food elimination diets as these appear to be the foods most commonly implicated[20,21]; however, more research is needed

TABLE II. Dietary reference intakes (DRI) and common dietary sources for select nutrients

Nutrient	Nutrient DRI Adult 18-50 y	Nutrient DRI Children (daily intake)	Common allergen sources for nutrient	Good alternative sources for nutrient
Protein	56 g males 46 g females	1-3 y—13 g 4-8 y—19 g 9-13 y—34 g 14-18 y—52 g (males) 14-18 y—46 g (females)	Milk and dairy products, fish, egg, nuts, soy	Meat, poultry, seeds, legumes, supplemental formula
Calcium	1000 mg	1-3 y—700 mg 4-8 y—1000 mg 9-18 y—1300 mg	Milk and dairy products, calcium-set tofu, salmon and sardines with bones, enriched soy milk products, almonds	Dark green leafy vegetables, hummus, tahini, sesame seeds, supplemental formula, enriched milk substitutes
Zinc	11 mg males 8 mg females	1-3 y—3 mg 4-8 y—5 mg 9-13 y—8 mg 14-18 y—9 mg (females) 14-18 y—11 mg (males)	Shellfish, fortified wheat cereals, soy, tree nuts	Beef, poultry, fortified cereals, sesame seeds, beans
Iron	8 mg males 18 mg females	1-3 y—7 mg 4-8 y—10 mg 9-13 y—8 mg 14-18 y—11 mg (males) 14-18 y—15 mg (females)	Fortified wheat-based breads and cereals, oysters, soy, egg	Liver, beef, lamb, white beans, lentils, chickpea, pumpkin and squash seeds, fortified cereals
Selenium	55 μg	1-3 y—20 g 4-8 y—30 g 9-13 y—40 g	Peanut and tree nuts, fish, egg, whole wheat	Meat, poultry, seeds (sunflower, pumpkin, squash, and sesame)
Vitamin A	900 μg males 700 μg females	1-3 y—300 μg 4-8 y— 400 μg 9-13 y—600 μg 14-18 y—900 μg (males) 14-18 y—700 μg (females)	Fortified milk and milk products	Liver, sweet potato, carrots, butternut squash, pumpkin, cantaloupe, dark leafy greens, plant oils (eg, sunflower, grape seed, olive, canola)
Vitamin D	600 IU (15 μg)	1-18 y—600 IU (15 μg)	Fortified milk and milk products, fortified wheat-based cereal, fatty fish (salmon, swordfish, tuna, cod liver oil), egg yolk	Fortified cereals, enriched milk substitutes
Vitamin E	15 mg	1-3 y—6 mg 4-8 y—7 mg 9-13 y—11 mg	Wheat germ and wheat germ oil, peanut, tree nuts	Plant oils (eg, sunflower, grape seed, olive, canola), sunflower seeds
Vitamin B12	2.4 μg	1-3 y—0.9 μg 4-8 y—1.2 μg 9-13 y—1.8 μg	Milk and dairy products, fish, shellfish, eggs, fortified wheat-based cereals	Liver, meat, poultry, fortified breakfast cereals, enriched milk substitutes, fortified nutritional yeast
Thiamin (B1)	1.2 mg males 1.1 mg females	1-3 y—0.5 mg 4-8 y—0.6 mg 9-13 y—0.9 mg 14-18 y—1.2 mg (males) 14-18 y—1.0 mg (females)	Enriched wheat-based cereals	Pork, nutritional yeast, fortified cereals
Riboflavin	1.3 mg males 1.1 g females	1-3 y—0.5 mg 4-8 y—0.6 mg 9-13 y—0.9 mg 14-18 y—1.3 mg (males) 14-18 y—1.0 mg (females)	Milk and dairy products, enriched wheat-based cereals, egg	Liver, nutritional yeast, red meat, fortified cereals

before conclusions regarding the efficacy of these approaches can be made.

Test-directed elimination diet

The test-directed elimination diet (TDED) is guided by combined results of food-specific skin prick and atopy patch testing. One study using the TDED reported a negative predictive value of combined prick and patch testing of just 42% for milk but up to 92% for other foods.[25] This study found that a combination of prick/patch-based elimination diet with the empiric elimination of milk resulted in histologic remission of EoE in 77% of children.[25] However, an evaluation of 14 TDED

studies by Arias et al[15] found that the overall histologic remission rate was 45.5% (14 studies; 95% CI) with a wide variability in the response rate between studies (35.4% to 55.7%), and a much lower response rate in the 2 adult studies (26.6% and 35%). Straumann et al[26] prospectively evaluated the impact of a wheat and rye elimination diet in a group of 6 patients with active EoE and sensitization to wheat or rye (without sensitization to other foods) assessed via skin prick test and/or food-specific IgE and found no benefit of elimination of grains alone in this population. None of these studies had a control arm.

An important proviso when considering the use of TDED is that food atopy patch testing has not been standardized or validated in patients with EoE and requires further investigation.[11,27] Positive serum food-specific IgE levels, food skin prick test responses, and food patch test results are not sufficient on their own to diagnose food triggers for EoE.[11] In addition, Van Rhijn et al[28] found no association between foods identified by component-resolved diagnostics and exacerbation of EoE. The only certain way to know if a food is a trigger for EoE is through resolution of symptoms and esophageal histology with elimination of the food, followed by recurrence of symptoms and abnormal esophageal histology with reintroduction of the food.[11,29]

The TDED and the SFED, however, have the benefit over the ED of eliminating only specific foods and allowing all others to remain in the diet. Patients require extensive education to successfully avoid eliminated foods, and a plan to meet nutritional needs within the context of the elimination diet, especially because the remaining foods may not provide adequate nutrition. If the patient does not prefer, cannot manage the texture of, or refuses to eat alternative foods, it can be challenging to meet nutritional needs on the diet alone and the use of an AAF may be beneficial to supplement the diet. Although in one small study of 17 adult patients, 88.2% maintained remission when supplemented with extensively hydrolyzed whey protein formula,[30] more research is needed and AAF is currently the recommended formula choice for patients with EoE.

DIETARY ELIMINATION THERAPY—CHALLENGES

Regardless of the elimination diet chosen, dietary therapy requires in-depth nutrition management as patients with EoE may be at nutritional risk, both before initiation of dietary therapy and after subsequent removal of multiple foods. Mukkada et al[19] evaluated 200 children (median age 34 months; range 14-113 months) with EoE and found that 16.5% had significant feeding disorders, and 93.9% had learned adaptive feeding (parental) behaviors and eating (child) behaviors including food refusal, low volume/variety of intake, poor acceptance of new foods, spitting food out, grazing, lack of mealtime structure, requiring prompting to eat, and inconsistent patterns of eating. The adult Eosinophilic Esophagitis Activity Index (EEsAI) was developed and validated to assess EoE symptom severity over a 7-day recall period. The patient-reported outcome instrument of the EEsAI included items on symptom severity and behavioral adaptations. The most common behavioral adaptation complaint for adult patients with EoE was increased time required to eat high consistency foods such as solid meat, raw foods, and bread. Food avoidance and food modification were reported for high consistency foods but was less frequently reported for soft foods such as pudding and applesauce. In adults, solid food dysphagia is the most common presenting symptom with food impaction requiring endoscopic removal occurring in up to 50% of adult patients with EoE.[31,32] Other symptoms in adults that may contribute to decreased dietary intake include chest pain, heartburn, and abdominal pain. In both the pediatric and adult EoE populations, symptoms related to esophageal dysfunction can contribute to early satiety and decreased ability to manage a variety of textures, resulting in reduced volume of intake.[33] In recognition of nutritional risks associated with EoE, the updated EoE consensus recommendations strongly encourage consultation with a registered dietitian.[1] In addition, the ability to comfortably adhere to an elimination diet may also be improved by the expert guidance provided by the dietitian.[34]

DIETARY ELIMINATION THERAPY—IMPLEMENTATION

Step 1: assess nutritional status

It is important to screen for nutritional risks before the implementation of the diet prescription. As previously discussed, common symptoms of EoE can impact dietary intake in a number of ways. Poor intake in childhood may be more detrimental as nutritional deficits may impact growth and development; therefore nutrition assessment is critical in the pediatric population. The physician's initial assessment must therefore include gathering and interpreting data from anthropometric measurements, dietary history, medical history, physical examination, and when indicated, laboratory data.

Anthropometry. Fundamental growth assessment in children includes weight, recumbent length (birth to 24 months) or standing height (>2-20 years), and head circumference (<36 months), and should be plotted on appropriate pediatric growth charts (World Health Organization charts for infants and children from birth to 24 months and Centers for Disease Control and Prevention charts for 2-20 year olds available at http://www.cdc.gov/growthcharts/who_charts.htm). This information is then used to identify and calculate growth velocity, weight-for-age, height-for-age, weight-for-length, and body mass index (BMI) z scores (SD). Growth history may need to be requested from the primary care provider, as a single measurement obtained during the consultation does not provide a complete picture of growth velocity in children. Both height (or length) and weight are important parameters of pediatric nutritional adequacy as data indicate that children with food allergies on elimination diets often become growth stunted[35] before weight is affected, and some children with food allergies on elimination diets may even develop overweight status or obesity.[36]

In adults, a complete nutrition assessment may reveal inadequate or inappropriate nutrient intake. Inadequate intake of calories, protein, and nutrients may lead to weight loss, loss of muscle or subcutaneous fat, fluid accumulation in severe cases (which may mask weight loss), and diminished functional status. Adults should also be weighed and measured and have their BMI calculated and weight history assessed for any unplanned weight loss or gain.[37]

Poor growth in children or weight loss in adults is not a contraindication to initiating dietary therapy, but requires additional nutrition planning to provide adequate calories, protein, vitamins, and minerals for catch-up growth to occur in children, and to prevent involuntary weight loss in adults.

Diet history. The diet history is an important part of the nutrition assessment. Patients may need to eliminate foods due to IgE-mediated food allergy but may also report foods that they suspect trigger EoE based on difficulty or pain with swallowing these foods. This may lead to self-limiting of many foods based on inaccurate assumptions about which foods are triggering EoE. Therefore, it is important to assess the types of foods tolerated/accepted in the diet, those avoided and the reasons for avoidance, and the ability (physical) and willingness (behavioral) of the patient to accept alternative dietary sources of nutrition.

