GUIDANCE NOTE FOR THE PROTECTION OF WORKERS FROM THE ULTRAVIOLET RADIATION IN SUNLIGHT

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Australian Government
Australian Safety and Compensation Council

The Australian Safety and Compensation Council (ASCC) has adopted a *Guidance Note for the Protection of Workers from the Ultraviolet Radiation in Sunlight*.

Guidance notes are advisory technical documents issued by the ASCC, and may not be suitable for reference in Commonwealth, State or Territory legislation.

The expectation of the ASCC is that guidance notes will provide detailed information for use by unions, employers, management, health and safety committee representatives, safety officers, occupational health and safety professionals and others requiring guidance.

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FOREWORD

The Australian Safety and Compensation Council (ASCC), through a partnership of governments, employers and employees, leads and coordinates national efforts to prevent workplace death, injury and disease. The ASCC is the successor to the National Occupational Health and Safety Commission (NOHSC). The ASCC aims to:

- support and enhance the efforts of the Australian state and territory governments to improve the prevention of workplace deaths, injury and disease
- work in alliance with others to facilitate the development and implementation of better preventative approaches and
- ensure the needs of small business are integrated into these approaches.

The NOHSC developed the National Occupational Health and Safety (OHS) Strategy 2002-2012 (National Strategy) which records a commitment by all Australian state and territory governments, the Australian Chamber of Commerce and Industry (ACCI) and the Australian Council of Trade Unions (ACTU) to share the responsibility of ensuring that Australia's performance in work-related health and safety is continuously improved.

The National Strategy sets out five 'national priorities' to achieve short-term and long-term improvements. The priorities are to:

- reduce high incidence and high severity risks
- improve the capacity of business operators and workers to manage OHS effectively
- prevent occupational disease more effectively
- eliminate hazards at the design stage and
- strengthen the capacity of government to influence OHS outcomes.

The Guidance Note for the Protection of Workers from the Ultraviolet Radiation in Sunlight [NOSHC:3012(1991)] was originally developed by the NOSHC in 1991. The document was revised by the ASCC in September 2008, and aims to provide advice for use by unions, employers, management, health and safety committee representatives, safety officers, occupational health and safety professionals and others requiring guidance. In addition, the principles outlined in this publication can be applied equally to non-occupational exposures.

1. INTRODUCTION

1.1 This guidance note provides practical guidance to employers on the protection of workers from the ultraviolet radiation in sunlight.

1.2 The prevention of skin cancer in Australia has been given a high priority because:

- Australia and New Zealand have the highest incidence of skin cancer in the world (Ferlay J, Bray F, Pisani P, Parkin D. *GLOBOCAN 2002. Cancer incidence, mortality and prevalence worldwide. IARC CancerBase No. 5, version 2.0.* Lyon: IARCPress, 2004)
- At least 2 in 3 Australians will be diagnosed with skin cancer before the age of 70 (Staples M, Elwood M, Burton R, Williams J, Marks R, Giles G. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Medical Journal of Australia* 2006; 184: 6-10); and
- Skin cancer costs the Australian health system around $300 million annually, which is the highest cost of all cancers (Australian Institute of Health and Welfare. *Health system expenditures on cancer and other neoplasms in Australia, 2000 – 01.* Canberra: AIHW2005).

1.3 Sun exposure is well established as the major cause of skin cancer in Australia. It is the ultraviolet (UV) radiation component of sunlight which is harmful; and the level of UV radiation is not directly related to temperature or brightness of sunlight. This means that harm can still occur on cool or cloudy days during the peak UV periods of the year. Exposure to UV Index levels of 3 or above can contribute to skin cancer. (The UV index is a measure of UV radiation and the higher the index value the greater the potential for damage to skin. Appendix 1 provides more information on solar UV radiation). In addition to skin cancer, solar UV exposure is a major cause of eye damage including photoconjunctivitis and photokeratitis, cataracts and pterygia (see Chapter 2).

1.4 Several factors contribute to an increased risk of developing skin cancer. For example:

- exposure received during childhood
- participation in outdoor work and leisure activities resulting in increased exposure to solar UV radiation
- because of higher solar UV exposures, the closer people live to the equator, the more likely they are to develop skin cancer. Queensland has a higher rate of diagnosed skin cancers than Tasmania
- solar UV radiation intensity increases with height above sea level
- solar UV radiation is at its greatest intensity between the hours of 10.00 am and 2.00pm, although dangerous levels of UV radiation can still be experienced outside those hours. (Note: These times should be adjusted to 11.00 am and 3.00 pm when there is daylight saving.)
- the risk of skin cancer is greatest in people with a fair complexion, blue eyes and freckles, who tan poorly and burn easily, but others, for example, individuals who have Dysplastic Naevi Syndrome, are also at risk (see Chapter 2) and
- there is an increased risk in people who have already had a skin cancer or Keratoses diagnosed.

