

Choosing and Using Sunscreen Information – Australasian College of Dermatology Policy Statement

Using sunscreen regularly has been shown to reduce the risk of skin cancer, including the deadliest form, melanoma.¹ It is one of five sun protection measures. For the best protection, Cancer Council recommends covering clothing, a broad-brim hat, shade, sunglasses and sunscreen when the UV (ultraviolet) index reaches 3 or above.²

UV can still cause damage if exposed for extended periods at levels below 3. This damage adds up over time, increasing the risk of skin cancer. Safe Work Australia therefore recommends sun protection – including sunscreen – for outdoor workers, even on days when the UV index is below 3.³

Some people with particular skin types or health conditions may also choose to use sun protection at all times even when the UV is below three.

Choosing a sunscreen

Cancer Council recommends using sunscreen that is:

- Sun protection factor (SPF) of at least 30;
- Broad-spectrum (which protects against both UVA and UVB radiation⁴, both of which can cause cancer);
- Water-resistant.

Cancer Council recommends SPF30 or higher. The SPF rating indicates the amount of UV that potentially reaches the skin if the sunscreen is applied according to directions. For example, SPF30 filters 96.7% of UV radiation with 1/30th (3.3%) of UV reaching the skin. SPF50 filters 98% of UV radiation with 1/50th (2%) reaching the skin. The difference between SPF30 and SPF50 is marginal (1.3%). Sunscreen is a 'screen' and not a 'block' and will never block 100% UV radiation which is why sunscreen should always be used with other sun protection measures.

When it comes to sunscreen, higher price does not necessarily indicate higher quality. The most important thing is that your sunscreen meets the above standards and is approved by the Therapeutic Goods Administration (TGA). There are many different types of sunscreen on the market. Try different types to find one that you like and suits your budget as this means you will be more likely to use it. While effective when used the right way, it is difficult to correctly apply aerosol sunscreen. Therefore, Cancer Council does not recommend aerosol sunscreens.

Cosmetics with an SPF of 30 or higher will provide good protection when first applied, however, like any SPF product, cosmetic products only provide sun protection for a limited period, so will still need to be reapplied to ensure adequate protection. Most cosmetics don't offer protection in water. Therefore, Cancer Council recommends using a sunscreen that meets all the criteria above, rather than cosmetics with SPF, if spending a long period outdoors, swimming or sweating.

Effectiveness

When applied properly, sunscreen protects the skin against UV damage including sunburn and tanning. In an experiment subjecting skin cells in Caucasian participants to UV radiation, sunscreen was shown to completely block the effects of DNA damage.⁵

A randomised study conducted in Nambour, Queensland, has shown that when sunscreen is used regularly, it is effective in reducing melanoma⁶ and squamous cell carcinoma (SCC), but not basal cell carcinoma (BCC).^{7,8}

The most comprehensive study of cancer prevention in Australia estimated that, in 2010, more than 1700 cases of melanoma and 14,190 squamous cell carcinomas (a common non-melanoma skin cancer) were prevented by long-term sunscreen use.⁹

Sunscreen use is also protective against sun spots¹⁰ and premature ageing.¹¹

Choosing and Using Sunscreen Information – Australasian College of Dermatology Policy Statement

Correct application

Before you apply sunscreen, check the expiry date to ensure it is still in date. Sunscreen should also be stored below 30°C as heat can cause the ingredients to separate and lose effectiveness.

To maximise its effectiveness, sunscreen must be used correctly. This means:

- Applying at least 20 minutes before going outside;¹²
- Using an adequate amount – at least one teaspoon for each arm and leg, front and back of torso and face (including neck and ears). This is a total of seven teaspoons (at least 35ml of sunscreen) for an adult's full body application;¹³
- Reapplying after swimming or sweating and/or every two hours¹⁴ regardless of what the label says.

While sunscreen labels often say '4 hours water resistant' this refers to testing under lab conditions and doesn't reflect real life situations where water, towel drying, sand, physical activity and sweat can cause sunscreen to rub off. In addition, most of us don't apply enough sunscreen in the first place, so reapplying every two hours will ensure the best protection.

The updated [Australian regulatory guidelines for sunscreens \(ARGS\)](#) also state "the directions for use for a primary therapeutic sunscreen should include statements to the effect that the product should be applied to the skin in generous amounts over all of the exposed areas 20 minutes before sun exposure, it should be reapplied every two hours or more often when sweating, and should be reapplied after swimming or towelling. The labelling must not contain a claim (for example, 'all day protection') that indicates or implies that the product does not need to be reapplied at regular intervals."¹⁵

Most people apply far less sunscreen than is recommended by manufacturers,¹⁶ so it is important to follow the steps above for best protection. No sunscreen provides full protection so sunscreen should be used in combination with other sun protection measures – clothing, broad-brimmed hats, shade and sunglasses. It is important to never just rely on sunscreen to protect the skin.

