

# Atopic Eczema (Atopic Dermatitis) in Children — Causes and Treatment

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**Atopic dermatitis is a common condition in children that is characterized by an atopic eczematous skin rash that is highly pruritic. Children with atopic dermatitis might have other autoimmune disorders, such as asthma and food allergies. The diagnosis of atopic eczema due to atopic dermatitis in children is a clinical-based one with little value of laboratory investigations. Once the diagnosis is confirmed, treatment mainly consists of skin rehydration, avoidance of the possible allergens and immunosuppressive therapy in more severe cases.**



## Overview

Atopic eczema, also known as atopic dermatitis, is a **chronic inflammatory condition of the skin that is characterized by an uncontrolled immunologic response**. The two terms are sometimes used interchangeably, but eczema is just the skin manifestation of a vast number of immunologic conditions that present as itching, redness, scaling, clustered papulovesicles and hyperkeratosis with atopic dermatitis being the most common cause. Atopic dermatitis is the histological finding of spongiosis and varying degrees of acanthosis.

# Epidemiology of Pediatric Atopic Eczema

Atopic dermatitis is a very common condition in children with an **estimated prevalence of 20% in the pediatrics' population**. The condition is more common in children with concurrent asthma or hayfever. The condition appears to be more common in Caucasians, compared to Asian or Middle Eastern ethnicities.

Atopic dermatitis and its presentation, atopic eczema, have been described **equally in boys and girls**. The most common age for presentation is before 5 years of age. The prevalence of atopic dermatitis in adults is as low as 2 %, suggesting that a significant proportion of the cases outgrow the condition. Approximately, 75 % of children with atopic dermatitis show marked improvement in their symptomatology by the age of 14 years.

Children with atopic eczema can **develop severe and disfiguring skin lesions** that can affect them adversely. It can limit their interaction with their peers and have a significant psychological impact on the child; therefore, the adequate recognition of the possible precipitating factors of the atopic eczematous reaction and the treatment of the condition is crucial.

Additionally, **younger parents of children with eczema might socially discriminate these children**. They might find them less attractive compared to the children of others, touching between the child and the mother might be limited, and the child might develop a tendency to avoid their parents because they do not like the application of skin products and creams to treat the condition.

It is very essential to consider the psychological aspect of the condition when eczema is being treated in a child because the impacts can be more severe compared to adults.

## Precipitating Factors of Atopic Eczema

The exact etiology of atopic dermatitis in all age groups is unknown. However, the condition is clearly **related to an abnormal immunologic response to allergens and is usually precipitated by common allergens** such as the house dust mite, grass pollens, and animal dander. A significant number of children with atopic eczema also have asthma or other immunological disorders. Food allergies are also more common in children with atopic dermatitis and eczema.

Recent studies have pointed to the role of **immunoglobulin E antibodies** against the house dust mite. It was found that children with atopic dermatitis have increased immunoglobulin E antibodies against a myriad of antigens with those against the house dust mite being the most common type. Because of this finding, it was argued that the house dust mite must be the most common precipitating factor for atopic dermatitis.