To assess the nutritional quality of the baseline diet, a completed 3-day food record is beneficial[38-40] (see Supplement E3 in this article's Online Repository at www.jaci-inpractice.org). This will provide an indication of typical daily intake, and help determine if the patient is able to meet micronutrient and macronutrient needs. In the absence of a 3-day food record, a detailed 24-hour recall may be substituted although this method can be time-consuming and important dietary deficiencies may be missed.[36] A detailed account of normal food intake will also assist the clinician in determining if the patient is dependent on a food that is targeted for removal. If this is the case, additional planning is required and there will be a greater need for specialized dietetic support. For instance, a patient dependent on milk and dairy products to meet energy and protein needs, when faced with milk avoidance, may require the addition of an AAF or protein from a variety of solid food sources, as many of the alternative beverages are too low in protein. Key nutrients of concern and common dietary sources of these nutrients are listed in Table II.

Children and adults often develop EoE-related eating behaviors that can be missed if the diet history is incomplete. In younger children, it is vital to evaluate for food refusal, and for limited variety and volume of food intake. Common behaviors in older children and adults include cutting food into small pieces, drinking fluids with each bite of food to facilitate swallowing, chewing carefully, eating slowly, avoidance of certain foods such as meats, and a history of regurgitation.[41] It is essential that the dietary history include questions about these behaviors. In addition, older children and adults with EoE may have aeroallergen allergy and related symptoms of oral allergy syndrome, also known as pollen food allergy syndrome (PFAS) that should be assessed. Although it is yet unclear if pollen cross-reactive foods influence EoE inflammation, it may be beneficial to provide guidance on using cooked, rather than raw versions of foods that trigger minor PFAS symptoms.[42]

In both children and adults, eating/feeding skills and behaviors must be assessed so appropriate substitute foods or supplements can be recommended. If the patient is unable to accept substitute foods or AAF while on the elimination diet, dietary therapy may be contraindicated.

Laboratory assessment. If nutritional inadequacies are suspected at any time based on the diet history and physical examination, laboratory tests may be used to confirm or rule out certain nutritional deficiencies. Tests may include a complete blood count and a comprehensive metabolic panel (albumin, total protein, electrolytes, blood urea nitrogen, and creatinine) and prealbumin. If indicated, micronutrient assessment of serum vitamin D (25-hydroxy vitamin D), iron (serum ferritin, iron and total iron binding capacity), zinc, vitamin B12, selenium, and folate levels can also be performed. Frequency of repeat laboratory assessment must be individualized and considered on the basis of initial findings and adherence to dietary recommendations including adequate introduction of food substitutes and compliance with supplementation schedule.

Screening for additional barriers to the dietary prescription. When initiating dietary therapy for EoE, providers should consider all potential barriers to adherence that could impede the successful implementation of the diet and result in inadequate therapy. Social support systems, financial resources, patient motivation, and patient lifestyle should all be assessed.

Assessing the support a patient will have from family members, friends, and if a child, school and other caregivers, will help determine how to direct the patient. All caregivers responsible for providing food for the patient must have the knowledge, skills, and desire to support the patient's diet. The Supplements E1-E16 (available in this article's Online Repository at www.jaci-inpractice.org) contain resources on numerous topics related to the daily management of an elimination diet.

Specialized allergen-free foods are more expensive than typical food products. If there are financial constraints, guidance should be provided on how to prepare meals and snacks using more common ingredients and home cooking methods while avoiding prepackaged, high-cost specialized foods (see Supplement E4 in this article's Online Repository at www.jaci-inpractice.org). Patients requiring a supplemental AAF may be able to get medical insurance coverage to help minimize the financial burden of these formulas. Coverage varies by geographic area and medical insurance provider.

Lastly, it is well documented that the self-reported QoL for children with EoE is adversely affected by an elimination diet prescription.[43,44] Klinnert et al[44] showed not only that the number and severity of EoE symptoms, comorbid atopic disease, and dietary restrictions were strongly related to lower health-related QoL but also that QoL improved over time with a multidisciplinary approach in families with children with EoE. In adults, health-related QoL is also clearly diminished.[45] Interestingly, disease anxiety and choking anxiety are major factors contributing to reduced QoL[45] in patients with EoE as opposed to food anxiety, emotional impacts, and social/dietary limitations, which are reported to affect QoL in those with IgE-mediated food allergy.[46]

There may be instances where barriers (nutritional, financial, QoL, lack of social support, or motivation) are significant such that dietary treatment is not feasible or may even prove harmful. Hence, dietary therapy is not always in the best interest of the patient and alternative options may be considered such as TCS. As previously suggested, the choice of treatment requires an individualized, patient-centered approach.

TABLE III. Nutrients in foods commonly eliminated during eosinophilic esophagitis (EoE) elimination diet therapy

Foods	Main nutrients
Cow's milk	Protein, calcium, magnesium, phosphorus, vitamins A, B_6, B_{12}, D, riboflavin, pantothenic acid (iodine in some countries)
Soy	Protein, calcium, phosphorus, magnesium, iron, zinc, thiamin, riboflavin, vitamin B_6, folate
Eggs	Protein, iron, selenium, biotin, vitamins A, B_{12}, pantothenic acid, folate, riboflavin
Wheat	Carbohydrate, zinc, selenium, thiamin, niacin, riboflavin, folic acid, iron, magnesium, dietary fiber
Peanut/tree nuts	Protein, selenium, zinc, manganese, magnesium, niacin, phosphorus, vitamins E and B_6, alpha linolenic acid, and linoleic acid
Fish/shellfish	Protein, iodine, zinc, phosphorus, selenium, niacin Fatty fish: vitamins A and D, omega-3 fatty acids

Step 2: eliminate dietary antigens

Label reading is a fundamental skill that should be mastered by any patient embarking on an elimination diet. The US Food Allergen Labeling and Consumer Protection Act (FALCPA) requires distinct disclosure of the 8 most common allergens in the United States (cow's milk, soy, egg, wheat, peanut, tree nuts, fish, and crustacean shellfish). In the European Union, additional "major allergens" have been identified that require full disclosure under the European Union Labeling Directive (cow's milk, soy, egg, gluten, peanut, tree nuts, fish, shellfish including mollusks, lupine, celery, sesame, and mustard). To comply with FALCPA, the allergen must be clearly disclosed by its common name on the product label. For patients following the SFED, FALCPA encompasses all eliminated food groups, with the exception of mollusks (not typically a "hidden" ingredient however). When patients are asked to eliminate foods that are not covered under current labeling laws such as grains, meats, seeds, fruits, or vegetables, avoidance may become more challenging. Ingredients derived from these foods do not require full disclosure on product labels and may be present but hidden under a vague label term such as "natural flavoring" or "starch" or "spice." Highly refined oils including peanut oil and soybean oil are not considered allergens and are safe while on a peanut or soy elimination diet. Although soy lecithin is considered an allergenic ingredient, it is an ingredient that is tolerated by the vast majority of those with soy allergy and is therefore generally allowed during soy elimination diets for EoE.[47] Cold-pressed, expeller-pressed, or extruded oils derived from eliminated foods should be avoided as they may contain enough protein to trigger an immune response.

Precautionary allergen labels (PAL) on packages indicate the potential for allergen content due to unintentional cross-contact. PAL are voluntary in most countries and the language is regulated in only a few regions (eg, Canada and the European Union). The voluntary nature of these labels means that even products that do not carry a precautionary label may still in fact present a risk. Only products with milk, egg, and peanut PAL have been evaluated in the United States, and it appears that products with PAL carry a small but real risk of allergen content.[48-50]Although avoiding all potential traces of eliminated foods during the initial diagnostic phases of dietary therapy for EoE may be prudent, the necessity of this level of elimination is not known at this time. Patients should be taught to read product labels each and every time an item is purchased, to avoid products with the allergen listed as an ingredient and, at least during the initial diagnostic phase, we suggest that they avoid products with PAL if alternative foods are available. Using products from companies that have good allergen controls and PAL policies or those that cater to the consumer with food allergies may help decrease the risk of unintended allergen exposure (see Supplement E5 in this article's Online Repository at www.jaci-inpractice.org).

Although threshold levels of allergen exposure that trigger EoE have not been determined, patients should be aware of potential for exposure to allergens due to cross-contact risk in the home environment or when eating outside of the home. The use of shared utensils, condiments, cutting surfaces, cooking equipment (eg, colanders, unwashed pots, pans, griddles, woks, and fryers), or appliances (eg, toasters, blenders, food processors, meat slicers) can be sources of unintentional allergen exposure as can food service areas (eg, salad bars, buffets, cafeteria lines) due to spillage or use of shared utensils.

In addition to avoidance education, families must learn how to manage the diet on a daily basis. The best way to approach this is to start by making a list of all the kitchen staples that must be exchanged for allergen-free versions, and then move to meal and snack staples, making a list of types of foods a patient would like to eat that are allergen free. It is important to ensure that the substitutes provided replace major nutrients lost to the elimination diet (Table III). All eating and meal environments should be addressed to help patients plan for an easier transition to the prescribed diet. These should include school, daycare, after-school programs and field trips, parties, university/workplace cafeterias, business lunches, dining-out, travel, and dating. In addition, patients and families can be taught to cook without allergens. The process is often less intimidating for patients if they are able to slowly transition to the newly prescribed diet over 1 to 2 weeks.

Step 3: individualize to meet nutritional needs on an elimination diet

Planning for nutritional adequacy from foods in the diet should be the primary aim of nutrition counseling, and can be achieved by incorporating sufficient amounts of substitute foods (Table II). Each food provides a unique set of nutrients (Table III), and when eliminated, appropriate nutrient-rich foods should be substituted. If tolerated, nutrient-rich foods such as meat, whole grain and/or fortified breakfast cereals, green/orange vegetables, and seeds may be added to the diet to boost intake of nutrients. Each patient's energy requirement should be determined and guidance on balanced nutritional intake given, including encouraging a variety of foods

TABLE IV. Type and volume of nutrient-dense foods to include in the pediatric diet

Food group	Daily servings	Food examples	Recommended serving size per age		
			1-3 years	4-8 years	>8 years
Grains	6	Alternative grains such as rice, corn, potato, gluten-free oats, quinoa, millet, amaranth, teff, sorghum, and buckwheat	1/4-1/3 cup	1/2 cup	1/2 cup
		Breads, cereals, crackers, baked goods made from alternative whole grains	1/4-1/2 slice	3/4 slice	1 slice
Fruits/vegetables	5	Fresh or frozen, prepared without allergenic ingredients	1/4 cup	1/2 cup	1/2 cup
Dairy or milk substitute	3-4	Fortified milk alternatives (drinks based on rice, coconut, hemp, flax) Amino acid-based formulas	4 fluid ounces	6 fluid ounces	8 fluid ounces
Proteins	2-3	Fresh or frozen meats (poultry, beef, pork, lamb)	1 ounce	2 ounces	3 ounces
		Dried legumes (peanut and soy may be excluded)	2-4 Tbsp	1/4-1/3 cup	1/2 cup
Fats and oils	3 (depends on energy needs)	Milk- and soy-free margarine and vegetable oils (olive, canola, refined soybean oil)	1 tsp	1 tsp	1 tsp

All portion sizes are for US foods and measures. A US cup is equivalent to 237 mL; 1 fluid ounce to 29.5 mL; 1 tablespoon (tbsp) to 15 mL; and 1 teaspoon (tsp) to 5 mL. 1 ounce is equivalent to 28.3 g. 1 cup of fruit is equivalent to 1 large banana, 8 strawberries and 2 large plums. 1 cup of vegetables is equivalent to 10 broccoli florets, 12 baby carrots, or 1 large sweet potato.