How sunscreen works

UV radiation is invisible energy from the sun and is the primary cause of skin cancer. Sunscreens work in two ways, either reflecting or absorbing ultraviolet (UV) radiation to stop it reaching the skin.^{17,18}

- Reflectors or physical sunscreens contain ingredients such as zinc oxide and titanium dioxide and may take on a milky-white appearance when applied to the skin.
- UV absorbers or chemical sunscreens usually contain a mixture of synthetic chemicals which are usually invisible when applied to the skin.

Because sunscreen helps prevent UV radiation from reaching the skin, it helps prevent DNA damage which leads to skin cancer.¹⁹

Adverse reactions

Adverse reactions to sunscreen are rare and can occur either with a single use or after repeated use.

Sunscreen milks or creams formulated for sensitive skin usually contain titanium dioxide or zinc oxide and are less likely to contain alcohol or fragrances that might irritate the skin. As sunscreens contain multiple active ingredients, it can be difficult to determine whether you will have a reaction – and, if you do, what component of the sunscreen caused it. If you are concerned, Cancer Council recommends performing a usage test before applying a new sunscreen, where a small amount of the product is applied on the inside of the forearm for a few days to check if the skin reacts, prior to applying it to the rest of the body. While the usage test may show whether the skin is sensitive to an ingredient in the sunscreen, it may not always indicate an allergy, as this may also occur after repeated use of the product.

As with all products, use of any sunscreen should cease immediately and medical attention should be sought if any unusual reaction is observed. Professional assessment and testing by a dermatologist may be useful in identifying the ingredient in the sunscreen that is causing the reaction.²⁰

Choosing and Using Sunscreen Information – Australasian College of Dermatology Policy Statement

Sunscreen use and babies

The widespread use of sunscreen on babies under six months is not generally recommended as they have very sensitive skin which may be more likely to suffer a reaction.

Cancer Council recommends keeping babies away from direct sunlight as much as possible when UV levels are 3 or above, as their skin is more sensitive than adults. Plan daily activities to ensure the baby is well protected from the sun and aim to minimise time outside during the middle of the day during the summer period when UV levels are strongest.

When this is not possible, ensure that babies are protected from the sun by shade, protective clothing and a hat. Check the baby's clothing, hat and shade positioning regularly to ensure he/she continues to be well protected from UV.

Some parents may choose to use sunscreen occasionally on small parts of their baby's skin – if that's the case parents should be careful to choose a sunscreen that is suitable for babies - they may wish to seek the advice of a doctor or pharmacist. Sunscreens for babies usually use reflecting ingredients such as zinc oxide and avoid ingredients and preservatives that may cause reactions in young skin. If your baby does suffer a reaction to a sunscreen, stop using the product and seek medical attention.

Sunscreen safety

Sunscreens help prevent skin cancer and are an important part of sun protection. They are regulated by the Therapeutic Goods Administration (TGA) to ensure they are effective and safe to use.

Nanoparticles

Nanoparticles are tiny particles, smaller than 100 nanometres and invisible to the human eye – a nanometre is 0.000001 millimetre. They are used in sunscreen to reduce the white residue left on the skin by larger particles of sun protective ingredients such as zinc oxide and titanium dioxide.

Nanotechnology has been used in sunscreens for many years. The TGA has conducted a review of the scientific literature in relation to the use of nanoparticle zinc oxide

and titanium dioxide in sunscreens, which concluded that, based on the best available evidence, nanoparticles used in sunscreens do not pose any risk to health. The review can be found [here](#).

Vitamin D

The sun is the main natural source of vitamin D which is essential for bone and musculoskeletal health. Groups at risk of vitamin D deficiency include:

- Those with previous skin cancer or at high risk of skin cancer
- People who wear covering/concealing clothing
- Naturally very dark skinned people
- People who spend long hours indoors, including housebound or institutionalised Australians
- Older adults
- Obese people
- Babies and infants of vitamin D deficient mothers.

Sunscreen use should not put people at risk of vitamin D deficiency. When sunscreen is tested in laboratory conditions it is shown to limit the effectiveness of vitamin D production, however, population studies have shown that regular use of sunscreen has little effect on vitamin D levels.²¹ Given the harmful effects of overexposure to UV radiation, extended and deliberate sun exposure without any form of sun protection when the UV Index is 3 or above is not recommended, even for those diagnosed with vitamin D deficiency. If you are concerned about vitamin D deficiency, speak to your doctor who may consider supplementation.



