

Activity 10: SunSmart quick quiz

Aim:

- To increase knowledge of skin cancer.
- To determine what students understand about skin cancer.

Assessment outcomes English 4.3; H&PE 4.6

Reference fact sheets Fact sheet 1: Skin cancer
Fact sheet 4: UV radiation
Fact sheet 6: Suntanning and sunburn
Fact sheet 11: Solariums

Worksheet Worksheet 10: SunSmart quick quiz

Teacher guidelines

- 1 Distribute Worksheet 10: SunSmart quick quiz. Ask students to decide whether each statement is true or false.
- 2 After completing the quiz, discuss the correct answers with the class.

Worksheet 10: SunSmart quick quiz

Read the following statements and write whether each statement is true or false.

Eight facts about skin cancer quiz

<i>Are these statements True or False?</i>	True	False
1 There is no such thing as a safe tan.		
2 UV radiation is still present when cloudy.		
3 The USA has the highest rate of skin cancer in the world.		
4 People of all skin types — pale or dark — are at risk of developing skin cancer.		
5 Most skin cancers can be cured if detected early.		
6 There is no such thing as windburn.		
7 Temperature is a safe way to gauge the level of UV radiation.		
8 A solarium provides a safe way to tan.		



Answers for worksheet 10

Eight facts about skin cancer quiz

	True	False
1 There is no such thing as a safe tan. Any deliberate exposure to UV radiation damages skin and adds to the risk of skin cancer. It is not only sunburn that causes skin damage.	✓	
2 UV radiation is still present when cloudy. Don't be fooled! UV radiation can penetrate clouds and still cause damage. Gaps in the clouds also allow more UV radiation to get through.	✓	
3 The USA has the highest rate of skin cancer in the world. Australia has the highest rate of skin cancer in the world. Half of all Australians will develop skin cancer at some time during their lives. Over 380 000 Australians are treated for skin cancer and 1300 die from the disease every year.		✓
4 People of all skin types – pale or dark – are at risk of developing skin cancer. Darker skin means more melanin so those with dark skin have some natural protection from the sun. However no skin type is immune to skin cancer.	✓	
5 Most skin cancers can be cured if detected early. Self examination is important. Early symptoms of skin cancer may seem quite minor, but any suspicious spot should be seen by a doctor immediately. The signs to look for are: a crusty, non-healing sore, a small lump which is red, pale or pearly in colour, or a new spot, freckle or mole changing in colour, size or shape.	✓	
6 There is no such thing as windburn. Skin is burnt by UV radiation. The wind may dry the skin but it does not burn it. Ever been burnt on a windy night?	✓	
7 Temperature is a safe way to gauge the level of UV radiation. UV radiation cannot be seen or felt and isn't related to air temperature. Maximum UV radiation occurs at solar noon. Maximum daily temperature occurs mid-to-late afternoon once the earth's surface has been heated.		✓
8 A solarium provides a safe way to tan. A solarium uses high levels of UV radiation to induce a tan on your skin. A solarium can emit UV radiation that is five times as strong as the midday summer sun. There is no safe way to tan.		✓



Fact sheet 1: Skin cancer

Structure and function of the skin

The skin is the largest organ of the body. It has several important functions. It acts as a protective layer against injury and disease and also regulates our body temperature and maintains its hydration.

The skin consists of three layers:

- the epidermis, or the outer layer
- the dermis, or the inner layer
- the subcutaneous fat layer.

The epidermis is made up of cells that produce keratin, a substance that covers the outside of the skin and resists heat, cold and the effects of many chemicals. The cells in the epidermis also produce melanin, the substance that gives our skin its colour. Melanin is able to absorb ultraviolet light and provide some protection from its damaging effects.

What is cancer?

Cancer is a disease of the body's cells. Normally the body's cells grow and divide in an orderly manner so that growth and healing of injured tissue occurs.

Occasionally some cells behave in an abnormal way and may grow into a lump which is called a tumour.

Tumours can be non-cancerous [benign] or cancerous [malignant]. Benign tumours do not spread to other parts of the body.

