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SunSmart messages

By Ella van Tienen

Case study

A 30-year-old woman comes into the pharmacy and asks for advice on sunscreens. She has two small children and she wants to protect herself and her children against sunburn. She is worried that using sunscreen may increase her risk of osteoporosis and was thinking she could protect her skin using a fake tanning product or by preparing her skin for the sun in a solarium.

Learning objectives

After reading this article you should be able to:

- Identify the active ingredients in sunscreens and how they work.
- Outline the recommendations for use of sunscreen in various populations.
- Describe the patient groups who would benefit from additional advice on sunscreen use.

Competency standards (2010) addressed: 1.3.2, 4.3.3, 6.2.1, 6.2.2, 6.3.1, 6.3.2 6.3.3

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Background

Australia and New Zealand have the highest rates of skin cancer in the world.[1] Skin cancer is the most common cancer diagnosed in Australia, accounting for 80% of all newly diagnosed cancers.[2] More than 430,000 Australians are treated per year for non-melanoma skin cancers, and over 10,000 new cases of melanoma are diagnosed per year.[2] Each year, over 1,600 Australians will die from skin cancers.[3]

The major cause of skin cancer is excessive exposure to ultraviolet (UV) radiation from the sun.[4] In addition to skin cancer, UV radiation causes sunburn, photoageing, cataracts, immunosuppression, activation of latent viruses and photosensitive skin disorders.[5]

UV radiation is subdivided into two categories based on wavelength. UVB radiation has wavelengths of 280–315 nm and UVA has wavelengths of 315–400 nm.[6] Both UVA and UVB contribute to the risk of skin cancer, however, concern over the role of UVA is increasing as it can penetrate the superficial dermis of the skin, is less efficiently filtered by sunscreens, and is able to penetrate window glass.[5]

Sunscreens

There is a huge range of sunscreens available on the market. The primary function of sunscreen products is to protect the skin from the damaging effects of UV radiation.[7] To do this, sunscreens contain materials to absorb, reflect or scatter UV radiation that reaches the skin, preventing the penetration of, and subsequent damage by, UV radiation.[7] Active ingredients of sunscreens can be classified as chemical filters or physical filters.[8]

- *Chemical filters or absorbers* include agents active against UVA or UVB. UVB absorbers include cinnamates, camphor derivatives, amino benzoates and salicylates.[5] UVA absorbers include benzophenes and dibenzoylmethanes.[5] These chemical absorbers work by binding with the cells in the skin, absorbing UV radiation, and dispersing it as heat before it can damage the cells.[8] These sunscreens often leave the skin feeling greasy.[7]
- *Physical filters* include titanium dioxide and zinc oxide.[8] These micro fine particles sit on the surface of the skin and act as a physical barrier to UV radiation.[8] These preparations often leave the skin feeling dry and with a characteristic white 'ghosting' appearance.[7] Nanoparticles are often used to reduce the whitening effect of sunscreen products, however recently concerns have been raised over the safety of nanoparticles and their potential for damaging skin cells.[9] A recent review by the Therapeutic Goods Administration concluded that current evidence suggests nanoparticles of titanium dioxide and zinc oxide remain on the surface of the skin and do not reach viable skin cells, and as such they are unable to cause any damage.[9]

Sunscreens may contain one or other filter type, or a combination of both.[8] Most sunscreen products are formulated as emulsions and range in thickness from thinner products, or lotions, through to thicker preparations, generally marketed as creams.[7] The thickness and 'skin feel' of sunscreen products becomes important when looking at compliance of use.

The sun protection factor, or SPF, measures a sunscreen's ability to prevent UVB from reaching the skin[5] and is often a key factor when deciding on a product. The SPF is determined using a testing protocol that requires a sunscreen product to be applied to the skin at an application rate of 2 mg/cm^2.[8] However it is now widely accepted that the stated SPF on sunscreen products is not usually achieved by users as the

products are applied inadequately.[8,11] Most people never apply more than 60% of the quantity of cream required to achieve the labelled SPF.[12,13] The term 'broad spectrum' is applied to sunscreen products which absorb at least 90% of UVA radiation in the spectrum of 320–360 nm.[5]

Recently sunscreens made the news following the announcement that SPF50+ sunscreens would be introduced into Australia in 2011. The Cancer Council expressed its concern that the new sunscreens would give people the false impression that a sunscreen was a 'suit of armour against the sun'.[14] The increase in benefit between an SPF30+ product and an SPF50+ product is reportedly only about 1.3%.[14] Consumers need to be aware of the minimal increase in benefit when choosing a sun protection product.

