

With Australia having the highest rate of skin cancer in the world, we all should be very familiar with the 5 ways to be Sun smart. They are SLIP on sun protective clothing, SLOP on a 30+ or 50+ sunscreen, SLAP on a hat, SLIDE on sunglasses, and SEEK shade.

Clearly sunscreens are not the complete answer to effective sun protection, but using the right ones for you, and using them properly, will save a lot of the pain of sunburn, and a lot of the long term skin damage we are best to avoid.

Why is being Sun Smart important?

- Overexposure to both the sun and artificial (e.g. solariums) ultraviolet radiation (UVR) can cause sunburn, skin and eye damage and skin cancers.
- Australia has the highest rate of skin cancer in the world.
- At least 2 out of 3 Australians will be diagnosed with skin cancer before the age of 70.
- It is four (4 !) times more common than any other cancer.
- Melanoma is the most dangerous of the skin cancers. It is the 4th most common cancer in Australia, BUT the most common cancer in Australians aged 15- 24 years. The lifetime risk is 1 in 29. That means for every 29 people walking into a pharmacy today, 1 will get a melanoma in their lifetime. At least one in 10 of these people will be killed by it. That is about 1-2 people walking into any of our pharmacies today who will die of a skin cancer. It is very important to us to be able to help you avoid this.

Who is most at risk??

Those people most at risk of skin cancer later in life are those who have fair skin that never tans, AND those who received large doses of UVR before the age of 15. That is, those who had bad sunburn as a child or early teen.

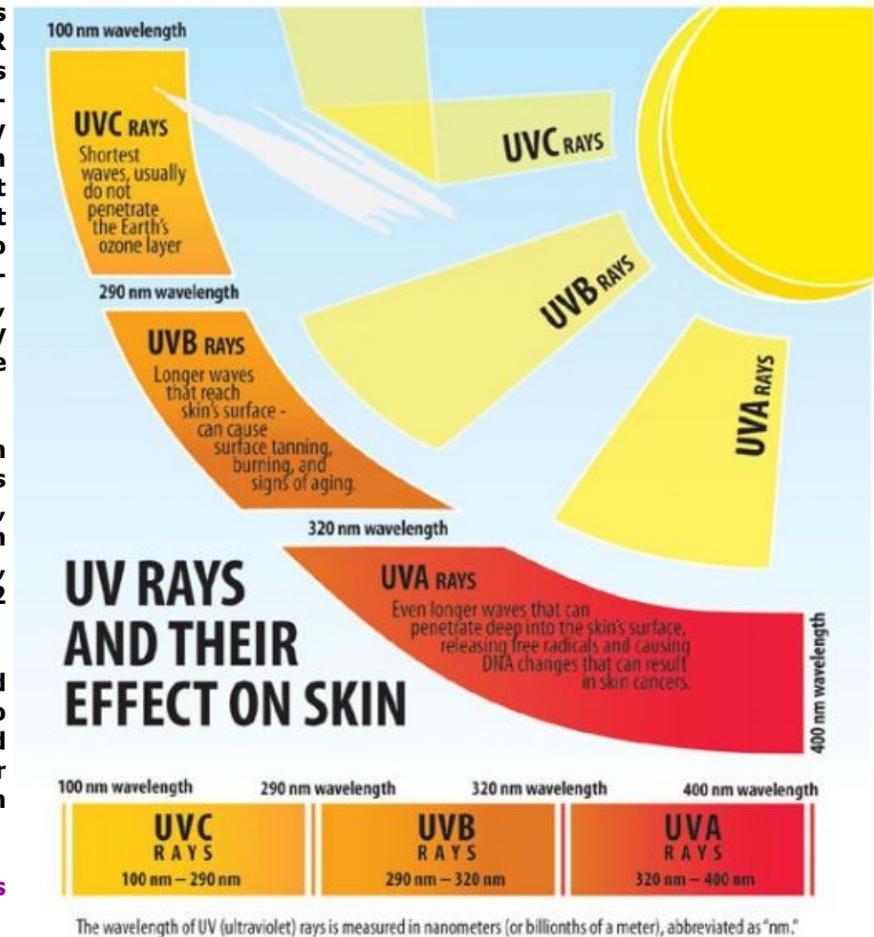
So what's the big deal with UV RADIATION?