A malignant tumour is made up of cancer cells. These cells have the ability to spread beyond the original site and if left untreated may invade and destroy surrounding tissues. Sometimes cells break away from the original [primary] cancer and spread to other organs. When these cells reach a new site they may form another tumour often referred to as a secondary cancer or metastasis.

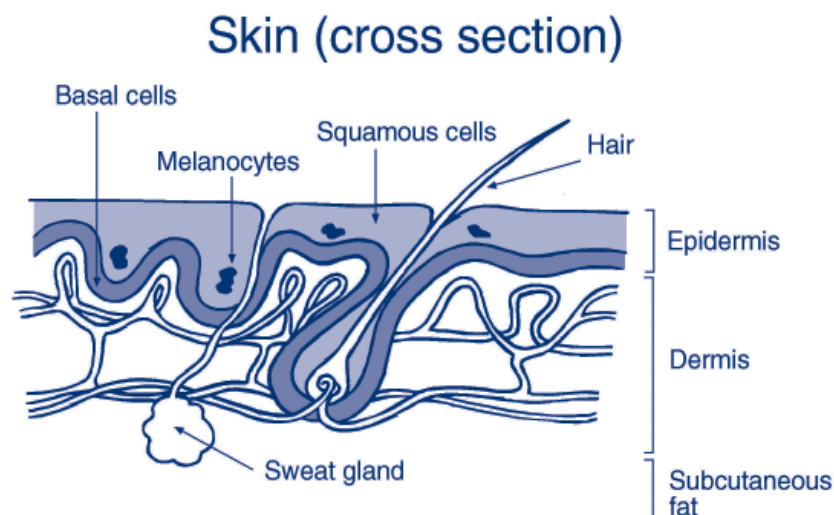
What is skin cancer?

Skin cancer is a type of cancer that begins in the basal layer of the epidermis. There are three main types of skin cancer: basal cell carcinoma, squamous cell carcinoma and melanoma. Melanomas start in the pigment cells [melanocytes] while basal and squamous cell carcinomas develop from the epidermal cells. [Carcinoma is a term used for some types of cancer].

Basal cell carcinoma [BCC]

Basal cell carcinomas are the most common but least dangerous type of skin cancer. They grow slowly over months to years but if left untreated a deep [rodent] ulcer may form. Fortunately they very rarely spread to other parts of the body. If you have one basal cell carcinoma you may have others, either at the same time or in later years.

Basal cell carcinomas are most commonly found on the face, neck and upper trunk. They appear as a lump or scaly area and are pale, pearly or red in colour. They may have blood vessels on the surface.



Fact sheet 1: Skin cancer (cont.)

Squamous cell carcinoma [SCC]

Squamous cell carcinomas are less common but more dangerous than basal cell carcinomas. They usually grow over a period of weeks to months. These cancers may spread to other parts of the body [metastasise] if not treated promptly.

Squamous cell carcinomas appear on areas of the skin most often exposed to the sun. They have scaling, red areas which may bleed easily and ulcerate, looking like an unhealed sore.

These common skin cancers generally occur in people over the age of 40. However basal cell carcinoma can occur in younger adults. The major cause of these skin cancers is sun exposure over many years.

Melanoma

Melanoma is the rarest but most dangerous skin cancer. If left untreated melanoma can spread to distant parts of the body to form secondary cancers or metastases.

Melanomas can appear anywhere on the body not only in areas that get a lot of sun. The first sign of a melanoma is usually a change in a freckle or mole, or the appearance of a new spot on normal skin. Changes are normally seen over a period of several weeks to months, not over several days. The changes are in size, shape or colour.

Melanoma can occur from adolescence onwards and is the most common cancer in the 15–44 year age group. In rare instances it may develop in children.

How common is skin cancer?

Skin cancer rates are higher in Australia than anywhere else in the world. It is the most common form of cancer in Australia affecting all age groups from adolescents upwards. Most common is basal cell carcinoma which accounts for about 75% of all skin cancers. Squamous cell carcinoma accounts for 20% and melanoma less than 5%.