1.5 While certain skin types are associated with an increased risk, it is important that everyone should protect their skin from exposure to solar UV radiation, regardless of skin type.

1.6 The SunSmart UV Alert is a tool that can be used to know when protection from UV radiation is required. The alert is issued whenever the UV Index is forecast to reach 3 or above. At these levels, the World Health Organization recommends the use of sun protection to avoid skin damage and skin cancer. The SunSmart UV Alert can be found on the weather page of most Australian daily newspapers, or on the Bureau of Meteorology website at www.bom.gov.au (search for 'UV Alert').

1.7 Even intermittent exposure to solar UV radiation can be harmful. Those who work outdoors part-time are still at risk.

2. ADVERSE HEALTH EFFECTS OF SOLAR ULTRAVIOLET RADIATION

2.1 During the peak UV period on a summer day (between 10am and 2pm, or 11am to 3pm where there is daylight saving), unprotected skin can burn within 12 minutes. Permanent damage can occur after 120 minutes.

SHORT TERM EXPOSURE

2.2 Short term exposure to the sun can result in sunburn and injuries to the eye.

Sunburn

2.3 The effects of sunburn include reddening of the skin, blistering, swelling and, later, peeling of the skin, generally within 8 to 24 hours. For untanned skin, exposed to the summer sun between 10.00 am and 2.00pm (11.00 am and 3.00 pm when there is daylight saving), the effects will be:

- 12 minutes of sun exposure will result in mild sunburn;
- 30 minutes of sun exposure will result in appreciable discomfort;
- 60 minutes of sun exposure will result in peeling and blistering; and
- 120 minutes of sun exposure will result in permanent damage[1].

Effects on the Eye

2.4 Exposure to solar UV radiation can cause short term effects such as photoconjunctivitis and photokeratitis. Photoconjunctivitis is an inflammation of the conjunctiva (the mucous membrane covering the anterior portion of the eye). Photokeratitis is an inflammation of the cornea.

2.5 Symptoms of these complaints include a painful sensation in the eyes, excessive blinking and tears, the sensation of a foreign body in the eyes, difficulty in looking at strong lights, and swelling of the eyes. The effects are apparent within a few hours and usually disappear within two days. Permanent damage is rare.

2.6 Some industrial chemicals can cause photosensitisation of the eyes, for example, exposure to some coal tar derivatives can damage the outer surface of the eye.

LONG TERM EXPOSURE

2.7 In the longer term, repeated exposure to the sun can result in keratoses, skin cancers, premature skin aging and injuries to the eye.

Keratoses

2.8 Keratoses, sometimes called sunspots, are dry, rough, firm spots on the skin. Like premature ageing, they are indicators of prolonged exposure to solar UV radiation. Keratoses very occasionally develop into cancers.

Skin Cancers

2.9 There are three main types of skin cancers in Australia:

- Basal cell carcinoma (BCC) – This is the most common, but least dangerous type of skin cancer. Over half of all BCCs occur on the face and neck. BCCs first appear as small, round or flattened lumps which are red, pale or pearly in colour and may have blood vessels over the surface. If untreated, they will continue to spread into surrounding tissue, eventually breaking down to form ulcers

- Squamous cell carcinoma (SCC) – This skin cancer is less common, but more dangerous than BCC. Caused by continuous exposure to UV radiation, such as occurs in outdoor occupations, half of SCCs in men are diagnosed on the head and neck, and a quarter are on the arms and shoulders. In women, more than a third of SCCs are found on the arms and shoulders, and a third on the head and neck. This cancer can also occur on the lips, particularly the lower lip. SCCs are characterised by scaling and red areas that may bleed easily and become ulcerated. Very occasionally, SCCs may spread to the lymph nodes; and
- Melanoma – This is the least common, but most dangerous skin cancer. This cancer usually starts as a new spot, freckle or mole on the skin that changes in colour, thickness or shape over months. Melanomas occasionally occur in parts of the body other than the skin, such as the eye and mouth. Melanomas can be dark brown to black, red or blue-black or a combination of colours with an irregular outline or shape. Melanomas can also develop in pre-existing moles, particularly those which have irregular borders and variable shades of black and other colours. People who have many moles of this type, as well as individuals with Dysplastic Naevi Syndrome (a rare familial condition, presenting as numerous brown moles over the body), seem to have a higher risk of developing melanoma. Melanomas can spread to internal organs and cause death if not detected and removed promptly.

Effects on the Eye

2.10 Long term effects of prolonged exposure to solar UV radiation include damage to the cornea, formation of cataracts and pterygia. Cataracts are opacities of the lens of the eye. Pterygia are wing-shaped growths of the tissue on the outside of the eye. They can grow over the cornea of the eye and cause symptoms of mild conjunctivitis.