UV radiation is part of the sun's rays that damages the skin. Damage to the skin occurs as soon as UVR hits the skin. Sunburn is the extreme form of this damage. UVR cannot be seen or felt. It is NOT related to temperature, and can be high on a cool day (e.g. skiing on snow capped chilly mountains) or on an overcast day. Clouds do not filter or stop UVR at all. UVR is strongest between 10 am and 3 pm. It can be reflected from shiny or white surfaces to increase exposure, including under shade structures. That is why people on the water, or snow, can sunburn more quickly than expected, and why people sitting under trees or umbrellas beside pools or on the beach can also get sunburnt.

The Bureau of Meteorology issues UV alerts when the UV Index is forecast to reach 3 or more. This is the level where UVR can damage our skin and eyes, and lead to skin cancer. It is commonly very high where we all live. Between October and March, anywhere in Australia, it will usually be between 12 and 16 and in the tropics almost all the year!!

UVR comes in different wavelengths called UVA,UVB and UVC. Both UVA and UVB contribute to sunburn, skin ageing, eye damage, melanoma and other skin cancers. UVB is mostly responsible for sunburn and UVA for the deeper, long term skin damage.

Please refer to the diagram right showing UV Rays and their effect on our skin



A little on SUNSCREENS.....

Sunscreens reduce the amount of UVR reaching your skin. Using sunscreen will help reduce the risk of sunburn, and regular use will reduce the amount of long term skin damage e.g. wrinkles, hyper pigmentation.

Sunscreens work by filtering (NOT blocking) UVR. There are 2 types of chemical sunscreen ingredients - chemical filters, and physical filters.

- Chemical filters work by absorbing UVR before it can damage the skin.
- Physical filters contain micro-fine particles that sit on the skin surface and act as a physical barrier.
- Some sunscreens contain both chemical and physical filters. NO sunscreen provides 100 % protection against UVR. Some UVR will always reach the skin cells below, causing damage.

All chemicals used in Australian sunscreens have been tested and approved as being safe and there is no scientific evidence showing any health side effects from using sunscreen.

The meaning of Broad Spectrum.....

Sunscreens that are labelled "broad spectrum" filter out some of the UVA, as well as the UVB radiation. Zinc oxide and Titanium dioxide are two of a number of ingredients with proven ability to protect skin from UVR. They are particularly valuable because of their ability to filter UVA and UVB, giving broad protection from damaging sunlight. They are the two physical filters available, and the two ingredients not likely to cause any reactions in sensitive individuals.

What do the SPF numbers mean?

SPF stands for Sun Protection Factor. The SPF protects against UVB radiation.

The SPF number is a guide to the level of protection provided by a sunscreen formulation. It is based upon how long it will take a person wearing the sunscreen to burn when exposed to UVR relative to how long it would take that same person to burn IF unprotected. E.g. If it takes 10 minutes to start to show sunburn after UVR exposure without sunscreen, then it should take 15 times 10 minutes for sunburn to start if that person wore a 15+ sunscreen (i.e. 150 minutes).

HOWEVER, this is a guide, not a rule. People have different skin types, and a scale of skin types from 1- 6 exists, and the tendency to burn varies as we go up the scale. Where you are in Australia (is there an ozone deficiency allowing more UVR to hit the Earth's surface?), at what time of day (midday, 5 pm?), and time of year (Summer or Winter?), will all influence how long a sunscreen will actually be effective for on your skin.

An SPF 30+ broad spectrum sunscreen filters approximately 96.7% of the UVR. This still means that 3% of the UVR is transmitted through. This small amount is still causing damage (e.g. leading to sunburn), and the chance of getting burnt goes up as the UVR intensity goes up the UV Index.

Once enough UVR has penetrated the sunscreen to damage the skin, putting MORE sunscreen application will NOT stop the damage at that point, as more UVR will continue to hit the skin, and further damage and possible sunburn signs will occur.

REMEMBER!!!