One out of two Australians will develop a skin cancer in their lifetime – usually a basal cell carcinoma. In South Australia in 2003 the lifetime risk for developing melanoma was 1 in 31 for men and 1 in 39 for women.

Signs and symptoms

As skin cancers are visible, they can be seen and checked as soon as they develop. Early symptoms of skin cancer may seem quite minor but any suspicious spot should be seen by a doctor immediately.

The signs to look for are:

- A crusty, non-healing sore.
- A small lump which is red, pale or pearly in colour.
- A new spot, freckle or mole changing in colour, thickness or shape over a period of several weeks to months. Particular attention should be paid to spots that are dark brown to black, red or blue-black.

Diagnosis

If a doctor suspects a skin cancer, a biopsy may be performed. A biopsy is the removal of all or part of the affected skin, generally under local anaesthetic. It is a simple procedure that can be done by your family doctor or you can be referred to a specialist. The piece of skin that has been removed is then examined under a microscope. However in many cases the whole tumour is removed and a specimen is then sent to the laboratory for diagnosis.

Treatment

Common skin cancers



A variety of methods are available to treat the common skin cancers. Your doctor will choose your treatment by taking into consideration a number of factors. These will include the type of skin cancer, its size and position on your body and your personal preference.

Surgery can be used to remove the skin cancer and a small area of normal skin. This is quite simple and can usually be done under local anaesthetic.

Sunspots or pre-cancers can be briefly frozen with liquid nitrogen. This is called cryotherapy. Following cryotherapy the skin can become intensely red and peel away. Healing will begin in about a week.

Another technique is simply scraping off small common cancers [curettage] and burning the spot [cautery or diathermy].

Fact sheet 1: Skin cancer (cont.)

Radiation therapy is another option although less commonly used now. It causes a crusting sore which takes some weeks to heal and then leaves a scar.

Melanoma

Surgery is the preferred method of treatment for melanoma. Very thin melanomas are usually removed along with a small area of normal skin, under local anaesthetic.

For deeper melanomas a wide area of skin may need to be removed to make sure that all the cancer cells have been taken out. The local lymph glands may also be removed at this time.

Outlook

Virtually all basal and squamous cell carcinomas that are found and treated early are cured.

The majority of people with early melanoma which is appropriately treated do not have any further trouble with their disease. However because there is a chance that the melanoma will reappear, your doctor will examine you at regular intervals.

For further details on outlook you should speak to your own doctor who is familiar with your full medical history.

Causes of skin cancer

The major cause of skin cancer is exposure to the ultraviolet rays of the sun over many years.

Sunlight exposure

Childhood exposure to the sun is an important factor in the development of skin cancer later in life. Research also suggests there may be a link between sunburn during childhood and melanoma in adulthood.

Occupation

People who work outdoors have a greater risk of developing the common skin cancers than indoor workers. This is because of their greater exposure to sunlight. Workers in some industries have to take precautions against other known causes of common skin cancers, such as arsenic, polycyclic hydrocarbons and a number of other chemical compounds.

Who is at risk?

Everyone is at risk of skin cancer, although people with skin that burns easily and rarely tans are at the greatest risk. Those who burn in early summer and then tan are also at high risk if they do not protect their skin. Unprotected skin, whether tanned or not, is likely to be damaged by the sun and may develop skin cancer later in life.

Skin type

Skin cancer is seen most often in fair skinned people who have lived in Australia all their lives. It is most common in people of Celtic [Scottish, Irish and Welsh] background. However it also occurs in people whose parents migrated from Southern Europe e.g. Greece or Italy and who have themselves spent all or most of their lives in Australia. This is because the Australian sunlight is very harsh.

Existing skin damage

Solar keratoses [sunspots] are dry, rough spots on the skin that are common in people over 40. They are not skin cancers but an indication that the skin has had enough sun exposure to develop skin cancer. People with keratoses should take particular care to protect their skin from the sun. Keratoses may progress and develop into SCCs.

They should also be examined to make sure a skin cancer is not present.

How can you reduce your risk?