PHOTOSENSITISING SUBSTANCES

2.11 Exposure to photosensitising substances can worsen the effects of solar UV radiation. Some examples of photosensitisers are coal tar and several of its by-products, certain dyes, selected plants and fruits and a number of medications.

2.12 Appendix 2 is a list of substances which are known to cause photosensitisation. Although there are many substances listed, it is rare for an individual to develop photosensitisation.

3. EMPLOYER AND WORKER RESPONSIBILITIES

3.1 Occupational health and safety legislation in Australia requires employers to provide and maintain, as far as is practicable, a working environment that is safe and without risks to health. This is the employer's general duty of care.

3.2 Workers are required to comply with instructions given by their employer for reasons of health and safety and take reasonable precautions to protect themselves and others at work.

3.3 Workers should report any problems in achieving compliance to their employers.

Consultation

3.4 Employers should consult with workers and/or worker representatives (such as health and safety representatives) on matters directly affecting their health and safety. In this case it should involve the assessment of exposure to solar UV radiation, the development and implementation of safe working procedures, and other control measures.

4. DEVELOPING A UV PROTECTION PROGRAM

RISK ASSESSMENT

4.1 Conducting an ultraviolet (UV) risk assessment in the workplace will identify those employees who have a higher risk of exposure to UV radiation and the situations and work systems that have a higher exposure to UV radiation.

4.2 The employer and/or nominated employee representative can conduct the assessment. Although no specific skills are required to carry out the assessment, it is vital the assessor/s have a sound knowledge of the work environment and processes being assessed.

How to perform a risk assessment

4.3 Do a 'walk through' inspection to gather information about work areas and to determine the amount of UV radiation employees are exposed to.

4.4 As solar UV radiation exposure in outdoor environments may vary depending on where the work is performed, an exposure assessment should identify:

- jobs/tasks, including breaks, which involve solar UV radiation exposure
- the time of day when the tasks are carried out and the frequency with which the tasks are performed
- the shade provided by the physical environment in which the work is carried out
- reflective surfaces, for example, water, reflective building glass, white surfaces such as sand, rock, cement or snow, and unpainted corrugated steel or aluminium roofing, that are part of the environment in which the work is carried out and
- any photosensitising substances associated with the work.

4.5 It is also important to note any existing measures in place that influence total UV radiation exposure, including:

- the current levels and availability of shade during outdoor work or rest breaks
- the degree of influence an employee has over their work schedule, for example, early starts and
- the level of protection offered by sun-protective items (such as work clothing and personal protective equipment (PPE)) currently provided to outdoor workers.

4.6 In most cases, a once-only exposure assessment will be sufficient. However, an assessment should also be conducted whenever there are changes in a work procedure which may lead to greater solar UV radiation exposure. A sample exposure checklist is given in Appendix 3.

4.7 The information obtained from the risk assessment can also be used to develop a risk control plan, as a part of the workplace's UV Radiation Protection Policy.

Examples of exposure assessment and control reports are given in Appendix 3.

UV RADIATION CONTROL MEASURES

4.8 Once the level of UV radiation risk in the workplace has been identified, control measures can be implemented. It is recommended that a combination of control measures is used.

4.9 Employers should ensure that exposures to solar UV radiation in the workplace are minimised by implementing a control strategy, where practicable, that includes the following control measures;

- the use of natural and/or artificial shade
- administrative and procedural measures and
- personal protection.

4.10 These measures should be implemented together to minimise exposure to solar UV radiation.

4.11 Where employees may be exposed to solar UV radiation and photosensitisers, exposures to both need to be minimised.

4.12 In many instances, employers can reduce exposure to solar UV radiation by making some simple changes to the way that outdoor work is done. Examples of these changes are outlined below.

Use of Natural and/or Artificial Shade

4.13 Where practicable, shade created by permanent objects such as trees, buildings and other structures should be used. In the absence of such objects, shade can be created by the use of canopies, tents, screens and other portable structures which are easy to erect and dismantle.

4.14 It is important to remember that shade will only lessen exposure to solar UV radiation. Sunburn can still occur in shaded areas, due to the scattering of solar UV radiation by clouds and reflection from brightly coloured or shiny surfaces such as metal roofing, concrete, sand, water, glass and snow.

4.15 In addition to shade, it is important to note that a high degree of attenuation of solar UV radiation can be achieved with ordinary window glass; hence there is value in keeping vehicle windows up when driving for long periods, provided this does not create a secondary hazard in itself.

Administrative and Procedural Measures

4.16 Consideration may be given to simple reorganisation of outdoor work programs, and to the opportunity to undertake alternative tasks when the sun is most intense, that is, between 10.00 am and 2.00 pm (11.00 am and 3.00 pm when there is daylight saving). The SunSmart UV alert can also be used to determine forecast UV levels each day.