Dosage guides exist to assist users apply the quantity of sunscreen required to achieve the stated level of SPF. All guides suggest application of sunscreen based on dividing the body using the 'rule of nines', which is the method used for calculating the extent of burns (Table 1).[15–17] The rule of nines divides the body into 11 segments each representing 9% of total body surface area. The volume of sunscreen to apply to each segment recommended in the guidelines is intended to be practical and includes two fingers (from the palmar crease to the fingertips),[15] 'more than half a teaspoonful',[16] or one beer bottle lid (or similar) per 9% of body surface area.[17] Despite these recommendations, sunscreens continue to be inadequately applied.[10]

Once a sunscreen has been applied to the skin, a number of factors can compromise its effectiveness. These factors may include immersion in water, vigorous towelling, or friction with clothing or sand.[18] Recommendations suggest that sunscreen should initially be applied 15–30 minutes before going out into the sun.[18,19] Many sources recommend that sunscreen should be reapplied every two hours,[19] however suggestions have been made that more regular reapplication is necessary, with one study suggesting reapplication as soon as 15–30 minutes after sun exposure begins.[18]

Numerous factors are believed to impact on people's sunscreen application behaviours, including the feel of the product on the skin, product fragrance, appearance and cost.[7,10] The water-resistance of a product also impacts on people's decision, depending on the activities they intend to undertake. Many of these factors may be addressed by recommending the sunscreen product that is most suitable to the consumers' requirements.

The pharmacist's role in SunSmart promotion

Pharmacists are well placed to advise people on the importance of sun protection and to provide information on the products most suitable to assist in minimising the risk of sun damage. Pharmacist advice can be especially beneficial to people who are particularly sensitive to UV radiation.

Children, babies and adolescents are one group who are particularly sensitive to the harmful effects of the sun. Exposure to high levels of sunlight in childhood, and particularly early age sunburn, have been shown to be a strong determinant of melanoma risk.[20,21] Pharmacists can reduce this risk by assisting parents to provide appropriate sun protection for their children. The recommendations for infants are the same as those for adults in that wherever possible sun protection should comprise staying out of the sun during the middle of the day and covering up well with appropriate clothing and hats.[22] Sunscreens may also be used in all age groups, including babies, as the skin structure of full term infants is indistinguishable from that of an adult.[22] It is recommended to test sunscreens on a small area of skin to check for sensitivity before widespread application, and to use sunscreen milks or creams formulated for sensitive skin, preferably those containing titanium dioxide or zinc oxide and lacking the addition of alcohols and fragrances.[22] As well as suggesting appropriate products, pharmacists can assist with advice such as encouraging parents to be SunSmart so that young children will copy their behaviours. Adolescents tend to benefit more from having the choice to choose sun protection products, such as sun glasses and hats, that they are likely to feel comfortable wearing.

Pharmacists should be aware of the risk of sun damage to those taking medications which cause photosensitivity and photoallergy (Table 2). All patients taking these medications should be encouraged to minimise exposure to sunlight and solariums, and should be counselled to use SPF30+ sunscreens and protective clothing to minimise photoallergic and photosensitivity reactions.[23]

Other groups who are at high risk of sun damage and may benefit from additional advice are those with fair skin (as they tend to burn easily and 90% of non-melanoma skin cancers occur in fair skinned people)[24] and those with a large number of atypical moles (naevi) (which may indicate a susceptibility to melanoma).[25]

Common sun protection myths

Pharmacists can help dispel common myths about sun protection.

Myth: It is not possible to get sunburnt on cloudy days

While UV radiation levels are highest under cloudless skies, high levels of UV radiation can still penetrate the clouds.[24] In fact, up to 80% of solar UV radiation can penetrate light cloud cover and haze in the atmosphere can even increase UV radiation exposure.[24] Because we

Table 1. The rule of nines and sunscreen recommendations for each segment

Body segment	Percentage	Number of teaspoons[16]	Number of fingers[15]	Number of bottle tops[17]
Face and neck	9%	>0.5	2	0.5
Right arm	9%	>0.5	2	1
Left arm	9%	>0.5	2	1
Back	18%	>1	4	2
Torso	18%	>1	4	2
Right leg	18%	>1	4	2
Left leg	18%	>1	4	2

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Table 2. Photosensitising medications[23]