(Tables IV and V). Providing sample menus can be helpful (see Supplements E6 and E7 in this article's Online Repository at www.jaci-inpractice.org).

Step 4: practical tips on substitution for eliminated foods

Wheat elimination. Unlike wheat-based foods, wheat-free foods are not frequently enriched with essential vitamins and minerals (thiamin, niacin, riboflavin, folate, iron). In addition, many are made from refined grains, which are naturally poor in dietary fiber, B-vitamins, and minerals. Thus, wheat-free substitutes should be chosen that are nutritionally rich and whole-grain, such as teff, amaranth, quinoa, buckwheat, gluten-free oats (as traditional oats may contain significant wheat contamination), brown rice, and millet (see Supplements E4 and E8 in this article's Online Repository at www.jaci-inpractice.org). There are currently no studies indicating that clinical and histologic outcomes would improve if wheat avoidance was expanded to gluten avoidance; however, gluten avoidance is recommended over wheat avoidance in some EoE centers worldwide.[51] If gluten elimination is prescribed, then rye and barley grains must also be eliminated.

Cow's milk elimination. Milk and dairy products can be replaced by substitutes that should be purchased "enriched" with added calcium, vitamin D, and other micronutrients. Suitable beverages include rice, oat (although oat milk in the United States may not be gluten free and therefore may contain wheat proteins), flax, or potato "milks." Soy- and tree nut-based (almond and cashew) beverages are often removed initially on EoE elimination diets and therefore may not be an option. Coconut, although considered a tree nut by the FDA, is often tolerated by those with IgE-mediated allergy or sensitization to peanut and other tree nuts[52] and therefore is not commonly eliminated on an empiric tree nut avoidance diet. Coconut milk and the remaining substitute milks are useful in baking and other cooking applications, but are lower in protein and energy than whole cow's milk. Therefore, they should not be considered nutritionally equivalent to cow's milk, and they are not suitable for young children. In the diets of young children, cow's milk supplies much of the protein and fat needed for growth and brain development. There have been case reports of kwashiorkor and nutritional rickets in toddlers consuming inappropriate milk substitutes.[53] Consequently, children required to avoid cow's milk who are not breast feeding should be prescribed a substitute AAF formula until 2 years of age.[54] Older children and adults not using substitutes may require calcium and vitamin D supplementation (see Supplement E9 in this article's Online Repository at www.jaci-inpractice.org).

Egg elimination. Nutrients found in eggs can easily be supplied by other foods (Table II). However, eggs act as a binding and leavening agent in many baked goods, providing important textures to young children. Therefore patients need to be advised on substitutes for these properties of egg when baking (see Supplements E4 and E10 in this article's Online Repository at www.jaci-inpractice.org). Some egg substitutes are derived from egg and should be avoided.

Peanut, tree nuts, and seafood elimination. Seeds and seed butters are good replacements for nuts and nut butters as they can be used in the same way and provide similar nutrients. When nuts and/or fish are excluded, the intake of omega-3 fatty acids and vitamins A and D is compromised. These nutrients can be provided by rapeseed (canola) and flaxseed oil (for omega-3 fatty acids), and vitamin A/D-fortified foods such as milk-free, soy-free margarine or enriched substitute "milk" beverages. Fish oil supplements cannot be used on a fish avoidance diet; however, marine algae-based omega-3 supplements are available and allowed.

Texture modification. A major symptom among older children and adults with EoE is dysphagia that can be very uncomfortable and can be complicated by (or progress to) esophageal food impaction.[55] To prevent symptoms, patients need to often avoid foods that are tough or lumpy in texture, such as

TABLE V. Type and volume of nutrient-dense foods to include in the adult diet

Food group	Food examples	Recommended daily intake based on Daily Energy Requirement			
		2000 kcal	2400 kcal	2600 kcal	3000 kcal
Grains	Alternative grains such as rice, corn, potato, gluten-free oats, quinoa, millet, amaranth, teff, sorghum, and buckwheat Breads, cereals, crackers, baked goods made from alternative whole grains	6 ounces	8 ounces	9 ounces	10 ounces
Fruits/vegetables (Veg)	Fresh or frozen, prepared without allergenic ingredients	Veg 2 ½ cups Fruit 2 cups	Veg 3 cups Fruit 2 cups	Veg 3 ½ cups Fruit 2 cups	Veg 4 cups Fruit 2 ½ cups
Dairy or milk substitute	Fortified milk alternatives (drinks based on rice, coconut, hemp, flax) Amino acid-based formulas	3 cups	3 cups	3 cups	3 cups
Proteins	Fresh or frozen meats (poultry, beef, pork, lamb) Dried legumes (peanut and soy may be excluded)	5 ½ ounces	6 ½ ounces	6 ½ ounces	7 ounces
Fats and oils*	Milk- and soy-free margarine Vegetable oils (olive, canola, refined soybean oil)	67-78 g	80-93 g	87-101 g	100-117 g

All portion sizes are for US foods and measures. A US cup is equivalent to 237 mL; 1 fluid ounce to 29.5 mL; 1 tablespoon (tbsp) to 15 mL; and 1 teaspoon (tsp) to 5 mL. 1 ounce is equivalent to 28.3 g. 1 cup of fruit is equivalent to 1 large banana, 8 strawberries and 2 large plums. 1 cup of vegetables is equivalent to 10 broccoli florets, 12 baby carrots, or 1 large sweet potato.
*Total fat intake from all sources including fats from other food groups.

meat, chicken, bread, and pasta. Although a major goal of treatment is to attain normal eating patterns, patients may initially require guidance on modified textures to improve dietary intake. A careful eating behavior history at each appointment should be obtained so appropriate dietary guidance may be provided. Suggestions may include the use of ground meat, ground chicken, soft bread without crusts, and dissolvable grains (whole grain crackers and cereals) in addition to counseling to chew food thoroughly and to eat without distraction. Adding sauce or gravy to meats and other foods can provide lubrication to help minimize symptoms of dysphagia. Similar advice should be given for toddlers with feeding dysfunction or oral motor skill deficits until disease remission and resolution of these symptoms can be confirmed.

Nutritional planning. Elimination diets are easier to implement with resources to aid in dietary change. Tables IV and V list suggested portion sizes for nutrient-dense alternative foods to aid in planning a nutrient-sufficient diet for children and adults. Ideally, the dietary plan should be individualized, and supported by other dietary management tips such as eating regular meals, making snacks nutritious, allowing sufficient time to consume meals, and avoiding situations that could promote increased acid reflux. It is also helpful to provide patients with resources such as lists of foods to be avoided, shopping lists, recipes, and instructions for reading food labels (see Supplements E1-E16 in this article's Online Repository at www.jaci-inpractice.org).

When to use nutritional supplements. Adequate nutrition should ideally be obtained from food because nutrients delivered in a "natural" form from foods may be more complete than their synthetic counterparts.[56] Individualized advice on how this can be achieved should be provided, with specific advice tailored to each patient, based on the number and the nutritional quality of the foods being eliminated and the patient's ability and willingness to accept substitute foods. A variety of alternative nutrient sources can be recommended with modifications suggested if needed (Tables IV and V). This process puts the correct emphasis on the importance of "food" rather than heavy reliance on supplements in the management of EoE, which is likely to help improve the patient's QoL.[43,57,58]

Micronutrient supplementation or supplementation with an AAF may however be required, particularly in the initial stages of an elimination diet when a wide range of nutrients may be deficient. In addition, a supplemental formula can provide a much-needed nutritional safety net in the early part of the dietary elimination, supplying energy, protein, and micronutrients while the patient adjusts to the altered diet. Elemental formulas also provide an excellent source of nutrition for children with faltering growth. If it is unlikely that adequate nutrient intake can be achieved from the remaining foods in an elimination diet, supplements (micronutrients and/or AAF) should be prescribed to bridge the gap between what is obtained from the diet and the recommended intakes for optimal health.

Monitoring. A patient following an extensive elimination diet requires close monitoring to ensure maintenance of adequate nutrition and effective food elimination. Periodic reassessment should include measurements of growth in children and weight in adults as well as diet assessment, which may include 3-day diet records and food frequency questionnaires. Follow-up nutrition laboratory tests may also be completed if indicated as previously discussed.

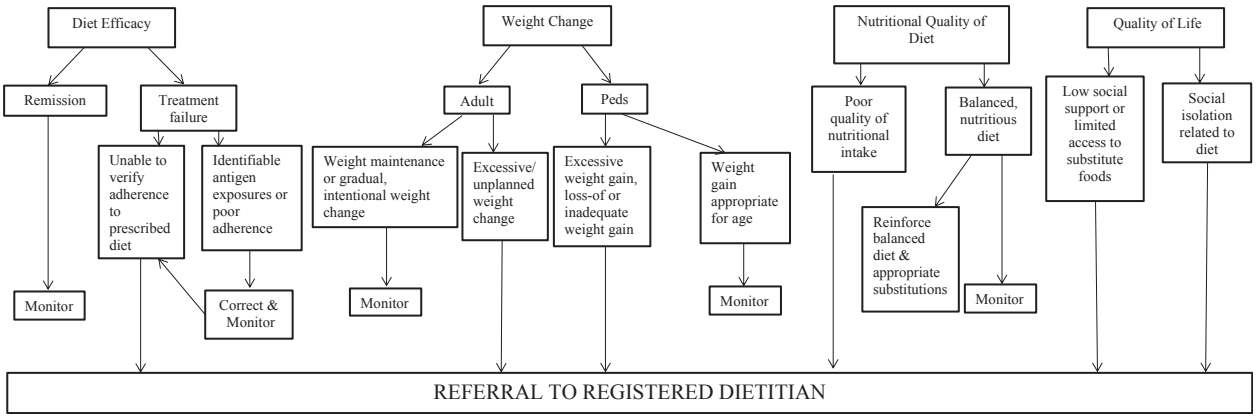

FIGURE 1. Algorithm for eosinophilic esophagitis dietary management and referral to registered dietitian.