- * Always use a broad spectrum 30+ or 50+ SPF
- * To be effective, sunscreen must be applied generously, and rubbed in lightly.
- * Apply 20 minutes before going into the sun to allow it to bind to your skin
- * Sunscreen should be applied every 2 hours
- * Physical rubbing e.g. from towels, chairs, shirts being slipped on and off, will remove sunscreen from the skin

A common scenario in summer catching people off guard is where the family arrives at the beach at 10 am in Summer, the gear is organised, the kids are chased up to put on the sunscreen, then mum and dad apply sunscreen to themselves, which in total may take 10—20 minutes, and during that time some have caught enough UVR to burn them. But they won't know until later that night . Applying sunscreen 20 minutes before sun exposure is the sensible thing to do, but not the easiest thing to do



The maximum SPF rating in Australia is 50+. Many Australian sunscreens have SPF ratings higher than 30, but the improvement in blocking UVR above 30 is limited. An SPF 50 or 100 sunscreen may block 98 or 99% of the UVR (versus 96.7 % for SPF 30), but the chances are that the screen will not last on the body "10 minutes times 100 = 1000 minutes = 16 hours " to give protection , so please do re-apply often .

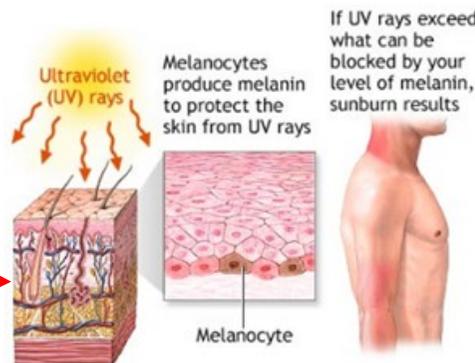
But I want a sun tan!!!

A suntan is considered by many in our society as a healthy sign. It shows the owner spends plenty of time outdoors, indicating a healthy lifestyle etc etc. A suntan is a sign of sun damage, and the owner of a great tan when young is the owner of wrinkly skin when older. As a rule, Australians look much older than their age equivalent Europeans.

A suntan is a natural process where certain skin cells (melanocytes) create the brown coloured pigment called melanin. Melanin protects the skin against overexposure to UVR. Melanin can be PRESENT in the skin, and UVA exposure will cause that melanin to go brown and create the suntan. This happens quickly, as the melanin is already present, leading to people assuming they can tan "within a day or 2 - I always do." UVA and UVB exposure also triggers the formation of NEW melanin in the melanocytes. This new melanin then turns brown with UVA exposure, and visible tanning will occur about

72 hours UVR exposure. This delayed tanning will last much longer, as the melanin is deeper in the living skin cells, not just in the dead cells on the surface of the skin (the epidermis) that turned brown within 24 hours.

Melanin protects the skin from direct DNA damage by absorbing UVR; HOWEVER a suntan gives a protection equal to about an SPF factor 3!!!



A suntan is sign of skin damage, and cannot be relied upon to prevent further skin damage from UVR. Despite this, people will still want to get a suntan. As UVA is mostly responsible for turning melanin brown, and both UVA and UVB will cause melanin production in the melanocytes to occur, it is sensible for a person who wants a suntan to still use a 15+ or 30+ sunscreen, BUT to use one that allows some UVA to reach the skin. The skin will have the protection from the burning UVB radiation , and some UVA , but will still get melanin produced, and turned brown (remember production takes days to start, and a week or two for the peak melanin production, and thus full suntan, to appear). Any broad spectrum sunscreen containing Titanium dioxide or Zinc oxide will NOT stimulate much melanin production , so will cause very limited sun tanning (clearly the best protection, though). A 30+ that is broad spectrum, but does not contain the 2 physical filters, will allow melanin to be stimulated, and allow tanning. Le tan 30+, for example.



WHAT'S THE BIG DEAL WITH VITAMIN D?

Vitamin D, which our bodies need for calcium absorption, bone formation and muscle strength and for prevention of certain cancers, is formed in our skin on exposure to sunlight and UVB. As a 30+ sunscreen filters only 97%, this allows some UVB to penetrate to the skin (3%), and research shows that normal sunscreen use doesn't generally result in vitamin D deficiency. However, studies do indicate that many people are deficient in Vitamin D, and it is best not to be deficient. Those people, who get little sun exposure, are most at risk of being Vitamin D deficient.

We need to find a balance between getting enough sun exposure to make enough Vitamin D, without the adverse consequences of too much UVR. To make enough Vitamin D, most people with fair coloured skin need to expose their face, hands and arms to sunlight for 6-8 minutes daily in summer (not 10 am to 3 pm!), and 15-30 minutes in winter. Darker skinned people and the elderly need a little longer in the sun.

