

# Milk Allergy in Children



In the United States, approximately 8% of children develop a food allergy, 2.4% have multiple food allergies, and around 3% experience reactions that are considered severe. Of all food allergies, cow's milk (2.2%), peanut (1.8%), and tree nut (1.7%) allergies have been found to be the most common allergies in children [1]. So, what is a milk allergy? A person has a milk allergy when their immune system responds abnormally to milk and food products made with milk. Most milk allergy symptoms are related to exposure to cow's milk, but milk from other domestic animals such as sheep, buffalo, and goats can also cause an allergic reaction. Many children outgrow their allergy to milk; those who do not will most likely need to avoid milk products into adulthood [2, 3].

For child care providers, knowing which children are allergic to milk and what signs and symptoms to be on the lookout for is crucial for child safety. Milk allergy symptoms range from mild to severe and might become evident immediately or develop over time. Examples of immediate (acute) symptoms include hives, wheezing, vomiting, runny nose, and problems with digestion. If a child has a severe milk allergy they are at greater risk of experiencing anaphylaxis, which is a life-threatening, acute condition. Milk allergy symptoms that might take longer to develop or be recognized include dermatitis, chronic diarrhea, bloody stools, iron deficiency anemia, and other disorders of the gastrointestinal tract [4].

To help you be able to offer the best care possible to children with a milk allergy, this course will explore further into milk allergy signs and symptoms, differences between milk allergy and lactose intolerance, sources of cow's milk, potential nutrient deficiencies that can result from avoiding milk, and recommendations for how to avoid milk and milk products.

# Milk Allergy Symptoms

As mentioned prior, milk allergy symptoms can be mild to severe, differ from person to person, and can occur within a minute to several hours or weeks after exposure to milk or milk products. The following table lists reactions that occur immediately after consuming milk, as well as reactions that take longer to develop [2, 4].

IMMEDIATE REACTIONS	LATE REACTIONS
<ul style="list-style-type: none"><li>• Anaphylaxis</li><li>• Dry cough</li><li>• Vomiting</li><li>• Hives</li><li>• Wheezing</li><li>• Runny nose</li><li>• Acute asthma with severe respiratory distress</li><li>• Diarrhea</li></ul>	<ul style="list-style-type: none"><li>• Loose stools, may contain blood</li><li>• Chronic diarrhea</li><li>• Abdominal cramps</li><li>• Dermatitis</li><li>• Iron deficiency anemia</li><li>• Constipation</li><li>• Itchy skin rash, often around the mouth</li><li>• Colic, in babies</li><li>• Poor growth, related to refusing food</li></ul>

## Milk Allergy vs. Milk Intolerance

Milk Intolerance, also known as lactose intolerance, is sometimes confused with a milk allergy. Lactose intolerant people lack a digestive enzyme that breaks down lactose, a natural sugar found in milk and milk products. Symptoms of lactose intolerance include gas, bloating, nausea, cramps, and diarrhea. While lactose intolerance involves a disorder with the digestive system, a milk allergy involves a “reaction by the body’s immune system to one or more milk proteins”, which can be life threatening and is commonly diagnosed within the first year of life [3]. Unlike an allergy to milk, lactose intolerance tends to develop during adolescence or adulthood [5]. Children who have a milk allergy are at greater risk of developing other food allergies (E.g. eggs, soy, or peanut allergy) or other general allergies, like hay fever or allergic reactions to pet dander [2].

# Anaphylaxis

Anaphylaxis is a life threatening, medical emergency that can constrict airways and make breathing extremely difficult. An epinephrine (adrenaline) shot is needed in treating anaphylaxis, as well as a trip to the emergency room. Runner up to peanuts and tree nuts, milk is number three on the list of foods that can cause anaphylaxis [2].

Make sure children with a milk allergy have easy access to an epinephrine pen in case of milk exposure that results in an anaphylactic reaction. Epinephrine is used to treat anaphylaxis by constricting blood vessels to increase blood pressure, relaxes muscles in the lungs to help improve breathing, “stimulates the heart (increases heart rate), and works to reduce hives and swelling that may occur around the face and lips” [6]. Using epinephrine as the first treatment of anaphylaxis is recommended. Antihistamines are not recommended for treating anaphylaxis, as antihistamines will not relieve shortness of breath, gastrointestinal symptoms, or shock [6].

## Avoiding Milk Products

Two proteins found in cow’s milk are known for causing an allergic reaction: casein and whey. Casein is found in the solid part (curd) of milk that curdles, whereas whey is found in the liquid part of milk that remains after milk curdles [2]. Children might be allergic to one or both milk proteins. Both milk proteins are commonly used in processed foods, making it hard to avoid.