Life after the initial elimination diet: food reintroductions

If a dietary elimination therapy proves successful (resulting in clinical and histologic remission of EoE), it is advisable to undergo sequential food reintroductions, where eliminated foods are added back into the patient's diet one at a time. It is recommended to add back one food (group) at a time with close assessment for symptom recurrence. The goal of sequential food introductions is to determine which eliminated foods are actual EoE triggers. Although recommendations are not standardized at this time, serial esophageal tissue biopsies after food introductions, as part of disease management in patients with EoE, should be considered as symptoms alone or endoscopy without biopsy cannot be used as an accurate gauge of EoE disease activity.[11] This identifies with greater certainty the EoE triggers and leads to a maintenance diet that eliminates only those foods proven to be triggers, with a potential for better nutritional outcomes.

There are several challenges faced by providers and patients in the process of dietary re-expansion. It is important to involve an allergist in managing patients with EoE, especially during the food reintroduction phase, to avoid the occurrence of IgE-mediated clinical reactivity to a food after its prolonged avoidance when previous sensitization to that food was demonstrated (positive skin prick test or serum food-specific IgE). Rarely, *de novo* IgE-mediated food allergic reactions have occurred.[59-61] During the food reintroduction phase, a patient's EoE may relapse. Unfortunately, standard allergy testing such as skin prick test results is not sufficient to support the development of food reintroduction plans.[62] Based on retrospective reviews, milk, egg, wheat, and soy are more likely to be triggers for EoE relapse,[10] so consideration should be given to introducing these higher risk foods at a later stage during the dietary reintroduction trials. Therefore one generally begins with lower risk foods such as nuts and seafood and progresses sequentially to the higher risk foods. In the case of relapse (symptomatic and/or histologic), the food identified as one of the patient's EoE triggers will need to be avoided on a long-term basis.

Although serial tissue biopsies are the only way to determine with certainty if a food is or is not an EoE trigger, this may not always be possible, practical, or desirable. At present, the only validated tool to evaluate clinical treatment response is the Pediatric Eosinophilic Esophagitis Symptom Score (PEESS) v2.0 in cases where endoscopies cannot routinely be performed.[63] This questionnaire effectively captures parent-reported symptoms in children aged 2 to 18 years. Martin et al[63] reported symptoms of dysphagia most closely correlated with tissue markers of eosinophil activity (strongest, $r = 0.37$, $P = .02$) and tissue expression of EoE associated genes (strongest, $r = 0.36$, $P = .02$). Symptom scores of dysphagia using the PEESS v2.0 provide a quantitative indication of eosinophil activity and thus provide a potential tool for assessing responses to treatment in children, rather than a diagnostic tool. No such tool has been evaluated for adults.

Another common challenge faced by providers and patients relates to eating ability. Patients with previous feeding aversions, adaptive feeding, or modified dietary textures may require encouragement to expand the diet and textures of foods eaten as their clinical condition permits after disease remission. Consequently, feeding therapy may be required to help ameliorate food refusal in patients, as feeding difficulties do not always resolve simply with the resolution of EoE.[34]

Decision tree: when to refer to a dietitian

We recommend a referral to a registered dietitian for any individual prescribed an elimination diet for EoE. A registered or licensed dietitian is trained in medical nutrition therapy (MNT) and can create nutrition care plans for patients based on nutrition assessment and nutrition diagnosis. The authors recognize that not every patient has the opportunity to consult with a registered dietitian, and the diet may have been implemented by the physician or other health care provider. Figure 1 outlines circumstances warranting further evaluation by a registered dietitian experienced in treating patients with food allergy and EoE. It is recommended that a registered dietitian who receives comparable referrals on a consistent basis and participates actively in food allergy and EoE networks (such as American Academy of Allergy, Asthma & Immunology [AAAAI], International Network of Diet and Nutrition in Allergy [INDANA], American College of Allergy, Asthma and Immunology [ACAAI], and North American Society for Pediatric Gastroenterology, Hepatology and

Nutrition [NASPGHAN]) provide MNT, when possible. If an allergy specialist dietitian is not available, a registered or licensed dietitian can also provide MNT. The following scenarios warrant MNT.

Unsuccessful dietary elimination. The elimination diet prescribed may be inadequate to result in resolution of EoE. However, before removing additional foods from the diet or switching to medication management, it is important to evaluate adherence as it is possible that symptoms and/or abnormal pathology may be related to poor dietary adherence. This may be inadvertent, in which case a trained registered dietitian may ascertain sources of unintentional exposures. If active EoE persists despite good adherence to the diet, the patient and treating physician may consider further dietary eliminations or medical treatment options.

Unfavorable weight changes. Involuntary weight changes in adults or insufficient weight gain or any weight loss in children should be further evaluated and warrants consultation with a registered dietitian.

Poor nutritional quality of diet. As discussed previously, an elimination diet poses risk of nutritional inadequacy. Any patient consuming an unbalanced or nutritionally inadequate diet would benefit from ongoing guidance by a registered dietitian beyond initial elimination diet implementation.

Severely diminished QoL. Food is an integral feature of social situations for children and adults alike. For children, elimination diets can affect participation in school lunches, parties, after school activities, and cause them to feel very different from their peers. Adults with EoE are often faced with managing dating, work functions, and travel while maintaining diet restrictions. A registered dietitian accustomed to these challenges can provide guidance to prevent social withdrawal. In some cases, access to substitute foods may be limited, whether the barrier is geographic (extended distance to specialty grocers) or financial. Many allowable substitute foods are available in standard supermarkets, but patients may require support from a dietitian for ideas on incorporating them into the diet.

Maintenance diet

The need for ongoing elimination of foods proven to trigger EoE is likely, as there does not appear to be evidence that patients with EoE achieve resolution of their disease without treatment (medical and/or dietary treatment).[1] Once all foods have been reintroduced, trigger foods are identified and eliminated again, and nontrigger foods are kept in the diet, the patient should continue the identified elimination diet to maintain disease remission.

ONLINE REPOSITORY

The handouts and tools found in this article's Online Repository at www.jaci-inpractice.org are intended to provide educational information needed to manage food allergen avoidance for patients with EoE, and tools for providers to assist patients in achieving a nutritionally balanced and satisfying diet. The Online Repository offers avoidance sheets for various eliminated foods, a SFED, an ED handout, sample menus for adults and children, elimination diet management handouts such as Cooking without Common Allergens and How to Read a Label, and a 3-Day Food Record. Handouts can serve to supplement in-office education by a physician, allied health provider, or registered dietitian.

CONCLUSIONS

Dietary elimination therapy has been shown to induce remission in the majority of patients with EoE. It also offers a potential for long-term treatment of EoE.[22] However, elimination diets are not without risk and may impact nutritional status, eating pleasure, and overall QoL. With adequate guidance and monitoring, these adverse impacts can be minimized so that more patients may benefit from this drug-free management option. Whenever possible, and when circumstances warrant in-depth dietary evaluation and follow-up, referral to a registered dietitian is advisable for MNT and individualized elimination diet education.

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SUPPLEMENT E1

Elemental Diet

What is an Elemental Diet?
An elemental diet removes all allergenic proteins. An amino acid based formula is used to substitute for foods.

Won't I be hungry?
If you are drinking enough formula, you will not be hungry. You will get all the nutrition you need from the formula.

How much formula should I drink?
The amount of formula is determined by your doctor or registered dietitian.

Which formulas may I use?
The following formulas are available in the United States and are acceptable on an elemental diet. Please discuss with your doctor or dietitian which formula may be right for you.

Formula	**Indication/ Unique Characteristics**
Alfamino Infant	For ages 0-12 months
Elecare Infant	For ages 0-12 months
Neocate Infant	For ages 0-12 months
PurAmino	For ages 0-6 months; or as supplement to diet up to 24 months.
Alfamino Junior	For ages 1-13 years; Unflavored
Elecare Junior	For ages 1 and up; Unflavored and Vanilla
Neocate Junior	For ages 1 and up; Unflavored, Chocolate, Tropical. With prebiotics: Unflavored, Vanilla, Strawberry
Eo28 Splash	For ages 1 and up as supplement to elimination diet; Ready-to-feed box with straw; three flavor varieties
Neocate Splash Unflavored	For ages 1 and up; appropriate as sole nutrition source Ready-to-feed box with straw

FIGURE E1.

If I don't enjoy the flavors available may I add my own flavoring?
Yes. You may add vanilla extract, sugars (see acceptable ingredients below) or Nesquik Strawberry syrup or Kool-Aid powdered drink mixes.

Can I only have formula?
There are a few items that are considered safe on an elemental diet. The following treats may be eaten for social reasons but they do not provide any nutrition. Always read product labels each and every time an item is purchased.

Candy
Dum Dum lollipops (artificial flavors only)
Rock Candy
Charms Cotton Candy
Smarties brand candies (Sugar-based not the European milk-chocolate version)
Smarties candy canes
Fun Dip
Pixie sticks

Acceptable ingredients:
Sugar, dextrose, corn syrup, high fructose corn syrup and corn syrup solids, sucrose, maltodextrin, artificial flavors, artificial sugars (sucralose, aspartame, acesulfame K), soy lecithin, soy oil or any refined oil, citric acid, malic acid, salt, sodium nitrate, artificial color

AVOID the following ingredients:
Natural flavors or colors, cornstarch, carrageenan, xantham gum, locust bean gum, guar gum, chewing gum, gelatin, mint extracts, yeast, spices, expeller pressed oils and powdered sugar.

FIGURE E1. (***Continued***)

DIETARY GUIDELINES FOR SIX FOOD ELIMINATION DIET FREE FROM MILK, EGG, WHEAT, SOY, PEANUT/TREE NUT, FISH/SHELL FISH

This handout is provided as a general guide. It is your responsibility to read product labels each and every time you purchase an item. Avoid any product containing an eliminated ingredient.

SAFE FOODS TO EAT

Proteins:	Meats (beef, lamb, pork), poultry (chicken, turkey), seeds, beans, peas, lentils
Vegetables:	All vegetables
Fruits:	All fruits
Grains:	Gluten-free oat*, rice, corn, amaranth, millet, quinoa, buckwheat, teff, sorghum, Montina
Milk Substitutes:	*Fortified* beverage made from rice, hemp, quinoa, gluten-free oat, coconut** or amino acid-based formula

*Oats may contain significant wheat due to cross-contact, therefore gluten-free oats are recommended. If your doctor has asked you to avoid all gluten-containing grains (and not just wheat) then rye and barley grains should also be avoided.
** Although the FDA considers coconut a tree nut, it is generally not avoided on a tree nut elimination diet for eosinophilic esophagitis. Ask your doctor if you need to avoid coconut.