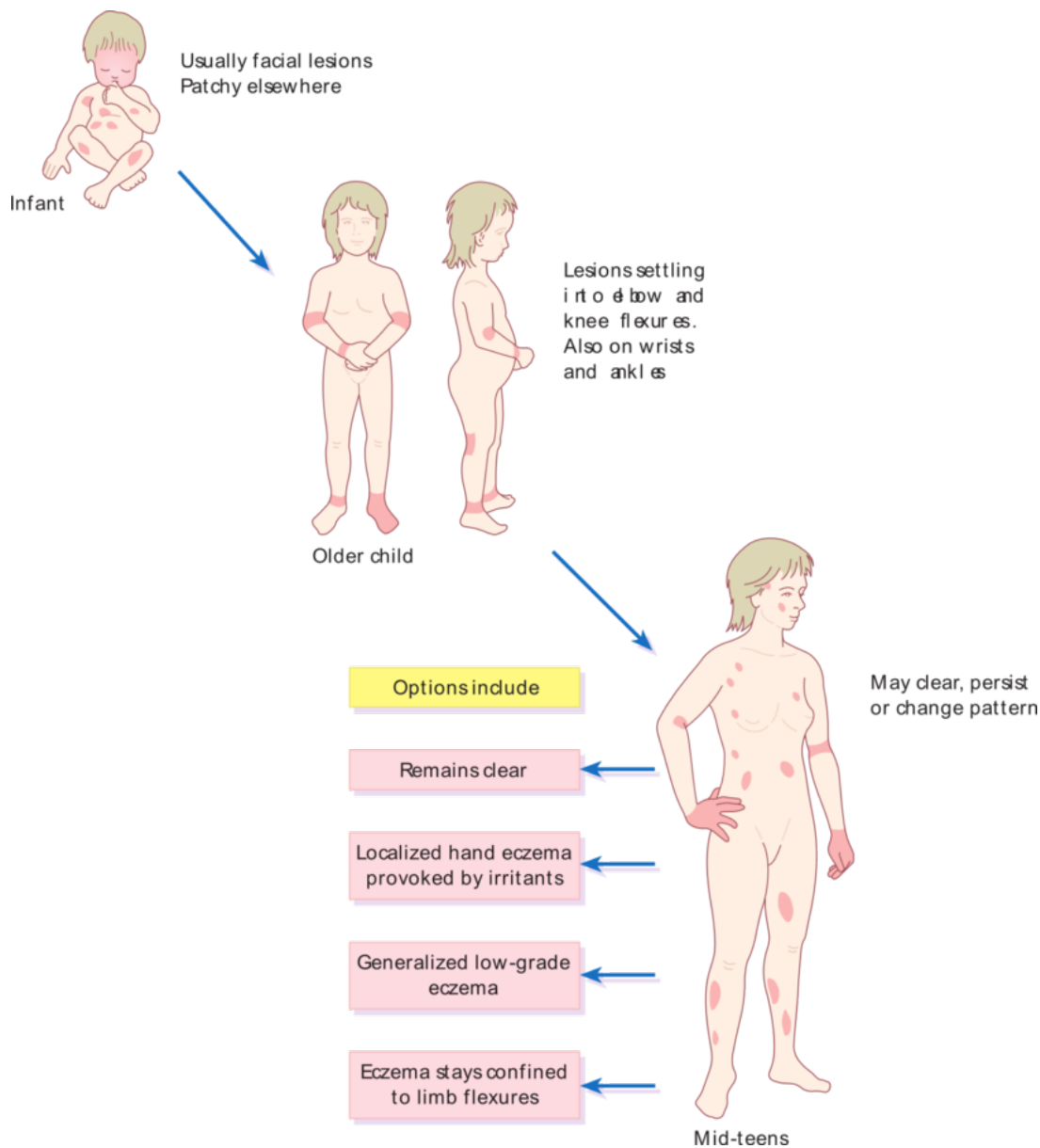


Image: "Pattern of atopic eczema varies with age." by Madhero88. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

## Pathophysiology of Atopic Eczema

In addition to the role of immunoglobulin E antibodies in the pathophysiology of atopic dermatitis, the role of **cell-mediated immunity** has been shown to play a significant part in the presentation of the skin lesions characteristic of eczema. The number of T-helper type 2 cells, for instance, was found to be higher in the skin of children with atopic dermatitis, compared to those who do not have the condition.

These T-helper cells are known to be **pro-inflammatory in that they can secrete several interleukins including interleukin-4, interleukin-13, interleukin-5 and interferon-gamma**. Recent studies have shown differences in the interleukins profile between children with chronic versus acute atopic dermatitis. It seems that interleukin-4 and 13 are more increased in children with acute atopic dermatitis with eczema, while interleukin-5 and interferon-gamma are usually elevated in children with chronic atopic dermatitis.

Exposure to early daycare and unpasteurized milk has been linked to a lower risk of

developing atopic dermatitis. The most likely explanation for this finding stems from our understanding of the pathophysiology of atopic dermatitis. **Children exposed to early daycare and unpasteurized milk are usually exposed to a higher number of nonpathogenic microbes and other allergens.** Exposure to other allergens most likely makes the child develop an immunologic tolerance which makes it less likely for the child to develop atopic asthma or atopic dermatitis. This is known as the hygiene theory of pathogenesis that postulates that early exposure to immunologic toxins leads to maturity of the immune system and thus rarely develops autoimmune reactions.