### Examples of Milk or Milk-Derived Ingredients:

<ul style="list-style-type: none"><li>• Butter, butter fat, butter oil, butter ester(s)</li></ul>	<ul style="list-style-type: none"><li>• Half and half</li></ul>
<ul style="list-style-type: none"><li>• Buttermilk</li></ul>	<ul style="list-style-type: none"><li>• Lactose, lactulose, ingredients spelled with the prefix “lact”</li></ul>
<ul style="list-style-type: none"><li>• Casein, caseinates (all forms)</li></ul>	<ul style="list-style-type: none"><li>• Milk (in all forms, including fresh, powdered, condensed, derivative, dry, evaporated, lowfat, nonfat, whole, malted, skimmed, solids)</li></ul>
<ul style="list-style-type: none"><li>• Cheese</li></ul>	<ul style="list-style-type: none"><li>• Pudding</li></ul>
<ul style="list-style-type: none"><li>• Cream</li></ul>	<ul style="list-style-type: none"><li>• Sour cream</li></ul>
<ul style="list-style-type: none"><li>• Curds</li></ul>	<ul style="list-style-type: none"><li>• Whey (in all forms)</li></ul>
<ul style="list-style-type: none"><li>• Custard</li></ul>	<ul style="list-style-type: none"><li>• Yogurt</li></ul>
<ul style="list-style-type: none"><li>• ghee</li></ul>	<ul style="list-style-type: none"><li>• Ice cream, gelato</li></ul>
<ul style="list-style-type: none"><li>• Artificial butter</li></ul>	<ul style="list-style-type: none"><li>• Protein powders</li></ul>
<ul style="list-style-type: none"><li>• Candies (including chocolate, nougat, caramel)</li></ul>	<ul style="list-style-type: none"><li>• Artificial cheese flavors</li></ul>

# Milk Found in Unusual Food Sources

According to the Food Allergy Research & Education (FARE) organization, milk shows up occasionally in some unexpected places due to cross-contamination during food preparation, as well as during the production of food products. The following list includes examples of unexpected ways a person might be exposed to milk (E.g. in a restaurant or via boxed/canned food). However, the following list is not implying that milk is always found in the below mentioned foods. Instead, the list of potential sources of milk is intended to highlight the importance of reading food labels and asking questions about food prepared by someone other than yourself [3].

## Potential Sources of Milk

- Deli meat cross-contaminated with milk due to using the same slicer or knife for both meat and cheese products
- Some deli meats contain casein as a binder, read all labels carefully
- Milk protein used in some brands of canned tuna fish
- Food products manufactured on equipment shared with milk
- Shellfish dipped in milk for reducing odor
- Steak topped with butter after being grilled to add flavor; ask restaurant server about how all foods are prepared
- Medication sometimes contains milk protein
- Processed foods labeled “milk-free” or “nondairy” might contain milk protein

With severe milk allergies, meals outside of the home should be limited. When eating at home is not possible, always ask about preparation methods and find out if it is appropriate to carry an epinephrine pen. If a child has a severe milk allergy, they might need to wear a medical alert bracelet or necklace to alert others about their condition [2].

# Feeding Infants with a Milk Allergy

Although not conclusive, research indicates exclusively breastfeeding infants for the first 4-6 months of life instead of feeding them cow's milk-based infant formula helps reduce the infant's chances of developing a milk allergy [2, 7]. The following are recommendations for what to feed infants:

- **Breastmilk** is the best source of nutrition for infants. Exclusively breastfeeding infants for the first 6 months is recommended by the American Academy of Pediatrics for optimal health, especially if there is an increased risk of developing a milk allergy [8]. Milk proteins found in cow's milk can pass from mother to infant via breastmilk and might cause an allergic reaction. Breastfeeding mothers should speak with their doctor regarding the potential need to avoid milk and milk products for as long as they are breastfeeding [7].
- When exclusive breastfeeding is not an option, choose a **hypoallergenic formula** for feeding infants. Hypoallergenic formulas are usually better tolerated by infants compared to regular formulas, because the milk proteins (casein and/or whey) in hypoallergenic formulas have been hydrolyzed (broken down) for easier digestion and reduced risk of causing allergic reaction. Hypoallergenic formulas are labeled as either partially or extensively hydrolyzed [2]. Formulas made with amino-acids in addition to being extensively hydrolyzed are even less likely to induce an allergic reaction in infants [7].
- **Soy-based formula** is an additional formula alternate made with soy protein instead of cow's milk protein. Formula made with soy is required to be comparable to formula made with cow's milk and fortified to ensure they are nutritionally complete. Children diagnosed with a milk allergy might also develop an allergy to soy [7].

## Nutrients of Concern

Cow's milk is a major source of nutrition in many children's diet. Calcium, vitamin D, and riboflavin are all nutrients important in children's health and have direct impact on their growth and development. Having a milk allergy can put a child at risk of developing a nutrient deficiency if those nutrients are not provided by other means, either dietary or supplemental. Thus, child care providers need to make sure children who are allergic to milk protein(s) are receiving a well-balanced, nourishing diet despite their food restrictions. Incorporating non-dairy foods high in calcium, vitamin D, and riboflavin is one of the best ways to compensate

for possible nutrient deficiencies associated with having a milk allergy. Fortified foods and multivitamins are additional ways to obtain missing nutrients needed for a well-balanced diet without including cow's milk and milk products. The following paragraphs address each nutrient of concern.