Healthy Meal and Snack Options- choose six food-free (SF-free) options
Caloric need will dictate serving size - ask your doctor or dietitian about portions or visit www.choosemyplate.gov to determine individual needs.

Breakfast- choose from each category below
- Grain-choose more whole grains (SF-free cereal, bread, pancake, etc.)
- Milk substitute or amino acid-based formula
- Fruit
- Meat or substitute (Some patients may need additional meat or substitutes in the diet to meet protein, iron and zinc needs)

Lunch and Dinner- choose from each category below
- Meat or substitute
- Vegetable/fruit
- Whole grain
- Milk substitute

Snacks (aim for balance between food groups even at snack time)
- Grain
- Milk substitute or amino acid-based formula
- Meat or substitute
- Fruit or vegetable

FIGURE E2.

BREAKFAST

GRAIN:

Hot cereals-(Prepared with fortified milk substitute for added calories, calcium & vit. D)

- Gluten-free Oats
- Cooked Rice cereal
- Cooked Quinoa Flakes
- Buckwheat Groats
- Cooked Millet

Dry cereals

- Cereals made from allowed grains and SF-free ingredients

Other Grains (SF-free)

- Breads from allowed grains and ingredients
- Gluten-free oat pita bread
- Wraps made with allowed ingredients (rice, corn or teff)
- Corn tortilla
- Pancakes or waffles made with whole, non-wheat based flours such as gluten-free oat or buckwheat flour or SF-free mixes using egg replacer and milk substitute

FRUIT: Choose any fruit (fresh, frozen, canned, dried and freeze-dried without allergens)

PROTEIN:

- Fresh chicken, turkey, beef, pork, lamb
- Seed butters (including tahini and sunflower seed butter)
- Beans, hummus or bean purees
- Lentils

MILK substitute or amino acid based formula:

- Rice milk
- Coconut milk
- Gluten-free oat
- Hemp milk
- Quinoa milk
- Coconut yogurt (yogurts may be lower in calcium and don't provide vitamin D)
  Note: Ensure your substitutes are fortified with calcium and vitamin D. Most of these substitutes are very low in protein therefore protein intake from other sources may need to be increased.

FAT: Depending on caloric need, you may also be advised to add additional fats to the diet

- Milk-free, soy-free margarine
- Olive oil and other vegetable oils such as canola, soybean, corn, coconut and safflower oil.
- Avocados and olives
- Soy-free vegan mayonnaise

FIGURE E2. (***Continued***)

LUNCH AND DINNER

PROTEIN

- Chicken, turkey, beef, pork, lamb, seeds, beans, peas, lentils

GRAIN (Six food-free; choose more whole grains[1])

- Amaranth
- Brown rice or brown rice pasta or rice crackers
- Wild rice
- Millet
- Quinoa or quinoa pasta or quinoa crackers
- Corn pasta or corn tortilla, corn crackers, corn chips
- Buckwheat, buckwheat noodles or buckwheat crackers
- Gluten-free Oat pita bread
- Teff tortilla
- SF-free breads or homemade rolls or biscuits made with allowed ingredients

ANY FRUIT and VEGETABLE: Choose any fresh (also frozen, canned, dried and freeze dried without allergens)

MILK substitute: (ensure your substitutes are fortified with calcium and vitamin D)

- Rice milk
- Coconut milk
- Gluten-free oat
- Hemp milk
- Quinoa milk
- Coconut yogurt (yogurts may be lower in calcium and don't provide vitamin D Note: Ensure your substitutes are fortified with calcium and vitamin D. Most of these substitutes are very low in protein- protein intake from other sources may need to be increased.

FAT: Depending on caloric need, you may also be advised to add additional fats to the diet

- Milk-free, soy-free margarine
- Olive oil and other vegetable oils such as canola, soybean, corn, coconut, safflower oil.
- Avocados or olives

SNACKS (aim for balance even at snack time)

GRAIN:

- Gluten-free pretzels
- Tortilla corn chips (whole grain)
- Rice, corn, quinoa, buckwheat crackers (check for other avoided ingredients)
- Allergen-free cookies
- Potato chips and plain salted corn chips
- Plain popcorn (popped on stove or in a popcorn popper in oil or air popped)

[1] Whole grains are typically the grain as it occurs in nature, which may also be found in the ground form (flour). Whole grains also typically have more *dietary fiber* than their processed counterpart.

FIGURE E2. (***Continued***)

MILK substitute: (ensure your substitutes are fortified with calcium and vitamin D)

- Rice milk
- Coconut milk
- Gluten-free oat
- Hemp milk
- Quinoa milk
- Coconut yogurt (yogurts may be lower in calcium and don't provide vitamin D)
  Note: Ensure your substitutes are fortified with calcium and vitamin D. Most of these substitutes are very low in protein- protein intake from other sources may need to be increased.

PROTEIN: Jerky, hummus, seed butters, beans and bean spreads

ANY FRUIT and VEGETABLE: Choose any fresh (also frozen, canned, dried and freeze dried without allergen)

MISCELLANEOUS

- Baking soda, baking powder, yeast, salt, spices, sugar, ketchup, mustard, vinegar (but not malt vinegar if avoiding gluten), strawberry and chocolate syrup, unsweetened cocoa powder, egg replacer, are all allowed.
- All distilled alcohol beverages are allowed for those over 21 years of age. Beer contains gluten and may contain wheat. Please ask your doctor is you should avoid all gluten or just wheat. Gluten-free beer is available and would be a safe choice. Wines may contain allergenic residuals (milk or egg) used in the fining process. Vegan wines and wines from Australia and New Zealand (which must label for allergenic ingredients in alcoholic beverages) may be better options. Please ask your doctor if you should be concerned about these protein residuals in wines.
- Snack foods and treats such as: rice-based ice creams or bars, dairy-free chocolates, Italian ice or popsicles, sugar-based plain hard candies (use with caution – advised not to give to small children due to choking hazard).

FIGURE E2. (***Continued***)

Sample Menu

Breakfast
Oat pancakes made with gluten-free flour, egg replacer and milk substitute
Blueberries
Milk-free, soy-free margarine
Pure maple syrup
Rice milk (fortified)
Chicken apple breakfast sausage

Snack
Homemade quinoa pudding with fresh strawberries

Lunch
Chicken salad sandwich on oat pita bread with egg-free, soy-free vegan mayonnaise
Tossed salad with spinach, carrot and tomato
Lemon vinaigrette made with canola oil
Pear slices

Snack
Hummus with gluten-free pretzels
Fruit smoothie made with hemp milk

Dinner
Roasted chicken
Brown rice pilaf made with olive oil, broth, onions, and minced carrots
Green beans roasted with garlic
Gluten-free oat milk (fortified)

FIGURE E2. (***Continued***)

3-Day Food Intake Record

- Please keep a record of *everything* you EAT and DRINK for 3 days.
- Please include 2 weekdays and one weekend day.
- Include all meals, snacks, and beverages.
- Include the time of day you are eating or drinking.
- Please choose days that are TYPICAL for your current eating pattern.
- Please include any texture modifications you make to your food or difficulty experienced eating any of you meals or snacks.
- Please also record your SUPPLEMENT schedule in detail: the name of the supplement, the dose of the supplement (e.g., 500 mg calcium per 2 tablets), the amount you take, how often you take it, when you started/stopped the supplement, and your reason for taking it.

FOOD/BEVERAGE RECORDING INSTRUCTIONS:

1. Please record all food and beverages consumed during a 24 hour period. Provide the following:

- **Type of Food Eaten:** e.g. Chicken nuggets
- **Brand Name:** e.g. Ian's, Perdue, Tyson's
- **Food or Beverage Characteristics:** Coffee with 1 ounce whole milk
- **Color:** e.g. white vs. orange sweet potato or white vs. whole wheat bread
- **Fat Content:** % fat (e.g. skim, 1%, 2%, semi-skimmed or whole milk), fat content of meat (e.g. extra lean ground beef, 80% lean, etc.), fat claims (e.g. "light", "low-fat"), was skin removed from poultry?
- **Freshness:** e.g., fresh, frozen, canned, or dried?
- **Other Details:** e.g. 25% reduced sodium, "diet" products, etc.
- **Time of Day** always include the time you ate or drank
- **For children**- please list the amount served to your child AND the amount actually eaten. (These are commonly 2 separate numbers. For instance you may have offered 3 chicken nuggets but your child may only have eaten 2 chicken nuggets.)

2. Please MEASURE and describe the amount of food eaten as best you can. Always estimate portion sizes of food ***after cooking*.**

Use household measurements to specify serving sizes.
1 cup = 250mL = 8 fluid ounce
1 ounce (oz) = 30grams
1 tablespoon (Tbsp) = 15mL
1 teaspoon (tsp) = 5mL

WHEN IN DOUBT… Measure an item prior to plating the food to get a better idea of the portion you are serving.

Adapted from http://www.starfht.ca

FIGURE E3.

Measuring cups (examples): You can measure your cereal in a measuring cup before pouring into a bowl and measure the added milk too.

Teaspoons/tablespoons (examples): Measure butter, margarine, mayonnaise, salad dressings, ketchup, mustard, ground flaxseed, sugar, milk/cream, and other condiments, seasonings, and toppings before adding to your food or beverages.

Count the number of food items if practical: e.g.: 20 grapes, 3 baby carrots, 4 medium-sized shrimp, 3 meat balls , 1 hamburger etc.

Fluid: Record amount in fluid ounces (oz), milliliters (mL), or cups.
Remember 1 cup = 250mL = 8 fl. oz

Use food labels to estimate quantities: Food labels can help you estimate the quantity of food eaten based on weight or volume. For example, write down a 355mL can of soda pop/fizzy drink or a 60g can of tuna, a 37g granola bar/cereal bar, etc.

3. Record if anything was ADDED during preparation of the food, such as oil (list specific kind), sauce, butter, margarine, or any other condiment or seasoning (salt/pepper).

4. For COMBINATION DISHES such as lasagne, casseroles, chili, soups, or stews include a description of the main ingredients (the recipe used can also be helpful)
e.g., Lasagne: lean ground beef (1/4 cup per piece), mozzarella cheese (1 oz per piece), ricotta cheese (1 oz per piece), ½ cup of tomato sauce, 2 large lasagne noodles, ¼ cup spinach.
Please remember to add if this was home-made or bought as a ready-prepared dish

5. Include SNACK FOODS eaten. Don't forget to include candy/sweets/chocolates, chips, cookies/English biscuits, popcorn, ice cream, and beverages such as soft/fizzy drinks, juice, coffee and tea (And added ingredients to coffee and teas).

6. Use the notes column to record any additional PRODUCT INFORMATION if available (e.g. 6 crackers: 80 kcal, 2.5 g fat, 1g fiber).