Type of medication	Examples
Antibiotics	Quinolones (ciprofloxacin, norfloxacin)
	Tertracyclines (doxycycline, minocycline)
	Trimethoprim/sulfamethoxazole
Antifungals	Voriconazole
Antimalarials	Hydroxychloroquine
Antipsychotics	Chlorpromazine, fluphenazine, olanzapine, trifluoperazine
Cardiac agents	Amiodarone, fenofibrate
Cytotoxic agents	5-fluorouracil, dacarbazine, everolimus, flutamide, mercaptopurine, methotrexate, thioguanine
Hormonal agents	Danazol
Immunosuppressants	Azathioprine, cyclosporin, imiquimod, mycophenolate, tacrolimus
Muscle relaxants	Dantrolene
Retinoids	Isotretinoin, acitretin

are unable to feel UV radiation we usually only know we have overexposed when our skin begins to redden eight to 24 hours after exposure.

The safest way to judge whether there is a risk of sunburn is to use the SunSmart UV Alert tool (www.bom.gov.au/uv). The alert is issued by the Bureau of Meteorology and is based on the World Health Organisation's Global Solar UV Index (UVI).[26] The UVI is a measure of the UV radiation level at the earth's surface, designed to indicate the potential for adverse health effects and to encourage people to protect themselves.[24]

The alert is reported in the weather page of all Australian daily newspapers, on the Bureau of Meteorology website (www.bom.gov.au/uv), and on some radio and mobile weather forecasts.

Myth: Fake tans and cosmetics protect you from sunburn

Fake tans essentially stain the skin a darker colour, but this colour does not provide any useful protection against UV radiation, nor does it improve the body's ability to protect itself from the sun.[27] Many moisturisers and foundations contain sunscreens; however they are not suitable for protection when spending long periods of time in the sun as users are unlikely to apply the required volume of product to ensure an appropriate level of protection is obtained.[19] Again, the darker colour provided by foundations and tinted sunscreens offers no protection against UV radiation.[28]

Myth: Solariums are a safe way to get a tan

No solarium can provide a safe tan. In fact, there is increasing evidence that the wavelength of UVA radiation used in solariums penetrates more deeply into the skin than solar radiation and contributes more to the development of cancer.[6] Solariums actually emit higher concentrations of UV radiation than the sun; at times they are up to five times as strong as the midday summer sun.[29] The evidence does not support a protective effect from the use of solariums against damage to the skin from subsequent sun exposure.[30]

The widespread belief that getting a tan in a solarium will protect against sunburn for a holiday in a sunny location should be laid to rest. It has been estimated that a solarium tan offers the same protective effect as using a sunscreen with an SPF of only 2–3.[6]

Myth: People need plenty of sun exposure to avoid vitamin D deficiency

While Australians obtain the majority of their vitamin D requirements through exposure to sunlight,[31] the sun exposure required to avoid vitamin D deficiency is not very great. Fair skinned people can achieve adequate vitamin D levels in summer by exposing their face, arms and hands to sunlight for less than 10 minutes per day on most days of the week.[31] In winter, the sun exposure required to achieve these levels increases to a cumulative of 2–3 hours of sun exposure per week in southern Australia.[31] The amount of sun exposure required for dark skinned people to achieve the same levels of vitamin D is around 3–4 times greater.[31]

Myth: It is not possible to get burnt through a window

While glass reduces the transmission of UV radiation, it does not completely block it. Generally the levels of radiation inside a window are much lower than those in full sunlight, however anywhere between 4% and 50% of UV radiation will make it through the glass.[32] The risk of getting sunburnt through glass is certainly lower than the risk of getting sunburnt outside, but there is still a risk of getting burnt.[33] This is particularly a risk for people who spend extended periods of time being exposed to direct sunlight through glass.[33] Clear or tinted films applied to windows ('window tinting') can substantially reduce the amount of UV radiation transmitted through glass.[32]

How to apply a health promotion activity in the pharmacy

Skin Cancer Awareness Week takes place each year in November. In 2010 it will be held from 21–27 November. This week provides the perfect platform for pharmacies to get involved and hold health promotion activities to raise the awareness of the prevalence of skin cancer and to reinforce the SunSmart message. The SunSmart message has been extended in recent years to encompass five simple steps of sun protection. That is:

- **Slip on some sun-protective clothing** that covers as much of the skin as possible;
- **Slop on SPF30+ sunscreen** 20 minutes before going outdoors and every two hours afterwards;
- **Slap on a hat** that protects your face, head, neck and ears;
- **Seek shade**; and
- **Slide on some sunglasses**.

Ideas for promotional activities include:

- creating a window display using a range of SunSmart products including hats, sunglasses, sunscreens, UV protective clothing (e.g. 'rash vests'), and shade umbrellas;