- Minimise your time in the sun between 10.00 am – 3.00 pm.
- Use shade as much as possible when outdoors.
- Wear protective clothing - a wide brimmed hat and cover-up clothing.
- Apply SPF 30+ broad spectrum sunscreen to skin which isn't covered by clothing.

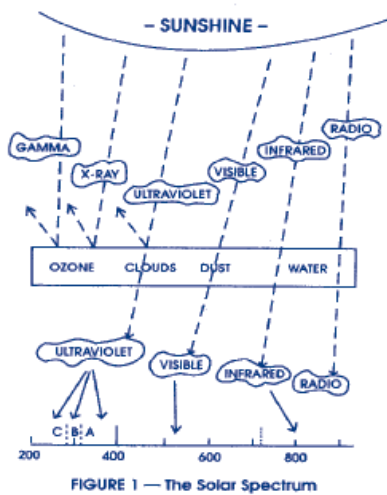


Fact sheet 4: Ultraviolet radiation

What is Ultraviolet Radiation (UVR)?

Ultraviolet radiation is the part of sunlight which causes sunburn and skin damage leading to premature ageing and skin cancer.

Sunshine is made up of different rays which travel in waves. The distance between the waves [the wavelengths] for each ray is different and allows us to categorise them. The diagram below shows the different rays arranged according to their wavelengths. The wavelengths are measured in nanometres.



Visible rays are the light-giving rays of the sun while infrared rays provide heat. There are three types of ultraviolet rays, UVA, UVB and UVC.

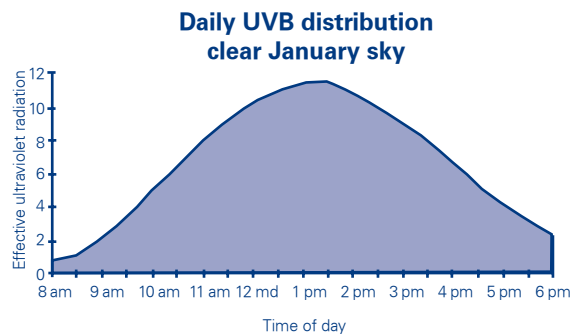
Naturally occurring UVC does not reach the earth's surface as it is absorbed or scattered in the atmosphere. However UVC can be produced artificially by arc welders and sterilising lamps and people working with such equipment should protect themselves.

UVA and UVB are the naturally occurring ultraviolet rays which are of concern because of their potential to cause skin cancer.

The danger period for UVR is between 10 am and 2 pm (11 am and 3 pm daylight saving)

The amount of UVR reaching the earth's surface varies throughout the day. On a cloud-free day, maximum UVR occurs when the sun is directly overhead at solar noon,

12 midday (1 pm daylight saving time). High levels of UVR also occur during the two hours before and after solar noon. So the danger period for UVR is between 10 am and 3 pm. These are the hours when skin damage occurs fastest. Damage can also occur before and after these hours - it just takes longer!

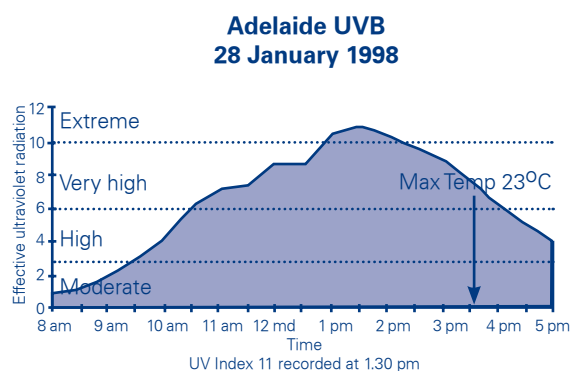


Source: Australian Radiation Protection & Nuclear Safety Agency

UVR levels are not related to the air temperature

UVR cannot be seen or felt and the intensity of such radiation is not related to the air temperature. The air temperature rises during the day as a result of the earth being heated by the sun's infrared rays. The maximum daily temperature usually occurs during the mid to late afternoon whereas maximum UVR occurs at around midday. There can be high levels of UVR on cool days.