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

Current Supplement Use

Initial Question (at first visit): Are you taking any **supplements?** This includes all over-the-counter and prescribed supplements (e.g. multivitamin, multivitamin and mineral, iron, fish oil, etc.).

Yes **No** (please tick)

If yes, please list all supplements in the table below.

All Follow-Up Visits: Have you had any changes to your supplements since your last visit?

Yes **No** (please tick)

If yes, please indicate in the table below which supplements you have started or stopped taking, or if the dose or frequency has changed for any current supplements.

Name of Supplement	Dose	Frequency	Start Date	Stop Date	Reason for Taking Supplement
e.g. Vitamin D	1000 IU per pill	1 pill, 1 time / day	Oct. 2010	--	Bone health (osteoporosis)

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

Sample 1-Day Food Record

Below is an *EXAMPLE* of how to keep accurate records.

TIME	AMOUNT	DESCRIPTION	NOTES
8 am	Large	Coffee	Folger's instant-made at home
	1 tbsp	Cream	Heavy cream
	1 tsp	Sugar	
11 am	2 slices	Bread, whole wheat	Wonder Brand
	2 oz	Turkey lunch meat	Applegate Farms
	1 tbsp	Mayonnaise (Hellman's)	Light: 4.5 g fat per tbsp
	1 leaf	Romaine lettuce	Fresh –removed- did not eat as it was too difficult to swallow.
	1 tsp	Butter	
11. 30 am	2 cups	Water	
2 pm	½ cup	Apple sauce/puree	Sainsbury's Own
	6	Nabisco Saltine crackers	80 kcal: 2.5 g fat, 20 mg sodium (from label)
	2 Tbsp.	Hummus	Homemade- Recipe included
4 pm	1 large	Blueberry muffin	Store bakery brand
	500 ml	Water, tap	
7. 30 pm	1 patty- 4 ounces after cooked	Hamburger, Grilled	90 % lean ground beef- was difficult to eat. Had to cut in tiny pieces and eat meat and bread separately.
	1	Hamburger bun	Arnold brand
	2 slices	Tomato, raw	Fresh
	2 tbsp	Ketchup, Heinz	45 kcal per teaspoon
	1 cup broccoli	Steamed and chopped	Frozen- Green Giant brand
10 pm	1 cup	Mint Chocolate chip ice cream	Hagen Daz

Was this a typical day? If not, why? YES
Did your take all of your usual supplements as prescribed?

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

DAILY FOOD RECORD

Date: _____ _____ __ _ Day of the week: _____
Please list all food/beverages/water/medications/supplements.
Estimate all food/drink amounts as accurately as possible.

TIME	AMOUNT	DESCRIPTION	NOTES

Was this a typical day? If not, why?
Did your take all of your usual supplements as prescribed?

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

DAILY FOOD RECORD

Date: _____ _____ __ _ Day of the week: _____
Please list all food/beverages/water/medications/supplements.
Estimate all food/drink amounts as accurately as possible.

TIME	AMOUNT	DESCRIPTION	NOTES

Was this a typical day? If not, why?
Did your take all of your usual supplements as prescribed?

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

DAILY FOOD RECORD

Date: _____ _____ __ _ Day of the week: _____
Please list all food/beverages/water/medications/supplements.
Estimate all food/drink amounts as accurately as possible.

TIME	AMOUNT	DESCRIPTION	NOTES

Was this a typical day? If not, why?
Did your take all of your usual supplements as prescribed?

Adapted from http://www.starfht.ca

FIGURE E3. (***Continued***)

Cooking Without Common Allergens

The following ingredient substitutions may be helpful in preparing allergen-safe meals. Ask your health care provider if you are unsure if an ingredient is safe for you.

Milk

- Substitute equal amounts of alternative milk, juice or water

Buttermilk

- 1 cup alternative milk plus 1 Tbsp. vinegar (white or cider) or 1 Tbsp. lemon/lime juice, let stand for 5 minutes or until thickened

Butter

- Equal amounts of safe margarine or avocado
- Milk-free, soy-free margarine with a low water content (usually stick instead of tub and not low fat)
- 6 Tbsp. applesauce plus 2 Tbsp. vegetable oil equals 1 stick
- ¾ the required amount of pureed pumpkin or safe oil

Yogurt- each will substitute for 1 cup yogurt

- 1 cup sweetened apple sauce
- 1 cup safe alternative yogurt
- 1 cup fruit puree

Egg: Each of these mixtures is equal to one egg

- 1 tsp. baking powder, 1 Tbsp. water, 1 Tbsp. Vinegar
- 1 tsp. yeast dissolved in ¼ cup warm water
- 1 ½ Tbsp. water, 1 ½ Tbsp. oil, 1 tsp. baking powder
- 1 Tbsp. Gelatin, 3 Tbsp. warm water (do not mix until ready to use)
- 1 Tbsp. ground flax or chia seeds, 3 Tbsp. warm water, mix and allow to sit for 5 minutes until a gel forms
- ¼ cup mashed avocado, pureed pumpkin or applesauce
- Commercial dry egg-replacer (follow directions on box)- typically potato-based

(If baked goods are dry, add ¼ to ½ cup of applesauce to the recipe)

Nuts

- Crushed safe cereal, toasted coconut, sunflower seeds, pumpkin seeds, crushed potato or corn chips

Adapted with permission from the Consortium of Food Allergy Research (CoFAR) Food Allergy Education Program

FIGURE E4.

Wheat

- **Non-wheat grains and substitutes** (nutrition and amounts will vary): Corn, potato, tapioca, white/brown rice, bean (not soy), barley*, rye*, gluten-free oat (non-gluten free oats may have significant wheat contamination) amaranth, buckwheat, millet, Montina, quinoa, sorghum and teff

To replace 1 Tbsp. of wheat flour for thickening:
1 ½ tsp of corn/rice/arrowroot/potato starch
1 Tbsp. of white or brown rice flour
2 Tbsp. tomato paste
1 Tbsp. commercial wheat free all-purpose flour mixture

Wheat alternative flour recipes:
All-purpose flour: ¾ cup rice flour, 1/8 cup tapioca flour, and ¼ cup potato starch or millet flour or corn starch
High-protein flour: 1 ¼ cup white bean flour, 1 cup arrowroot powder or potato or corn starch, and 1 cup brown rice flour
High-fiber flour: 1 cup sorghum or brown rice flour, ½ cup light teff flour, ½ cup millet or Montina flour, 2/3 cup tapioca flour, and 1/3 cup potato or corn starch
Self-rising: 1 cup of prepared wheat free all purpose flour, 1 ½ tsp baking powder, ¼ tsp salt
A variety of commercial wheat-free, all-purpose flour substitutes are available.

*Xanthan/guar gum may be used to provide the elasticity missing when using gluten-free grains

Other tips for managing a wheat-free diet:

- Homemade pasta can be made from squashes and root vegetables; commercially available pastas are prepared from quinoa, rice, corn, legumes
- Rice flour and crushed chips provide a crunchy crust when used to coat foods for frying
- To thicken soups and stews, use pureed vegetables such as peas, carrots, and potatoes

Cooking: Due to variations in altitude and cooking methods, please refer to product package for preparation instructions.

Grain 1 cup	Amount of Liquid (cups)	Simmering time/ Standing Time (minutes)	Yield (cups)
Amaranth	3	20-25/0	3
*Barley (pearled)	2 ½	50/5	3 ½
Brown Rice	2 ¼	45/10	3
Oats (whole groats)	3	60/10	2 ½
Quinoa (rinsed)	2	15/5	3-3 ½
Buckwheat	2	10-/5	2
Sorghum (rinsed, pearled)	3	30/5	3
Millet	2	15/10	3 ½

*Avoid barley and rye if you have been asked to avoid gluten.
Adapted with permission from the Consortium of Food Allergy Research (CoFAR) Food Allergy Education Program

FIGURE E4. (***Continued***)

How to Read Labels to Avoid Food Allergens- United States (US)

The Food Allergen Labeling and Consumer Protection Act requires food labels clearly identify the source of ingredients derived from these eight major food allergens:

- **Milk**
- **Soybean (Soya)**
- **Wheat**
- **Egg**
- **Peanut**
- **Tree nut** – the specific tree nut must be identified
- **Fish** - the specific fish species must be identified
- **Crustacean shellfish** - the specific species must be identified (e.g. shrimp, lobster, crab).*

***Mollusks** (e.g. clams, oysters, scallops) are not considered "major allergens" under US law, therefore are not necessarily identified on labels.

Read the entire label each and every time you purchase an item:

- Read the entire ingredient list and also the "contains" statement. Look carefully for those ingredients you need to avoid. The above major food allergens must be listed using their common name, for example: "milk" or "wheat."
- Your healthcare provider may also ask you to avoid products with a precautionary label for the foods you are avoiding.
- The US law only applies to the eight foods/food groups that are considered the "major allergens." If allergic to other foods (such as seeds, garlic or any others) you will need to call the manufacturer to know if ingredients labeled with non-specific terms such as "spice" or "natural flavoring" contain a food you are avoiding.

Unintentional ingredients and precautionary labeling:

- The unintentional presence of ingredients due to contamination or cross contact in processing is not required to be listed on the product label.
- Some manufacturers choose to use precautionary allergen labeling to address the issue of unintentional ingredients. Look for precautionary labeling such as "may contain [allergen]" or "produced in a facility that also produces [allergen]."
- Beware: The words used may not reflect risk (for example, "processed in a facility" may not be safer than "may contain").
- As precautionary labels are voluntary, the absence of a precautionary label does not necessarily mean there is no risk of cross contact with the allergen.

A Sample Chicken Soup Label with an Advisory Statement:

The ingredient list in the sample chicken soup label includes milk. This product label also carries a precautionary label- although the ingredient list does not indicate the presence of egg or wheat, the precautionary label indicates that there is a risk of cross contact with egg or wheat; therefore, this product is not safe for those avoiding milk and may not be considered safe for those avoiding egg or wheat.



Nutrition Facts	Amount/serving	%DV*	Amount/serving	%DV*
Serv. Size 1 cup (249g)	**Total Fat** 12g	**18%**	**Sodium** 940mg	**39%**
Servings About 2	Sat. Fat 6g	**30%**	**Total Carb.** 24g	**8%**
Calories 250	Polyunsat. Fat 1.5g		Dietary Fiber 1g	**4%**
Fat Cal. 110	Monounsat. Fat 2.5g		Sugars 1g	
*Percent Daily Values (DV) are based on a 2,000 calorie diet.	**Cholest.** 60mg	**20%**	**Protein** 10g	**20%**
	Vitamin A 0% • Vitamin C 0% • Calcium 6% • Iron 8%			

Ingredients: WATER, CHICKEN, RICE, MODIFIED CORN STARCH, CREAM (MILK), POTATO, CARROT, ONION, SPICES, SALT.

