



**BRITISH ASSOCIATION
OF DERMATOLOGISTS**
HEALTHY SKIN FOR ALL

Sunscreen Fact Sheet

A sunscreen is a substance applied to the skin to reduce the intensity of the sun's ultraviolet (UV) rays entering the skin and damaging vulnerable skin cells. Sunscreen can take many forms including creams, milks, lotions, gels, foams, oils, ointments, and sprays.

The active ingredients of a sunscreen are generally a mixture of organic chemicals that can either absorb UV radiation and convert it into harmless warmth (but so weak that we can't feel it), and inorganic chemicals that scatter the incoming UV rays away from the skin and so prevent them entering the skin and causing harm. The term organic should not be confused with organically grown food or other plant derived ingredients; organic simply refers to the fact that the active UV ingredients contain carbon atoms.

In addition to these active chemicals, there will be several other chemicals called excipients that are used to formulate the product and give the product its cosmetic feel. Some sunscreens may contain additional chemicals such as antioxidants that can play some role in reducing UV damage to the skin.

Our top sun safety tips

You do not have to avoid the sun all year but taking a few steps when out and about in the summer sun or when on a sunny holiday will help to protect you from sunburn and the risk of skin cancer.

- Protect the skin with clothing, including a hat, t-shirt, and sunglasses
- Spend time in the shade between 11am and 3pm when it is sunny
- Use a 'high protection' sunscreen of at least SPF 30 which also has high UVA protection, and make sure you apply it generously and frequently when in the sun.
- Keep babies and young children out of direct sunlight
- The British Association of Dermatologists recommends that you tell your doctor about any changes to a mole – if your GP is concerned about your skin, make sure you see a Consultant Dermatologist (on the GMC register of specialists), the most expert person to diagnose a skin cancer. Your GP can refer you via the NHS.

Sunscreens should not be used as an alternative to clothing and shade, rather they offer additional protection. No sunscreen will provide 100% protection.

The Sun Protection Factor

The Sun Protection Factor (SPF) is commonly interpreted as how much longer skin covered with sunscreen takes to burn compared with unprotected skin. So, if you burn after 10 minutes in the sun, then using a sunscreen labelled with, say, SPF15, is taken to mean that you can safely remain in the sun for $10 \times 15 = 150$ minutes, or 2½ hours, before burning.

This definition focuses on extending time in the sun but a better way of thinking about the SPF is that if you spend a certain time in the sun, then wearing a sunscreen with a given SPF reduces the UV dose to $1/\text{SPF}$ of that which you would have received by spending the same time in the sun but with no sunscreen applied. For example, applying an SPF15 sunscreen results in a UV exposure to the skin of one-fifteenth of that which you would have received if you had not applied any sunscreen. However, this statement is only true if the sunscreen is providing protection equivalent to the SPF, but as we shall see in the next section,

this rarely happens and most people who apply sunscreen are protected to a much lesser extent than they realise.

What SPF should I choose when I buy a sunscreen?

The short answer is that we recommend that you choose a sunscreen with an SPF 30 or above, we've gone into more detail as to why that is in this section.

If preventing sunburn from all day exposure is your goal, then we need to start by asking what SPF would provide this. From considering ambient levels of UV throughout a clear, sunny, summer's day and your skin's sensitivity to sunlight, we can calculate that for most people with white skin an SPF 15 should, in theory, protect them from sunbathing all day on a beach in southern Europe or Florida. But many people who use SPF 15 report getting sunburnt and the reason is that there is a mismatch between both how much sunscreen manufacturers use during the testing process and how uniformly they spread it, compared with the quantity of sunscreen most people will typically apply and how carefully they spread it over their exposed skin. This means that in real life, people apply less sunscreen than the amount it is tested at, and they apply it less uniformly and so leave patches of skin with little or no protection.

As a rule-of-thumb, the protection you may actually receive is about one-third to one-half of the labelled SPF. So, to compensate for the difference between testing sunscreen under laboratory conditions and applying it when you are out and about, we recommend an SPF 30, especially if you plan to spend several hours in strong sunshine. Reapply it every 2-3 hours or so to protect areas where the sunscreen may have rubbed or sweated off.

Finally, it is important to choose a sunscreen that you find cosmetically appealing. So, when you are deciding what sunscreen to buy, if a sample is available, test a small amount on the back of your hand first to get an idea of whether you will like applying the product and will be happy to use it time and again. Remember, it is not all about the SPF.

Sunscreen Star Rating - what does it tell us?

When you pick up a bottle of sunscreen the first thing you see is the SPF rating on the front of the bottle. But turn the bottle over and on the back is the Star Rating, which can range from 1 to 5 stars, as shown here:



But just what does the Star Rating tell us? To understand more, we need to go back to first principles.

What we know is that by reducing the intensity, or strength, of the sun's ultraviolet rays on our skin, we reduce the likelihood of damaging our skin – either by getting sunburnt that day or developing skin cancer later in life.

Nature understands the importance of this so that when we seek natural shade by stepping under a tree, or wear clothing to protect our skin, we reduce the overall strength of the sun's UVB and UVA rays almost equally. In other words, Nature is providing us with balanced protection against both UVB and UVA.