A cool front which will cause a sudden drop in temperature has no effect on the level of UVR unless it is accompanied by substantial cloud cover.



Source: Australian Radiation Protection & Nuclear Safety Agency

Fact sheet 4: Ultraviolet radiation (cont.)

You can still get burnt while under shade

About 50% of UVR reaches you directly from the sun while the remaining 50% is scattered about the sky and reaches you indirectly. Light coloured and shiny surfaces such as concrete, sand and water reflect UVR which can reach you even if you are in the shade. Reflected UVR can reach your face under a hat.

You can still get burnt on cloudy days

Skin damage can still occur on days with a thin cloud cover. The cloud scatters the UVR in all directions and although you receive less direct UVR you may receive more indirectly. Heavy cloud does decrease the amount of UVR but scattered cloud has little or no effect on UVR levels.

More UVR at high altitudes

At high altitudes where the atmosphere is thinner, the amount of UVR reaching your skin can be as much as 20% higher than at sea level.

Fresh snow reflects up to 80% of UV, thereby increasing the amount of UVR which reaches skiers' faces and other exposed areas.

UVR levels are higher during the summer months than in the winter months. In winter the UV rays have to pass through more of the atmosphere because of the angle of the sun in relation to the earth's surface. However UVR levels do vary from day to day and a high UVR day in April or October may be more damaging than an overcast day in January.

What are the risks from UVR?

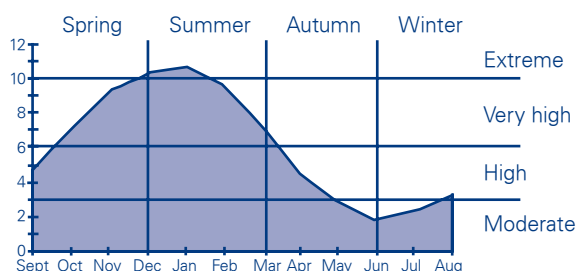
The immediate risk from over-exposure to UVR is sunburn. The more serious, long-term risk is skin cancer. UVR also causes premature ageing, causing the skin to become leathery, wrinkled and blotchy.

The eyes can also be damaged from long-term exposure to UVR.

Be SunSmart - protect yourself from UVR!

- Take particular care the sun between 10 am and 2 pm (11 am and 3 pm daylight saving) if possible.
- Wear a broad brimmed hat - this will reduce the UVR reaching your face and eyes by 50%. Sunglasses will also protect your eyes.
- Wear cover-up clothing - shirts with long sleeves and a collar, made of closely woven fabrics give good protection.
- Apply a SPF 30+ Broad Spectrum sunscreen on any exposed skin that cannot be protected with clothing.
- And remember: you can still get skin damage on cool, slightly overcast days.

**Average monthly UV Index
Adelaide 1997-1998**



Source: Australian Radiation Protection & Nuclear Safety Agency

Fact sheet 6: Suntanning and sunburn

Tanning

A tan is much more than the skin just turning brown. Skin cells located in the epidermis produce a pigment called melanin that gives skin its natural colour. When skin is exposed to UV radiation, melanin production is stimulated, causing the skin to darken.

Many people refer to a healthy tan – but even a light tan is a sign the skin has been exposed to too much sun. Tanning without burning may still cause DNA and skin damage leading to premature ageing, and potentially skin cancer.

Fair skinned people (a large proportion of the Australian population) have a less protective form of melanin than people with darker skins. When fair-skinned people spend time in the sun, cells called melanocytes produce melanin, which then stays in the top layer of skin for four or five days, sometimes giving a tanned appearance. The melanin produced by fair-skinned people is much less protective, meaning no amount of sunbaking will result in a lasting tan – just sunburn and skin damage.

Sunburn

In Australia, sunburn can occur in as little as fifteen minutes on a fine January day (Cancer Foundation of Western Australia 1994).

It is the UV radiation in the sun that causes our skin to burn. UV radiation is invisible; it is not warm and can pass through light cloud, so sunburn can occur on cool, cloudy days.

