

What causes eczema?

Eczema is a very common skin condition. Although the term eczema is used to describe a few different conditions, when people say eczema they usually mean the condition called atopic dermatitis or atopic eczema. In eczema, the skin becomes dry and more vulnerable to inflammation and infection. People with eczema are also likely to have asthma and hay fever. All three of these are called atopic conditions. In atopic conditions, the immune system response is activated by otherwise-harmless things - allergens. Eczema is not contagious. It can't be passed from person to person.

The causes of eczema are complicated and not fully understood. It's thought that eczema develops from a combination of inherited (genetic) things, alongside other things in the environment. We think the causes of eczema include:

- Genetics.
- Changes in the skin, which make it more 'leaky' and vulnerable to becoming irritated.
- Changes in the immune system, which make it react more strongly to irritants, allergens, and infections.
- An overgrowth of bacteria on the skin.
- Exposure to things that cause skin damage, like irritating soaps and detergents, cigarette smoke, and pollutants.

In this series of articles centred around eczema you can read about [eczema symptoms](#), [eczema treatment](#), and causes of eczema - all written by one of our expert GPs.

The rest of this feature will take an in-depth look at the causes of eczema, as, at Patient, we know our readers sometimes want to have a deep dive into certain topics.

Causes of eczema

There are a lot of theories about the causes of eczema. It's likely to be very complicated, and the causes probably differ from person to person. We think the following things are involved in causing eczema:

Genetics

Eczema tends to run in families. Six out of 10 children who have one parent with eczema also get it, and if both parents have eczema, eight out of 10 children develop eczema.

It's therefore likely that people inherit genes that make them more likely to get eczema.

One example is the filaggrin gene. Filaggrin is a protein that helps to form the outermost protective layer of the skin. Mutations in the filaggrin gene can stop this layer forming, causing dry skin and making it more vulnerable to irritants. Around half of all people with severe eczema have a detectable filaggrin gene mutation.

Loss of the skin's barrier function

The skin has many different functions. One very important role is acting as a barrier – preventing water loss, and protecting the body by stopping irritants, allergens, and infections from entering. This is called the barrier function of the skin. Healthy skin, under a microscope, looks like a brick wall – skin cells are tightly packed together with no gaps between them.

The skin's barrier function stops working in eczema. The skin becomes more leaky. This allows water to escape from the skin, leading to dry and itchy skin. It's also easier for irritants, allergens, and infections to get into the skin. All of these can cause inflammation in the skin. Inflammation, in turn, can damage the skin more and further reduce its ability to act as a barrier.

Itching and scratching are also very common in eczema. Scratching damages the skin, again making it more vulnerable to irritants and skin infections.

Moisturisers (emollients) are an important [treatment for eczema](#). They work mostly by forming a protective layer on the skin, restoring the skin barrier and protecting it from further irritation.

Inflammation and the immune system

Inflammation – the immune system's response to injury and infection – is important in eczema. Inflammation is triggered by injury to the skin – such as scratching, infection, and allergens. Inflammation causes irritated skin and leads to many of the typical [symptoms of eczema](#) – such as redness and warmth of the skin, and discomfort or pain.

Inflammation leads to lots of other problems. Activated immune system cells make itching worse. Itching leads to scratching, and scratching damages the skin and further worsens the inflammation. Inflammation also directly damages the skin barrier, making it even leakier.

In eczema, the immune system seems to be overly-sensitive to harmless things on the skin, like pollen or dust mites. Leaky skin in eczema allows these potential allergens to get inside the skin, where immune cells learn to identify them as a threat, triggering inflammation. This leads to a type of allergic reaction.

Around seven out of 10 children with eczema outgrow it as they grow up. It's thought that this occurs because their immune system has learned to tolerate their allergic triggers for eczema and is no longer activated by harmless things on the skin.

Allergy is also important in [asthma](#) and [hay fever](#). Asthma, hay fever, and eczema are all called atopic conditions, and people often get them together. These conditions have become more common over the last 100 years, and are more common in the developed world.

One theory that's been proposed to explain this is the hygiene hypothesis. This suggests that the immune system in babies and children needs to be exposed to germs – such as bacteria and parasites – to learn to react against them and that, if this doesn't happen, the immune system instead identifies harmless things, such as like pollen, as targets, leading to allergy.

People in developed countries have much less exposure to germs due to efficient hygiene practices – such as sanitation, access to clean water, and less overcrowding – there are much fewer serious infections as a result. However, it might mean that children are more likely to get allergic conditions.

Many [treatments for eczema](#), like [topical steroids](#), work by reducing inflammation.

Bacterial overgrowth on the skin

All of us have bacteria living on our skin, which make up the microbiome. A healthy balance of bacteria protects against infection and inflammation. Some people with eczema have a high level of the bacterium *Staphylococcus aureus* growing on their skin. *Staphylococcus aureus* can cause skin infections, and it also seems to be a potent trigger for inflammation in eczema.