MAY CONTAIN EGG AND WHEAT

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FIGURE E5.

MORE LABEL READING TIPS

You may need to contact the manufacturer for more information about a product:

- To ask the manufacturer about cross contact risk
- To find out if ambiguous terms (e.g., “flavoring” “spices” “starch”) contain an ingredient you are avoiding if you are avoiding any food that is not a major allergen (such as sesame, garlic, rice, corn, fruits, etc.) as these can remain hidden in a vague ingredient term
  Note: Manufacturers may be reluctant to reveal “secret ingredients” therefore you should ask specific questions such as: “Do the “spices” contain sesame?” Rather than asking “What spices are used?”

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FIGURE E5. (***Continued***)

Sample Six Food Elimination Diet Menu for CHILDREN

The sample 4-day menu provides easy-to-prepare meal and snack ideas for children that start from delicious whole foods for improved nutritional value and appeal. The menus do not take into consideration caloric needs therefore some children will require fewer snacks and smaller portions while others may require more. Consider your child's weight goal when choosing portion sizes and number of snacks. Consultation with a dietitian may be required in individual cases.

Meals	Day 1	Day 2	Day 3	Day 4
Breakfast	Gluten-free oatmeal prepared with milk substitute*, sliced or cooked apples and cinnamon, chia seeds	Cooked quinoa flakes with cinnamon, sugar and Sliced peach Milk substitute *	Turkey sausage links Crispy brown rice cereal Sliced cantaloupe Milk substitute *	SF-free buckwheat pancakes or waffles with 100% pure maple syrup Blueberries Milk substitute*
Snack	Rice cakes with sunflower seed butter** and banana slices	Dried fruit and seeds**	Cultured coconut milk yogurt Berries and chia seeds	Trail mix with raisins, seeds** and SF-Free chocolate chips
Lunch	Turkey wrap with corn or teff tortillas, lettuce, avocado and SF- Free mayonnaise Potato chips Grapes**	Vegetable salad** with Grilled chicken Breast Balsamic vinaigrette (made with canola oil) SF-free roll with olive oil or milk- free, soy-free margarine Medium orange	SB& J: SF-free bread Sunflower seed butter** and jelly Vegetable soup Mixed fruit salad Milk substitute*	SF-free Chicken Nuggets French Fries with ketchup Carrot sticks** Nectarine Milk substitute*
Snack	Fruit smoothie: Milk substitute* Frozen fruit (blended), flax seed	Sunflower seed butter** Buckwheat crackers	Carrot and celery sticks** with Hummus	SF-Free pretzels with Sunflower seed butter** and honey dip
Dinner	Baked chicken Brown rice or cooked millet with canola oil Broccoli sautéed with garlic Milk substitute*	Turkey and bean Tacos Cheese substitute (milk-free, soy-free) Corn on the cob with milk-free, soy-free margarine Milk substitute*	Brown rice pasta with Marinara and Meatballs (no egg and SF-free breadcrumbs) Sliced cucumbers and carrots** and lemon vinaigrette dipping sauce (lemon, herbs, canola oil) Milk substitute*	Barbeque Pork tenderloin with barbeque dipping sauce Green beans roasted with canola oil Baked sweet potato with milk-free, soy-free margarine
Snack	SF-free chocolate chip cookie	Coconut milk ice cream	SF-Free sugar cookie	Cherries and Popcorn**

Six food-free (SF-free)

*Calcium-enriched beverage (coconut, rice, gluten-free oat, hemp or quinoa), or Amino Acid based formula (Neocate Junior, Elecare Junior, PurAmino, Eo28 Splash)

** Consider appropriate textures. Foods such as raw vegetables, dried or hard fruit, popcorn, whole seeds and thickly-spread or chunks of seed butters may be a choking hazard for children under 4 years of age.

FIGURE E6.

Sample Six Food Elimination Diet Menu for ADULTS

The sample 4-day menu provides easy-to-prepare meal and snack ideas for adults that start from delicious whole foods for improved nutritional value and appeal. The menus do not take into consideration caloric needs therefore some adults will require fewer snacks and smaller portions while others may require more. Consider your weight goal when choosing portion sizes and number of snacks. Consultation with a dietitian may be required in individual cases.

Meal	Day 1	Day 2	Day 3	Day 4
Breakfast	Gluten-free oatmeal prepared with milk substitute*, sliced apples and cinnamon, chia seeds Coffee or tea	Cooked quinoa flakes with cinnamon, sugar and sliced peach Milk substitute* Coffee or tea	Turkey sausage links Hash browns cooked in canola oil Grits or buckwheat groats Sliced cantaloupe Milk substitute* Coffee or tea	SF-free buckwheat pancakes or waffles with 100% pure maple syrup Blueberries Milk substitute* Coffee or tea
Lunch	Turkey wrap with corn or teff tortillas, lettuce, avocado and SF-Free mayonnaise Potato chips Grapes	Vegetable salad with Grilled chicken Breast 2 tbsp. balsamic and canola oil vinaigrette 1 SF-free roll with olive oil or milk-free soy free margarine 1 medium orange	SB& J: SF-free bread Sunflower seed butter and jelly Vegetable soup Mixed fruit salad Milk substitute*	Gluten free pasta salad with carrots, green peas, sliced red grape tomatoes, roasted chicken and tahini or vinaigrette dressing. Nectarine Milk substitute*
Dinner	Baked chicken Brown rice or cooked millet with canola oil Broccoli sautéed with garlic Milk substitute*	Baked potato topped with Turkey and bean chili and Cheese Substitute (milk free, soy free) Milk substitute*	Brown rice pasta with Marinara and Meatballs (no egg and SF-free breadcrumbs) Mixed green salad with lemon vinaigrette (lemon, herbs and canola oil)	Barbeque Pork tenderloin Green beans with caramelize onions (cooked in canola oil) Corn on the cob Baked sweet potato with milk-free, soy-free margarine
Snacks-Optional	-SF-free chocolate chip cookie -Fruit smoothie: Milk substitute* Frozen fruit (blended), flax seed -Rice cakes with sunflower seed butter and banana slices	-Coconut milk ice cream -Dried fruit and seeds -Sunflower seed butter on Buckwheat crackers	-SF-Free sugar cookie -Carrot and celery sticks with Hummus -Cultured coconut milk yogurt Berries and chia seeds	-Cherries and Popcorn -Trail mix with raisins, seeds and SF-Free chocolate chips

Six food-free (SF-free)

*Calcium-enriched beverage (coconut, rice, gluten-free oat, hemp or quinoa), or Amino Acid based formula (Neocate Junior, Elecare Junior, Neocate Splash or Eo28 Splash)

FIGURE E7.

WHEAT ELMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain wheat. All manufactured food products that contain wheat as an ingredient are required by US law to **list the word "Wheat" on the product label.**

AVOID foods that contain any of these ingredients:

bread crumbs
bulgur
cereal extract
couscous
durum (durum flour or wheat)
emmer
einkorn
farina
flour (all-purpose, cake, enriched, graham, high gluten, high protein, pastry, wheat)
kamut
semolina
spelt
sprouted wheat
triticale
vital gluten
wheat (bran, germ, gluten, malt, starch)
whole wheat berries

Foods that often contain wheat:

- Wheat may be found in ale, baking mixes, baked products, batter-fried foods, beer, breaded foods, breakfast cereals, candy, crackers, frankfurters and processed meats, ice cream products, salad dressings, sauces, soups, soy sauce and surimi.

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with wheat. This can happen through shared cooking utensils, surfaces, frying oils or not keeping safe foods separated from those made with wheat. Avoid cross contact by washing everything well with soap and water.

Usually safe:

- The following flour substitutes are available and may be used **if tolerated**: amaranth, arrowroot, buckwheat, corn, millet, teff, gluten-free oat (regular oats may contain significant wheat contamination but gluten-free oats do not), potato, rice, tapioca, and quinoa flour.
- Barley and rye are two wheat-free grains that contain gluten. If eliminating gluten, barley and rye should also be eliminated. Barley may be present in malt flavorings or malt extract. Ask your doctor if you should eliminate all gluten-containing grains or just wheat.

Read product labels carefully before buying or eating any item.

For more information on wheat substitutes, see handout: *Cooking without Common Allergens.*

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FIGURE E8.

MILK ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain milk. All manufactured food products that contain milk as an ingredient are required by US law to **list the word "Milk" on the product label**.

AVOID foods that contain any of these ingredients:

Artificial butter flavor, butter fat, butter oil
Butter
Casein and caseinates (in all forms)
Cheese (all types)
Cheese flavor
Cream
Curds
Custard
Ghee
Hydrolysates (casein, milk protein, protein, whey, whey protein)
Ice cream
Lactalbumin, lactalbumin phosphate, lactoglobulin, lactoferrin, lactulose
Milk
Nougat
Pudding
Rennet, rennet casein
Recaldent™ (used in teeth-whitening chewing gums)
Simpless®
Whey (in all forms)
Yogurt

Foods that often contain milk:

- Milk may be found in many products such as many margarines, breads, cookies, cakes, chewing gum, chocolates, caramels, cold cuts, crackers, cereals, non-dairy products, processed and canned meats and frozen and refrigerated soy products.
- Most mammalian milks such as sheep and goat's milk are generally NOT safe for those with cow's milk allergy.

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with milk. This happens through shared cooking utensils, frying oils, cooking surfaces or not keeping safe foods separate from those made with milk. Avoid cross-contact by washing everything well with soap and water.
- Deli meats may present a risk of cross contact from cheese or meats containing milk sliced on the same slicer.
- Kosher Dairy - A "D" on a product label next to the circled K or U indicates the potential presence of milk protein. You may need to avoid these products, even if there is no apparent milk ingredient.
- Kosher - Parve or pareve are words that indicate that a product is not supposed to contain milk. However, a food product may be considered pareve even if it contains a very small amount of milk protein – potentially enough to cause an allergic reaction in some people. Do not assume pareve products are always safe.
- Milk may be found in cosmetics, nutrition supplements, medicines, and pet foods.

Usually safe:

- Cocoa butter, coconut milk, calcium lactate, oleoresin, cream of tarter

Milk is an important dietary source of protein, calcium, vitamin D and vitamin B12. Please discuss a safe dietary alternative to cow's milk with your doctor or dietitian.

Read all product labels carefully before buying and eating any item.

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FIGURE E9.