As soon as UV radiation hits our skin, the epidermis releases chemicals that cause the blood vessels to swell and leak fluids, causing inflammation, pain and redness – otherwise known as sunburn. This type of damage will continue to develop for twenty-four to seventy-two hours after exposure to the sun.



Fact sheet 11: Solariums

artificial tanning process which is claimed to be effective and harmless. There is, however, evidence to suggest that the ultraviolet radiation used in solariums and sunbeds damages the skin and may increase the risk of developing skin cancer. In view of this possibility, The Cancer Council South Australia strongly recommends against the use of solariums and sunbeds for cosmetic tanning.

Ultraviolet (UV) radiation is made up of three types of rays - UVA, UVB and UVC. The harmful effects of UVB and UVC rays have been known for some time. Naturally occurring UVC from sunlight does not reach the earth's surface as it is a short wavelength and is absorbed by the atmosphere. Until recently, UVA was thought to be relatively harmless but evidence is emerging which suggests that UVA also causes skin damage and increases the risk of developing skin cancer.

Is using a solarium a safe way to tan?

Most solariums claim to use only UVA. There are, however, two issues to be considered. Firstly, the output from solarium lamps can change over time. If UVB and UVC (both of which are dangerous in smaller quantities than UVA) are to be excluded, solariums need to be tested regularly, especially if globes or the perspex shields are changed. Secondly, researchers no longer regard exposure to UVA as safe.

Solarium advertising has claimed that UVA does not cause skin ageing or skin cancer in the long term. This is not true. UVA rays penetrate the top layer of the skin and can cause damage to the fibres in the lower layer. This causes the skin to lose its elasticity, to become thickened, roughened, blotchy and wrinkled.

Prolonged exposure to UVA may cause sunburn as well as a tan.

In the past, solarium advertising has also claimed that a UVA tan protects against sunburn, premature ageing and the risk of skin cancer which result from exposure to natural sunlight. There is, however, clear evidence now to show that UVA contributes to the development of the more common non-melanoma skin cancers. Some studies have suggested that using a sunbed or solarium may increase the risk of developing melanoma.

The effects of UV radiation are cumulative.

Whether a tan is produced by artificial sources of UVA (solariums) or by natural UVB and UVA (sunlight), the UV radiation dose received while acquiring the tan adds to the lifetime total dose and to the risk of skin cancer.

Do solariums pose any other health hazards?

- There is clear evidence to show that exposure to UVA from solariums and sunbeds contributes to the development of the more common non-melanoma skin cancers. Some studies have suggested that using a sunbed or solarium may increase the risk of developing melanoma.
- If the eyes are inadvertently exposed to UVA, the cornea and the conjunctiva may be briefly inflamed and sight may be damaged permanently.
- Up to 50 percent of people who use solariums develop minor skin irritations such as redness, itchiness and dryness. Exposure to UVA can also irritate some existing rashes.
- Some prescription drugs, including some antibiotics and diuretics, and some substances used in cosmetics, can increase a person's sensitivity to UVA. Use of a solarium by people taking these drugs or using these cosmetics can result in severe burning.
- The UV radiation from solariums has been shown to cause changes in the body's immune system, although it is not known how important these changes are.

What about the use of sunlamps for medical treatment?

Sunlamps are used to treat some medical conditions. This is done under strict medical supervision.

PUVA treatment stands for psoralens (P) and UVA. It is used to treat a variety of conditions, most commonly psoriasis. Psoralens are drugs which are either taken by mouth or applied to the skin prior to shining UVA onto the skin. The psoralens sensitise the skin to UVA.

PUVA is a very effective treatment. Although it is associated with an increased risk of skin cancer development, this is usually outweighed

Fact sheet 11: Solariums (cont.)

by the unpleasant nature of the underlying skin condition. It is important that this treatment is only carried out under medical supervision so that if problems do occur they can be detected and treated early.

Drugs which may produce a photo-sensitive reaction to UVA

Listed below are some of the most commonly used drugs that may cause a photosensitivity reaction to either naturally occurring UVA (sunlight) or artificial UVA (solariums). These drugs may be taken by mouth, or used as creams or lotions applied to the skin.