The simplest solution is to take a daily supplement of 1000 IU of Vitamin D3, or to get more Vitamin D in your diet, eating salmon, cheese and milk with Vitamin D added.

SUNSCREENS AND ALLERGIES / PRICKLY HEAT

Some people may develop an allergic reaction (such as a rash or stinging) after using sunscreen. The allergic reaction may be caused by preservatives, perfumes or the chemical filters. Zinc oxide and Titanium dioxide are usually suitable for sensitive skins. Note that MOST skin reactions after sunscreen application will be prickly heat reactions (sometimes caused or made worse by the sunscreen base, or moisturisers), not allergies, (see Prickly Heat information leaflet).

If someone has a history of prickly heat, and wants to prevent it, it is important to note that it is NOT a "sensitivity." It is a body reaction to excess heat. "Sensitive" sunscreens are not the answer, as they generally will be Titanium or Zinc based, thick and water resistant, and likely to impede heat loss/perspiration from the skin, LEADING to prickly heat.

Keeping cool, and using a sunscreen that will minimise sun burning e.g. SPF 30+ or 50+, broad spectrum, but with a sunscreen base that will not sit too long on the skin, blocking the skins' sweat glands (pores), is ideal. That is, an alcohol base. Sunsense and Hamiltons both make a 30+ spray, and it should be used on areas of the body where prickly heat tends to, or HAS appeared.

Importantly, wash the sunscreen off immediately when getting out of the sun for the day, and avoid moisturisers and aloe gels on these areas, to keep the sweat glands clear and functioning properly. (Please see heat rash/prickly heat leaflet for further information on this topic)

SUNSCREENS AND BABIES / CHILDREN

Clearly the best protection is required for young skins. There is no evidence that sunscreens are harmful to babies or children. It is recommended that infants under 6 months of age should be kept out of the sun as much as possible, thus minimising UVR exposure, and sunscreen use. It is also recommended that the skin of infants and children is covered by sun protective clothing, with sunscreens on hands, face and feet, or other areas not protected. Sunscreens for children may have less water resistance (this is to make them less blocking of the skins sweat glands, as babies and children do not lose heat as easily as adults), and so will need to be reapplied often if swimming or sweating.

As bad sunburn in children and teens is a known cause of skin cancer later in life it is imperative that parents are diligent with putting lots of 30+ sunscreen on their kids before sun exposure.

NATURAL SUNSCREENS

There is no scientific evidence to support "natural" sunscreen products as being safer or more effective than sunscreen products that are not promoted as "natural." Most of these natural products contain the physical filters, Zinc and Titanium, and are equivalent, if in the same strength, to most of the sunscreens available on the pharmacy shelf.

SUNLESS TANNING / SELF TANNERS

Their use has become popular as people become more aware of the dangers of long term sun exposure.

Sunless tanning options are skin stainers, tablets containing beta carotene (a form of Vitamin A), spray tanners, and solariums.

Self tanning preparations, and spray tanners, universally use Dihydroxyacetone (DHA), which stains the dead skin cells on the surface of the skin. The critical thing is to know that self tanners offer NO UVR protection at all.

Tablets containing beta carotene, especially if too many are taken, can lead to a bizarre orange tint to the skin. They are not popularly used.

Solariums emit UV-radiation, mostly UVA, at up to 3 times the strength of the midday summer sun. UVB is also emitted. All forms of UVR contribute to skin cancer. There is no evidence that any type of solarium is less harmful than natural sun exposure. Using a solarium before you are 35 years old could increase your risk of melanoma by 75-92% (that is, nearly double it). Solariums should be avoided!

REMEMBER!

SLIP on sun protective clothing

SLOP on a 30+ sunscreen

SLAP on a hat

SEEK shade

SLIDE on sunglasses

Be SunSmart

Slip!
Slop!
Slap!
Seek!
Slide!