EGG ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain egg. All manufactured food products that contain egg as an ingredient are required by US law to **list the word "Egg" on the product label.**

AVOID foods that contain any of these ingredients:

Albumin
Egg (white, yolk, dried, lecithin, powdered, solids)
Egg substitutes
Eggnog
Egg noodles
Globulin
Lysozyme (used in Europe)
Mayonnaise
Meringue
Ovalbumin
Ovovitellin

Foods that often contain egg:

- Egg may be found in many products such as baked goods, breaded foods, cream fillings, custards, candies, canned soups, casseroles, eggnog, frostings, ice creams, lollipops, marshmallows, marzipan, nougat, pastas, salad dressings, and meat-based dishes such as meatballs or meatloaf.
- Egg whites and shells may be used as clarifying agents in soup stocks, consommés, bouillon's, wine, and coffees.

Look out for:

- Cross contact – Cross contact occurs when safe foods come in contact with egg. This can happen through shared cooking utensils, surfaces, frying oils or not keeping safe foods separate from those made with egg. Avoid cross contact by washing everything well with soap and water.
- A shiny glaze on baked goods may be an "egg wash"
- Most "egg substitutes" contain egg
- Egg may be found in cosmetics, nutrition supplements, medicines, and pet foods.

Usually safe:

- Lecithin from soy does not contain egg.

Read product labels carefully before buying or eating any item

For safe egg replacers, see handout: *Cooking without Common Allergens.*

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FIGURE E10.

SOY / SOYBEAN ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain soy. All manufactured food products that contain soy as an ingredient are required by US law to **list the word "Soy" or "Soybean" on the product label.**

Avoid foods that contain any of these ingredients:

Edamame
Miso
Natto
Shoyo sauce
Soy (fiber, flour, grits, nuts, sprouts)
Soy (milk, yogurt, ice cream, cheese)
Soy protein (concentrate, hydrolyzed, isolate)
Soy sauce
Tamari
Tempeh
Textured vegetable protein (TVP)
Tofu (soybean curd)

Foods that often contain soy:

- Soy may be found in numerous products such as baking mixes, breads, cookies, crackers, canned broth and soups, canned tuna and meat, breakfast cereals, high protein energy bars and snacks, low fat peanut butters and processed meat and frankfurters.

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with soy. This can happen through shared cooking utensils, cooking oil, cooking surfaces or not keeping safe foods separate from those made with soy. Avoid cross contact by washing everything well with soap and water.
- Asian restaurants are considered high risk for individuals with soy allergy due to the common use of soy as an ingredient and the risk of cross contact even if a soy free item is ordered.
- Soy may be found in cosmetics, nutritional supplements, medications and pet foods.

Usually safe:

- **Soybean oil and soy lecithin do not need to be avoided on a soy elimination diet.**

Read all product labels carefully before buying and eating any item.

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FIGURE E11.

PEANUT ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain peanut. All manufactured food products that contain peanut protein as an ingredient are required by US law to **list the word "Peanut" on the product label**.

AVOID foods that contain any of these ingredients:

Beer nuts
Ground nuts
Mixed nuts
Peanut (including peanut flour and peanut butter)
NuNuts® (and other artificially flavored nuts)

Foods that often contain peanut:

- Peanut may be found in many manufactured products such as candy, chocolate, baked goods and ice creams.
- Peanut protein is found in Arachis oil, cold pressed, expressed, expelled, and extruded peanut oils. Highly refined peanut oils may be safe, but it may be difficult to identify the type of oil used in a product. Avoidance of peanut oil is often recommended.

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with peanut. This may happen through shared cooking utensils, cooking surfaces, frying oils or not keeping safe foods separate from those made with peanut. Avoid cross contact by washing everything well with soap and water.
- Ethnic restaurants (such as Chinese, African, Indonesian, Thai and Vietnamese), bakeries and ice cream parlors are considered high risk due to the common use of peanut and the risk of cross contact even if a peanut free item is ordered.
- Peanut butter and/or peanut flour have been used in homemade chili and spaghetti sauce as thickeners.
- Peanut may be found in cosmetics, nutrition supplements, medicines, and pet foods.

Usually safe:

- Nutmeg, water chestnut and butternut squash are not nuts and are safe if eliminating peanut and tree nuts.

Read all product labels carefully before buying and eating any item.

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FIGURE E12.

TREE NUT ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain any tree nuts. All manufactured food products that contain tree nut as an ingredient are required by US law to **list the specific tree nut on the product label.**

Avoid foods that contain any of these ingredients:

Almond	Macadamia nut	Brazil nut
Pecan	Cashew	Pine nut (Pignolia nut)
Chestnut	Pistachio	Filbert/hazelnut
Walnut		

The following are uncommon, additional tree nuts which require disclosure by US law

Beech nut	Butter nut	Chinquapin	Coconut*
Ginkgo	Hickory	Lychee nut	Pili nut
Shea nut			

Foods that often contain tree nuts:

- Tree nuts may be found in cereals, crackers, cookies, candy, chocolates, energy bars, flavored coffee, frozen desserts, marinades, barbeque sauces and some cold cuts such as Mortadella.
- Tree nut protein will be found in foods such as Gianduja (a creamy mixture of chocolate and chopped almonds and hazelnuts although other nuts may be used), Marzipan (almond paste), Nougat, Nu-Nuts® artificial nuts, Nutella®, pesto, and nut meal.
- Some alcoholic beverages may contain nut flavorings. These beverages are not currently regulated by the labeling laws therefore it may be necessary to call the manufacturer to determine the safety of ingredients such as natural flavoring.
- Avoid natural extracts such as pure almond extract and natural wintergreen extract (for the filbert/hazelnut allergy). Imitation or artificially flavored extracts are generally safe.
- Nut oils contain tree nut proteins
- *Coconut is generally allowed on a tree nut elimination diet for eosinophilic esophagitis. Ask your doctor if you should avoid coconut.

Look out for:

- Ethnic restaurants (such as Chinese, African, Indian, Thai and Vietnamese), ice cream parlors and bakeries are considered high risk for individuals with tree nut allergy due to the common use of nuts and the risk of cross contact even if a tree nut free item is ordered.
- Tree nut oils may be found in cosmetics, lotions and soaps, nutritional supplements, medications and pet foods.
- Cross contact- Cross contact occurs when safe foods come in contact with tree nuts. This may happen through shared cooking utensils, surfaces, frying oils, deli meat slicers or not keeping safe foods separate from those made with tree nuts. Avoid cross contact by washing everything well with soap and water.

Usually safe:

- The following are not tree nuts: nutmeg, water chestnuts, and butternut squash.

Read product labels carefully before buying or eating any item.

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FIGURE E13.

FISH ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain fish. All manufactured food products that contain fish as an ingredient are required by US law to **list the specific fish on the product label.**

Avoid foods that contain any of these ingredients:

FISH

Anchovies
Bass
Catfish
Cod
Flounder
Grouper
Haddock
Hake
Herring
Mahi Mahi
Perch
Pike
Pollock
Salmon
Scrod
Swordfish
Sole
Snapper
Tilapia
Trout
Tuna

Foods that often contain fish:

- Worcestershire sauce, Caesar salad and Caesar salad dressing usually contain fish (anchovies) ingredients. Caponata, a Sicilian eggplant relish, may contain anchovies.

- Surimi, an artificial crabmeat (also known as “Sea legs” or “Sea sticks”), is made from fish.

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with fish. This can happen through shared cooking utensils, surfaces, frying oils or not keeping safe foods separate from those made with fish. Avoid cross contact by washing everything well with soap and water.
- Seafood restaurants are considered high risk due to the risk of cross contact even if a non-fish item is ordered.
- Ethnic restaurants (such as Chinese, Indonesian, Thai and Vietnamese) are considered high risk for people with fish allergy due to the common use of fish and fish ingredients and the risk of cross contact, even if a non-fish item is ordered.
- Fish oils are sometimes added to products to increase Omega 3 fatty acid or DHA content. Please read labels carefully, especially on products (such as yogurt or juice) “with DHA” or “with Omega 3 fatty acids.”
- Fish may be found in cosmetics, medicines, nutrition supplements (for example omega 3 fatty acids supplements) and pet foods.

Usually safe:

- Carrageen is not a fish. Marine algae-based omega 3 fatty acid supplements are considered safe on a fish elimination diet.

Read all product labels carefully before buying and consuming any item.

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FIGURE E14.

SHELLFISH ELIMINATION for Eosinophilic Esophagitis

It is important to read all ingredient labels to identify foods that contain shellfish. All manufactured food products that contain crustacean shellfish as an ingredient are required by US law to **list the specific crustacean shellfish on the product label.**

Avoid foods that contain any of these ingredients:

Crustacean
Shrimp (prawns, crevette)
Lobster (langouste, langoustine, scampo, coral, tomalley)
Crab
Crawfish (crayfish, ecrevisse)

Mollusks

Abalone	Octopus
Clam	Scallop
Cockle	Snail (escargot)
Mussel	Squid (calamari)
Oyster	

Mollusks are not considered major allergens under food labeling laws. They may not be fully disclosed on a product label.

Foods that often contain shellfish:

- Shellfish protein may be present in bouillabaisse, fish stock, surimi, and seafood flavoring (such as crab or clam extract.)

Look out for:

- Cross contact- Cross contact occurs when safe foods come in contact with shell fish. This can happen through shared cooking utensils, surfaces, frying oils or not keeping safe foods separated from those made with shell fish. Avoid cross contact by washing everything well with soap and water.

- Fish and seafood restaurants are considered high risk due to the risk of cross contact even if a non-shellfish item is ordered

Usually Safe:

- Carrageen is not a fish and considered safe for those avoiding fish and shellfish.

Read all product labels carefully before buying and eating any item.

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FIGURE E15.

CORN ELIMINATION for Eosinophilic Esophagitis

Avoid foods that contain any these ingredients:

Corn
Corn bran
Corn flour
Cornmeal
Grits
Hominy
Maize
Masa
Popcorn
Polenta

The following foods contain corn protein ingredients and should be avoided:

- Powdered sugar
- Cornstarch
- Baking powder
  (Corn-free baking powder is available; Baking soda is safe)

Foods that often contain corn protein:

- Bakery products such as breads, rolls and bagels
- Bread crumbs, breading and prepared breaded products
- Breakfast cereals often contain corn flour
- Snacks such as tortillas chips, Japanese snack mixes
- Ethnic Latino foods commonly have corn-based ingredients

Look out for:

- Cross Contamination with corn may occur in bakeries, bagel shops, Mexican and Latin restaurants.

Generally safe:

- Highly refined corn oil, corn syrup, high fructose corn syrup, corn syrup solids and maltodextrin do not contain corn protein and are considered safe for those with corn allergy.

FIGURE E16.