## Clinical Presentation of Pediatric Atopic Eczema



**Image:** "Inflamed atopic dermatitis on the head of a 2-month-old child." by Gzzz. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

Because many conditions can present with pruritus in children, the American Academy of Allergy, Asthma, and Immunology has put diagnostic criteria for the diagnosis of atopic eczema in children. For the diagnosis of atopic dermatitis with eczema to be made in a child, he or she must have at least **three major criteria and at least three minor criteria.**

- The presence of pruritus.
- The presence of skin lesions that are localized to the flexural surfaces and show lichenification with possible involvement of the extensor surfaces and the face,
- The condition runs a chronic course marked by periods of remission and exacerbation.
- Family or personal history of atopy which is **defined as asthma, allergic rhinoconjunctivitis or atopic dermatitis.**

The list of minor criteria is quite long. The patient might have dry skin, keratosis pilaris, involvement of the hands and feet, nipple eczema, recurrent viral and bacterial skin infections, pityriasis alba skin infection, keratoconus, food intolerance, intolerance to clothes made of wool and certain laboratory findings suggestive of an impaired immune response. **Children usually describe a vicious cycle of itching, followed by scratching and followed by more itching and so on.**

The clinical examination can help in the differentiation between acute and chronic atopic dermatitis. Patients with acute episodes of eczema have very pruritic lesions that are red in color and have papules or vesicles. Exudates might also be evident on physical examination. Chronic lesions are characterized by lichenification, thickened skin plaques, and possibly scaling skin lesions that can look like psoriasis.

## Summary: clinical presentation by age

### 1. **Infantile (< 2 years)**

- Pruritic, red, scaly, crusted lesions
- Extensor surfaces, cheeks, scalp
- Sparing diaper area
- Bacterial superinfection

### 2. **Childhood (2-12 years)**

- Less exudates
- Lichenification
- plaques on flexural areas

### 3. **Adult (> 12 years)**

- Localized, lichenified
- Excoriated, fibrotic papules
- Flexural surfaces

## Diagnostic Workup for Pediatric Atopic Eczema

Laboratory investigations are not needed for establishing the diagnosis of atopic dermatitis as the cause of the eczematous rash. If laboratory investigations are ordered for research purposes, then one might see **elevated serum immunoglobulin E antibodies and peripheral blood eosinophilia**. Children who are diagnosed with atopic eczema might benefit from a **prick skin test** where certain antigens are used to identify the most likely cause of the atopy in the child.

The diagnosis of atopic eczema is based on the **presence of three major criteria and three minor criteria** and is usually a clinical diagnosis. A response to avoidance strategies for possible allergens and typical therapy is another way to confirm the diagnosis of atopic eczema in a child.

## Treatment of Pediatric Atopic Eczema

The management of atopic dermatitis in children revolves around **treating skin dryness, the use of skin dresses, avoidance of the possible allergens, treating secondary skin bacterial infections and immunomodulation therapy**.

Bathing oils, skin products that contain oatmeal and skin moisturizer are essential in skin rehydration in children with atopic eczema due to atopic dermatitis. The moisturizer should be applied all over the body at least twice a day, regardless of whether the child has an active eczematous skin rash or not. Some creams and bathing oils that contain antiseptics might exacerbate the condition.

Children with severe outbreaks of eczema might need the **application of corticosteroid based creams all over the body followed by covering the skin with a double layer of wet dressings**. This treatment approach has been found successful in treating

atopic eczema in children with complete clearance of the active lesions within three or four days.

As we have explained, the most important allergen for the development of atopic eczema is the house dust mite. The mattress **encasing, and hot washing of pillows and mattresses** might help in getting rid of the house mite and should always be discussed with the caregivers of the child. Additionally, if a possible food allergen is identified, it should be avoided.

**Staphylococcus aureus infections are common** in the eczematous skin of children with atopic dermatitis. The topical fusidic acid ointment is usually effective in the management of skin bacterial infections in children with atopic dermatitis.

The **use of oral corticosteroids is no longer recommended** due to the risk of severe rebound of eczema on discontinuation. Ciclosporin has been found to be more effective, compared to steroids, and has a lower risk of rebound eczema. The use of oral immunosuppressive therapy should be reserved for children with severe atopic eczema and atopic dermatitis.

Symptomatic treatment of the pruritus might be needed, especially at bedtime.

**Sedating antihistamines such as promethazine are useful.** Non-sedating antihistamines should be avoided if possible in children because the sedating effect of the antihistamines is needed in children with severe pruritus due to eczema.

## Complications

### Cellulitis

- Bacterial infections
- Tx: dilute bleach and oral antibiotics

### HSV (Eczema herpeticum)

- Life, vision-threatening
- Tx: acyclovir

## References

Barnetson, R. S. C. and Rogers, M. (2002) 'Childhood atopic eczema.', *BMJ (Clinical research ed.)*. BMJ Group, 324(7350), pp. 1376–9. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/12052810> (Accessed: 20 March 2017).

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