## Calcium

Diets excluding dairy products put children at risk of being deficient in calcium, an important mineral needed in growing children. Adequate calcium intake, especially in childhood, is needed for strong bone and teeth formation. Corn tortillas, oatmeal, beans, almonds, sesame seeds, mustard and turnip greens, bok choy, kale, parsley, watercress, and broccoli all contain calcium that is easy to absorb. Not all dark green vegetables are good sources of calcium because of the binders they contain which inhibit calcium absorption. For example, spinach and Swiss chard appear to be good sources of calcium, but they contain oxalic acid which binds to dietary calcium and dramatically reduces the amount of calcium absorbed during digestion. In addition to naturally occurring plant sources of calcium, people avoiding milk can obtain calcium from fortified foods such as calcium-fortified orange juice, calcium-fortified soybean milk\*, and calcium-fortified cereals. Calcium supplements are another option [8].

\* "Soybean milk may be served as a milk substitute because of medical or other special dietary needs. See FNS instruction 783 -2 Rev.2. Nondairy beverages offered as fluid milk substitutes must be nutritionally equivalent to milk and provide specific levels of calcium, protein, vitamins A and D, magnesium, phosphorus, potassium, riboflavin, and vitamin B-12. Use of this product must be requested by parents or supported by a statement from a recognized medical authority that includes recommended alternate foods" [9].

## Vitamin D

Vitamin D is a fat-soluble vitamin needed by the body to promote calcium absorption and bone growth, along with many other important bodily functions. There are two forms of vitamin D: ergocalciferol (D2) and cholecalciferol (D3). Vitamin D3 is the more potent and bioavailable form of vitamin D compared to D2. Unlike any other nutrient, vitamin D3 can be made by the body when exposed to sunlight [10]. Despite our ability to produce vitamin D3 via sun exposure, approximately 40-75% of people are vitamin D-deficient. A variety of factors interfere with the body's ability to convert sunlight into vitamin D3: season, time of day, latitude, air pollution, cloud cover, sunscreen, body parts exposed/unexposed, skin color, and age. As a result, it is difficult to determine how much vitamin D a person gets from time spent in the sun. Some researchers

suggest sun exposure 2-3 times per week, 5-30 minutes per day between 10 AM and 3 PM, might be sufficient exposure for the body to produce adequate vitamin D3 [11]. Many dermatologists, however, recommend limiting sun exposure due to increased risk of skin cancer [12].

Fatty fish and fish liver oils are the only natural food sources of vitamin D3. Many people turn to vitamin D-fortified milk, or in the case of people allergic to milk, vitamin D-fortified non-dairy milks (E.g., soybean milk\*). Other reimbursement-approved vitamin D-fortified food options include orange juice and ready-to-eat cereals [11]. Plants exposed to ultraviolet light produce small amounts of vitamin D2. These vitamin D-containing plants (E.g., mushrooms) will be labeled accordingly. Another milk-free option is taking a daily vitamin D supplement. Since research suggests that vitamin D2 is not as potent as vitamin D3, look for supplements made with D3 [13].

## Riboflavin

Riboflavin, also known as vitamin B2, is a water-soluble vitamin found in foods either naturally or by fortification, and is also available in dietary supplements. Riboflavin is an essential component of two major coenzymes involved in energy production, cellular function, growth, and development, as well as in the metabolism of fats, drugs, and steroids. Bacteria found in the large intestine “produce free riboflavin that can be absorbed by the large intestine in amounts that depend on the diet” [14]. Plant-based diets are more favorable for bacterial production of riboflavin compared to diets high in meat [14].

In most American’s diets, the largest contributors of dietary riboflavin include milk, meats, grains, and ready-to-eat cereals. Since milk is avoided, special attention should be made to ensure other sources of riboflavin are included in children’s diet every day. Examples of dairy-free foods that are good sources of riboflavin include eggs, organ meats (kidney and liver), salmon, lean meats, portabella mushrooms, almonds, and quinoa. Other dietary sources that contain smaller amounts of riboflavin include spinach, apple with skin, kidney beans, sunflower seeds, and canned tomatoes. Due to riboflavin being water-soluble, choose cooking methods other than boiling in water as often as possible. Non-water cooking methods, such as baking, broiling, steaming and microwaving, are great options to help retain riboflavin content in foods [14].

# Cow's Milk and Milk Product Alternatives

## Non-Dairy Milk

- Soybean\*, coconut, almond, rice, oat, hemp, or cashew milk

## Non-Dairy Cheese

- Nut cheese (E.g. cashew)
- Soybean cheese

## Non-Dairy Butter

- Margarine
- Coconut spreads
- Coconut oil
- Cooking oil (E.g. canola, soybean, olive)

## Non-Dairy Ice Cream

- Ice creams made with soybean, rice, or coconut milk instead of dairy
- Make your own dairy-free ice cream and sorbet with an ice cream maker and dairy-free ingredients
- Creamsicles made with blended fruit and coconut milk

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