Frequently Asked Questions

1. Can I get burnt while using sunscreen?

Yes, for these reasons:

- In peak UVR times enough UVR hits the skin through the sunscreen to cause sunburn. Obviously this is more likely using a low SPF; e.g. SPF 4 will offer about 4 times the normal protection of the skin from UVR. Once this time has elapsed (e.g. 40 minutes) the skin has burnt, although not necessarily physically showing it yet. Reapplying, even with a high SPF at this point, and staying out in the sun, will only lead to more severe sunburn. This can still happen using a 30+ sunscreen, especially in those individuals with a tendency to sunburn in a short time, if a long time elapses between sunscreen applications. Even under optimal conditions, a 30+ sunscreen applied at the beach or on a boat at 9am in the summer will allow enough UVR through to start causing sunburn by 2 or 3 pm, if the person has been in the sun all or most of that time. 3pm is still in the peak UV Index time period, so further UVR exposure will lead to more sunburn. It is essential to be reapplying every 2 hours and seeking shade where possible.
- The sunscreen is physically removed e.g. by towels, water movement (surf, spas) if not water resistant.
- Insufficient sunscreen was used initially, or if areas of skin were missed out. Other forms of sun protection should also be considered, along with sunscreen, to minimize the chances of sun damage/sunburn.
- The sunscreen has passed its expiry date.
- Too much time elapses between the initial sun exposure and the first application of sunscreen. A full dose of UVR may already have hit the skin, without yet showing up as red, painful sunburn, before any sunscreen is applied. This is not unusual, especially with kids, who are hard to catch or have sit still at the best of times. It is always Sun-smart to apply sunscreen before exposure to the sun.



2. Does the SPF matter if I want a suntan?

If the sunscreen ingredients allow UVA to penetrate to the skin, while blocking UVB, then clearly we will get the same suntan with an SPF 30 as we will with an SPF 4. The SPF relates ONLY to UVB. Thus, Le tan 30+ will allow the same tan as Le tan 4 or 8. Reef oil 15+ will allow the same tan as Reef oil with no factor, or an SPF 4. Obviously, the Sun-smart option is to go with the highest factor to best prevent sunburn (long term benefits, AND stops the skin/suntan from burning and falling off prematurely) while allowing maximum sun tanning over time.

3. Does the base of the sunscreen matter regarding getting a suntan?

NO. The amount of UVR (thus UVA) hitting a spot on the Earth's surface is dependent upon a lot of things, but NOT what you are wearing. The solar radiation has travelled a very long way in a straight line to hit you on the shoulders. Wearing an oil instead of a cream will NOT cause that radiation to bend and get more of it hitting you. The amount of UVR hitting your skin WILL depend upon the ingredients, and amount thereof, in your sunscreen. You will get the same protection, and suntan, irrespective of the base e.g. lotion, milk, cream, oil, alcohol spray, as long as the ingredients are the same.

4. What about the chemicals in sunscreen—are they harmful?

- **Oxybenzone** (also known as benzophenone3) is one of the many chemical filters that are used in sunscreens. It is a good broad spectrum sunscreen, blocking UVA and UVB radiation. Much has been made of the fact that trace amounts of Oxybenzone have been found in 97% of urine samples analysed by the CDC in the USA. Oxybenzone is used in a lot of skin products, and some foods. No studies however suggest that Oxybenzone causes any adverse health effects. It certainly does not cause cancer, although it has a weak oestrogenic effect if given orally in mas-

sive doses. If anybody is concerned about the use of chemical sunscreens, they should avoid Oxybenzone as there are many equally good or better alternatives (e.g. Zinc oxide and Titanium dioxide).

- **Nanoparticles**, or nano ingredients, are particles that are so tiny they can be very reactive, and can penetrate cells in organisms. Their interactions with biological systems are relatively unknown. Zinc oxide and Titanium dioxide are 2 ingredients that can be used in nanoparticle form. Historically, when used in sunscreens in large particle form, Zinc oxide and Titanium dioxide are visible, giving the skin a white colour as they reflect radiation. This effect can be reduced when these chemicals are in nanoparticle form to the point of not being seen on the skin, therefore becoming more cosmetically acceptable to customers. They still retain their excellent UVR filtering ability. Concerns have been raised that if nanoparticles were to be absorbed into skin cells, they could possibly interact with sunlight to increase the risk of damage to these cells. Recent studies, including one by the FDA in the USA, shows that these particles don't absorb through healthy or damaged skin. The TGA in Australia states that "the potential for titanium dioxide and zinc oxide nanoparticles in sunscreens to cause adverse effects depends primarily upon the ability of the nanoparticles to reach viable skin cells; and to date, the current weight of evidence suggests that titanium dioxide and zinc oxide nanoparticles do NOT reach viable skin cells; rather they remain on the surface of the skin and in the outer layer of the skin that is composed of non-viable (dead) cells.