For enquiries or concerns, please contact
Fremantle Dermatology on
9430 4488

Choosing and Using Sunscreen Information – Australasian College of Dermatology Policy Statement

- 1 Green AC, Williams GM, Logan V, Strutton GM. Reduced melanoma after regular sunscreen use: randomized trial follow-up. J Clin Oncol 2011 Jan 20;29(3):257-63 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/21135266>
- 2 Allinson S, Asmuss M, Baldermann C, Bentzen J, Buller D, Gerber N, et al. Validity and use of the UV index: report from the UVI working group, Schloss Hohenkammer, Germany, 5-7 December 2011. Health Phys 2012 Sep;103(3):301-6 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/22850235>
- 3 Safe Work Australia. Guide on Exposure to Solar Ultraviolet Radiation (UVR). Canberra Australia; 2013.
- 4 Standards Australia, Standards New Zealand. Australian/New Zealand Standard AS/NZ 2604 (Sunscreen products - evaluation and classification). Sydney, Australia; 2012.
- 5 Hacker E, Boyce Z, Kimlin MG, Wockner L, Pollak T, Vaartjes SA, et al. The effect of MC1R variants and sunscreen on the response of human melanocytes in vivo to ultraviolet radiation and implications for melanoma. Pigment Cell Melanoma Res 2013 Nov;26(6):835-44 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/23962207>
- 6 Green AC, Williams GM, Logan V, Strutton GM. Reduced melanoma after regular sunscreen use: randomized trial follow-up. J Clin Oncol 2011 Jan 20;29(3):257-63 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/21135266>
- 7 Green A, Williams G, Neale R, Hart V, Leslie D, Parsons P, et al. Daily sunscreen application and betacarotene supplementation in prevention of basal-cell and squamous-cell carcinomas of the skin: a randomised controlled trial. Lancet 1999 Aug 28;354(9180):723-9 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/10475183>
- 8 van der Pols JC, Williams GM, Pandeya N, Logan V, Green AC. Prolonged prevention of squamous cell carcinoma of the skin by regular sunscreen use. Cancer Epidemiol Biomarkers Prev 2006 Dec;15(12):2546-8 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/17132769>
- 9 Olsen Catherine M, Wilson Louise F, Green Adèle C, Biswas Neela, Loyalka Juhi, Whiteman David C, Prevention of DNA damage in human skin by topical sunscreens, Photodermatology, Photoimmunology & Photomedicine, Jan 2017
- 10 Thompson SC, Jolley D, Marks R. Reduction of solar keratoses by regular sunscreen use. N Engl J Med 1993 Oct 14;329(16):1147-51 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/8377777>
- 11 Hughes MC, Williams GM, Baker P, Green AC. Sunscreen and prevention of skin aging: a randomized trial. Ann Intern Med 2013 Jun 4;158(11):781-90 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/23732711>
- 12 Diffey BL. When should sunscreen be reapplied? J Am Acad Dermatol 2001 Dec;45(6):882-5 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/11712033>
- 13 Schneider J. The teaspoon rule of applying sunscreen. Archives of Dermatology 2002;138(6):838-9.
- 14 Odio MR, Veres DA, Goodman JJ, Irwin C, Robinson LR, Martinez J, et al. Comparative efficacy of sunscreen reapplication regimens in children exposed to ambient sunlight. Photodermatol Photoimmunol Photomed 1994 Jun;10(3):118-25 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/7947191>
- 15 Australian Government, Department of Health, Therapeutic Goods Administration, Australian regulatory guidelines for sunscreens V1.1 January 2016 Available at www.tga.gov.au/sites/default/files/sunscreens-args.pdf
- 16 Diffey BL. People do not apply enough sunscreen for protection. BMJ 1996 Jan 1 [cited 1996 Oct 12] Abstract available at <http://www.bmj.com/content/313/7062/942.1>
- 17 González S, Fernández-Lorente M, Gilaberte-Calzada Y. The latest on skin photoprotection. Clin Dermatol 2008 Nov;26(6):614-26 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/18940542>
- 18 Osterwalder U, Sohn M, Herzog B. Global state of sunscreens. Photodermatol Photoimmunol Photomed 2014 Apr;30(2-3):62-80 Photomed 2014 Apr;30(2-3):62-80 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/24734281>
- 19 Hacker E, Boyce Z, Kimlin MG, Wockner L, Pollak T, Vaartjes SA, et al. The effect of MC1R variants and sunscreen on the response of human melanocytes in vivo to ultraviolet radiation and implications for melanoma. Pigment Cell Melanoma Res 2013 Nov;26(6):835-44 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/23962207>
- 20 <https://www.dermcoll.edu.au/atoz/sun-protection-sunscreens/>
- 21 Norval M, Wulf HC. Does chronic sunscreen use reduce vitamin D production to insufficient levels? Br J Dermatol 2009 Oct;161(4):732-6 Abstract available at <http://www.ncbi.nlm.nih.gov/pubmed/19663879>