Bleach baths for eczema – as advised by your doctor – are warm baths with very dilute amounts of household bleach which work by reducing the amount of *Staphylococcus aureus* bacteria on the skin. They are not right for everyone, especially those under 2 years of age, and only to be used with exact amounts and type of bleach as advised by your specialist.

Other environmental factors

Other things in the environment can be important for developing eczema, and can act as triggers for eczema, including:

- Exposure to irritants on the skin – such as harsh soaps and detergents. For example, research shows that people with eczema are more sensitive to the chemical sodium lauryl sulfate, a common ingredient in many shampoos and soaps.
- Exposures during pregnancy – exposure to various things whilst pregnant have been linked with an increased risk of eczema in children. These things probably affect the way in which the fetal immune system develops. Examples include:
 - Stress in the mother.
 - Smoking during pregnancy.
 - Using [antibiotics](#) during pregnancy.
 - Drinking alcohol during pregnancy.
- Exposure to pollutants – such as pollution from road traffic. These might damage the skin directly, or affect the way the immune system works.

- Exposure to tobacco smoke - damages the skin and affects the immune system. Children who are exposed to passive smoking are more likely to get eczema.

Eczema triggers

Eczema tends to go through cycles where it flares up, and then becomes a bit better. Identifying and avoiding triggers is important for controlling eczema, as they differ from person to person. Common triggers include:

- Soaps and detergents - particularly ones containing sodium lauryl sulfate.
- Clothing - synthetic fabrics and wool tend to scratch and irritate the skin. Silk fabrics can sometimes stop the skin from breathing and some people are allergic to them. Cotton fabrics are usually best, although sometimes people can be allergic to certain dyes used in them.
- Skin infections - *Staphylococcus aureus* infection can trigger and worsen eczema.
- Allergies to things in the air - such as pollen or animal hair.
- Hormonal changes in women - some women find that eczema flares before their period, and that eczema gets worse in pregnancy.
- Excessive sweating due to heat or exercise.
- Cold or hot temperatures - most people find that their eczema is worse in the winter.
- Stress.

- Food allergies – some people find that their eczema gets worse after eating specific foods, either immediately after, or one to two days later.
 - Tests like [skin prick testing](#) can be used to investigate immediate reactions.
 - For delayed reactions, the only way to test this is to trial removing that food from the diet and see if the eczema improves. If the results aren't clear, the food might need to be re-introduced to see if it does indeed make the eczema worse. Speak to a doctor before trying an elimination diet.
 - [Food allergies](#) don't cause eczema, but they can make symptoms worse. Eliminating certain foods from your diet only helps eczema symptoms if you are allergic to them.
- [Allergic contact dermatitis](#) – technically a different condition to eczema, but people can get both. Allergic contact dermatitis is a delayed reaction – occurring one to three days later – to something that's been put on the skin. For example, this might be an ingredient in creams, ointments, or makeup. A common culprit is nail varnish and facial eczema. It can be triggered by touching your face.

How common is eczema?

Eczema is very common – up to one in three children and one in ten adults have it.

Eczema risk factors

Risk factors for developing eczema include:

- Having a close relative with eczema or another atopic condition – asthma and/or hay fever.
- Having another atopic condition – asthma and/or hay fever.
- Smoking, or being exposed to cigarette smoke – such as having a parent who smokes.

- Living in an urban area. We don't exactly know why, but it might be because there is more pollution in urban areas. It might also relate to the hygiene hypothesis: children in urban areas have less exposure to animals, and exposure to germs from animals may help the immune system to develop properly.
- Growing up in a smaller family. Again, we don't exactly know why, but one theory is that, in a larger family, you have more siblings who pass on infections, thereby training your immune system to react against infections instead of allergens.
- Taking antibiotics in infancy, or being exposed to antibiotics in the womb.

Some things seem to reduce the risk of developing eczema, such as:

- [Breastfeeding](#).
- Being exposed to farm animals early in life.
- Having pets – especially dogs – early in life.

Is eczema an autoimmune disease?

Although immune system problems are important in eczema, eczema is not considered an autoimmune disease.

An autoimmune disease is one where the immune system directly attacks the body's own tissues. For example, in [rheumatoid arthritis](#), the immune system attacks the inside of the joints. In Hashimoto's thyroiditis, the most common cause of an [underactive thyroid](#), the immune system attacks the cells in the thyroid that produce thyroid hormones.

In eczema, the immune system isn't directly targeting the body itself. Instead, it's reacting against external things – irritants, infections and allergens. The resulting inflammation does harm the body's tissues as well – but it's not the immune system's intended target.

How to avoid an eczema flare-up

Eczema can't always be prevented, but some things can make flare-ups less likely. These include:

- Moisturising regularly - [eczema treatment](#) - even when the skin is clear.
- Avoiding eczema triggers - which differ from person to person, but some examples are given above.
- Avoiding scratching or rubbing the skin.
- Sometimes, doctors might suggest using topical steroids infrequently but regularly (weekend steroids) to help keep eczema at bay in people who get lots of flare-ups.

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