Please note that this is not a complete list and people who are taking medication are strongly advised to ask their doctor or pharmacist about the possibility of photosensitivity reactions occurring.

- Some products containing sulphonamide drugs, such as Septrin, Bactrim and Resprim, and other antibacterials such as Negram (Nalidixic acid).
- The tetracycline group of antibiotics, which includes several brands of doxycycline (Doryx, Vibramycin, Vibra-Tabs), tetracycline (Achromycin V, Mysteclin, Tetrex).
- Some of the non-steroidal anti-inflammatory drugs (NSAIDs), notably piroxicam (Feldene) and tiaprofenic acid (Surgam).
- Some drugs used to treat diabetes, such as tolbutamide (Rastinon), glibenclamide (Daonil, Euglucon) and chlorpropamide (Diabinese).
- The antifungal agent, griseofulvin (Grisovin, Griseostatin, Fulcin).
- The retinoids, such as isotretinoin (Roaccutane, Accure, Isotrex Gel), tretinoin (Retin A, ReTrieve, Stieva-A) and etretinate (Tigason).
- The phenothiazine group of drugs, such as prochlorperazine (Stemetil) and chlorpromazine (Largactil).
- The thiazide diuretics, chlorothiazide (Chlotride), hydrochlorothiazide (Dichlotride) and bendrofluazide (Aprinox).

Which cosmetics can cause a photo-

sensitive reaction?

Some oils and fragrances used in cosmetics and other products have been identified as possible photosensitisers. These include:

- angelica root oil
- bergamot oil
- cumin oil
- lemon oil
- lime oil
- orange oil bitter
- rue oil
- cedarwood oil
- lavender oil
- neroli oil
- orange peel oil
- sandalwood oil
- musk ambrette

Are there regulations for operators of solariums and sunlamps?

There is no regulated training for solarium operators and there is no legal requirement for their equipment to be regularly checked or serviced.

A new Australian Standard relating to the installation, maintenance and operation of solarium for cosmetic purposes (AS/NZ 2635:2002) was published in April 2002.

The new Standard was developed in consultation with a broad cross-section of solarium industry representatives, manufacturing interests, UV radiation specialists and public health professionals including The Cancer Council Australia. The Standard sets out the requirements for the installation, maintenance and operation of solariums.

Some of the key points in the new Standard include:

- No person under the age of 15 shall be allowed to use a solarium or sunbed.
- Consumers aged between 15 and 18 require parental consent. (These age restrictions reflect general concerns about the negative health consequences associated with UV exposure in adolescence and the risk of skin cancer.)
- People with fair skin which burns and who are unable to tan shall not use a solarium.
- Claims of health benefits cannot be made in

Fact sheet 11: Solariums (cont.)

the advertising or promotion of solariums.

- Unsupervised, automatic solariums do not comply with the Australian Standard.
- Warning notices must be displayed to ensure consumers are adequately informed of the risks associated with solarium use.
- Clients must sign a consent form.
- Solarium operators must be properly trained.
- The allowed effective irradiance (solarium UV output) has increased from 0.3 watts per metre square to 1.5 watts per metre square. (This means that the UV radiation from solariums can be up to 5 times stronger than the mid-summer sun at noon.)

Further information about the Standard can be found at <www.standards.com.au>

Sunlamps that are sold for use at home are not controlled by any such guidelines. These lamps often emit high levels of UVB and may even emit the more damaging UVC. These products should only be used on the advice of a doctor and then only under strict medical supervision.

Key points

- A solarium tan is induced by ultraviolet (UV) light.
- All forms of UV light contribute to skin cancer.
- All forms of UV light cause premature ageing of the skin. This may be evident as wrinkling, loss of elasticity, sagging, yellowish discolouration and brown patches.
- No solarium can give a safe tan.
- Artificial UV light exposure is not necessary for optimal vitamin D production in Australia.
- There is no scientific evidence in humans to indicate that solarium usage lowers the chance of developing cancers such as breast or bowel cancer.
- The Australasian College of Dermatologists and The Cancer Council Australia do not support the use of solariums.