And that is just what we would like to achieve when we apply a sunscreen to our skin. So how do we know if we're getting balanced protection? That is where the Star Rating comes in. The higher the number of stars, the more balanced the protection. So, the next time you're wondering what sunscreen to buy, the first thing to do is to look at the back of the bottle and choose one offering 4 or 5-star protection. Then decide on what SPF you would like.

If you are keen to protect your skin as much as possible, you need to choose a sunscreen with SPF30 or higher. You may also see a UVA logo on a sunscreen bottle like this, which has been approved by the EU and is another way of saying that the product provides good balanced protection against both UVA and UVB.

From a practical viewpoint most sunscreens are now either 4 or 5 stars, or have a UVA logo, so the vast majority of modern products are already providing balanced protection.

Tips for applying sunscreen

- Apply sunscreen liberally to exposed sites 15 to 30 minutes before going out into the sun.
- Do not rub the sunscreen into your skin but spread the sunscreen as uniformly as possible over the surface of the skin and allow to dry.
- Re-apply sunscreen to exposed sites 15 to 30 minutes after sun exposure begins.
- Re-apply sunscreen after vigorous activity that could remove sunscreen, such as swimming, towelling or excessive sweating and rubbing.

Are sunscreens safe?

Expert reviews of sunscreen safety have concluded that the current list of active ingredients used in sunscreens do not pose a concern for human health. However, although uncommon, sunscreens can occasionally cause skin irritation, or a skin allergy.

Is it safe to use sunscreen on babies?

You are at the beach applying your sunscreen. Your 5-month-old baby is there with you so should you put sunscreen on him/her? Ideally this is best avoided in infants less than 6 months of age as babies' skin is thinner than that of adults, and it can absorb the UV active chemical ingredients in sunscreen more easily. This means that a baby's exposure to the chemicals in sunscreens is greater than in adults and so could increase the risk of an allergic reaction.

The best approach is to keep infants under 6 months out of direct sun and in the shade as much as possible. This is especially important between the hours of 11 am and 3 pm when UV rays are most intense.

How long will sunscreens keep?

Sunscreens are emulsions of oil and water and so will always tend towards separation. The time this takes depends on the quality of the formulation and can vary from just a few months to many years. Typically, the shelf life for sunscreens is 30 months.

To maximise their quality, sunscreens should be stored in a cool, dry place, out of direct sunlight. If you are concerned about your sunscreen, have a smell, and feel of the product first, and if it seems okay and has been stored correctly, it should be fine to use.

However, you should also refer to the 'period after opening' (PAO) symbol on the labelling, as products do have a fixed life after they have been opened. The PAO symbol is a small picture of an opened jar with a

number printed within it – this number shows the number of months the product can be used for after it has been opened.

As well as shade, make sure your child wears loose-fitting clothing that covers the skin and keeps them cool – and do not forget a sunhat. If there is no way to keep your baby out of the sun, you can apply a small amount of high SPF sunscreen to small areas such as the cheeks and back of the hands. Don't forget that babies can easily overheat, which can be very dangerous, so shade is best.

Is there evidence that sunscreens prevent skin cancer?

Although there is some data to indicate that sunscreens have a role in preventing skin cancer, we lack the strength of evidence that would be expected before a new drug was introduced as a treatment. This does not mean that we should not be using sunscreen. Just because we do not have sufficient evidence does not necessarily mean that they are not effective as a way of reducing our risk of skin cancer – and theoretically we would expect them to be as sunscreens absorb UV and UV is a major risk factor for skin cancer.

Sunscreens and vitamin D

The UV rays in sunlight produce vitamin D in the skin, necessary for strong, healthy bones. Since sunscreens are designed to absorb UV, it might be thought that applying a sunscreen would adversely affect vitamin D production. This is generally not the case for a number of reasons.

People normally apply less quantity of sunscreen than used by manufacturers in the testing process, and they spread it non-uniformly, resulting in some areas of skin with little or no protection. Also, only a minority of sunscreen users re-apply as necessary to maintain adequate sun protection.

Secondly, sunscreen is mostly used during recreational exposure when people intend to remain in the sun for a long period of time, so even areas of skin that are protected, may have a sufficiently thin layer of sunscreen that during the period of sun exposure, adequate UV penetrates through to the skin to make vitamin D.

And finally, vitamin D is synthesised in our skin on a daily basis, not just during recreational sun exposure, and most people will not bother applying sunscreen during their day-to-day sun exposure, such as popping out to the shops at lunchtime. So, apprehension about vitamin D should not be a reason not to use sunscreen, especially during long periods in strong sunlight.

What about SPF in moisturisers?

SPF used in moisturisers are tested the same way as sunscreens, so an SPF 15 moisturiser should provide an SPF of 15. However, these formulas are less likely to be rub-resistant and water resistant, do not bind as well to the skin as sunscreen, and most importantly are likely to be applied a lot more thinly than sunscreen. They therefore are unlikely to offer the same level of protection.

A moisturiser with an SPF will help protect you against small amounts of UV exposure, such as when you walk to the car or pop outside to hang out the washing, but sunscreen is better suited for longer, more deliberate UV exposure, such as spending your lunch hour outside.

It is also worth noting that moisturisers containing an SPF may not contain any UVA protection and as a result will not protect against UV ageing.