Personal Protection

4.17 The use of personal protection is an important component in the solar UV radiation control strategy.

4.18 It is also important to ensure that the use of personal protection itself does not create a secondary hazard to the worker. For example, loose clothing worn near outdoor machinery, such as a post hole digger/auger, may constitute a secondary hazard. Heat stress may also be a secondary hazard when wearing some types of protective clothing and performing heavy manual labour.

4.19 For best protection, do not rely on personal protective equipment (PPE) alone. For example, the use of a hat and sunscreen together is preferable to the use of sunscreen alone.

Clothing

4.20 Clothing provides one of the most convenient forms of protection against UVR but not all garments offer sufficient sun protection. All fabrics have some ability to block UVR and laboratory testing is performed to determine how effective different fabrics are.

4.21 The selection of appropriate clothing must take into account both the need to screen out solar UV radiation and the need for coolness in hot conditions. The key features to look for when selecting clothing are:

- tightness of weave or knit
- permeability of the material to assist the evaporation of sweat
- design and
- UPF Rating of 50+.

4.22 The UPF rating indicates how effective a fabric is at blocking out solar ultraviolet radiation. UPF ratings range from 15 to 50 with higher ratings indicating more effective blocking and therefore better protection for the wearer of a garment made from the fabric. Fabrics that test higher than UPF 50 are rated as UPF 50+.

4.23 Long-sleeved shirts with collars worn with long trousers are recommended, if practical. Cuffs, ankles and waist bands should be loose to allow air to circulate. Shirts are best worn outside trousers to increase ventilation, providing care is taken to ensure that this does not place the worker at greater risk of injury (see the reference to secondary hazards in Section 4.18).

4.24 The tighter the fabric weave or knit, the less solar UV radiation reaches the skin. However, tightly woven fabrics provide more protection at the cost of being warmer. Impermeable materials, such as some disposable overalls with plastic linings, do not allow sweat to evaporate and will increase the risk of heat stress in certain circumstances. Cotton fabrics, which tend to be tightly woven, usually offer better protection than synthetics. In addition, cotton, because it assists sweat evaporation, is more comfortable to wear than fully synthetic fabrics. Light coloured fabrics are cooler to wear because they reflect the heat; however, dark coloured fabrics absorb more UV radiation than lighter shades.

Hats

4.25 Hats provide shade and the bigger the brim, the greater the amount of shade that is provided. Hats with brims of at least 8 centimetres should be worn to provide adequate shade. Legionnaire-style caps, with loose flaps to protect the neck and ears, are also effective.

4.26 Where practicable, hard hats and other protective hats, for example, bicycle helmets, should be fitted with broad brims. Attachable brims and neck flaps are available for this purpose. Due to their size, the wearing of wide brimmed hats may cause difficulties in some circumstances. In such cases, the safety function of the hat should take precedence over protection from the sun. Sunscreens and other protective measures should be used instead.

4.27 Hats with wide brims will not protect against solar UV radiation reflecting from shiny surfaces.

Sunscreens

4.28 Sunscreens should be selected in accordance with skin type and working conditions. A high SPF broad-spectrum sunscreen (that provides protection against UV-B rays and some

UV-A rays) is recommended. A water-resistant sunscreen may be necessary for some types of work. Sun protection factors (SPFs) are based on Australian Standard AS 2604

Sunscreen Products-Evaluation and Classification. The higher the SPF, up to a value of 30+, the greater the protection. However, the SPF value only relates to the reddening of the skin caused by one part of the UV spectrum (UV-B). Therefore, it is a wise precaution to use a high SPF broad-spectrum, water resistant sunscreen that will block a greater range of the UV spectrum, not just the part that causes this effect.

4.29 No sunscreen provides complete protection. For example, an SPF of 30+ filters out 96 per cent of solar UV radiation. Therefore, hats, clothing and other protective measures should always be used in addition to a sunscreen.

4.30 Sunscreens are best applied to dry skin at least 20 minutes before the start of any outdoor work. Sunscreens are more effective if they are wiped on, rather then being rubbed into the skin. Reapply sunscreens every two hours. In hot conditions, when sweating is profuse, reapply the sunscreen more frequently as the sweat will wash off the previous application. The effectiveness of any sunscreen depends on its correct use and storage. Too much sunscreen can reduce sweating and cause heat stress, and too little may not provide protection. Always read the instructions on the label to ensure correct use.

4.31 In dusty conditions, such as where cement dust may be present, a sunscreen with an alcohol or vanishing cream base should be used. The use of an oil based sunscreen may increase the risk of dust adhering to the skin, thereby giving rise to a secondary hazard if the dust is of a hazardous nature. The Material Safety Data Sheet for the relevant substance should be referred to (if available) to determine if there is a health risk.

4.32 The possibility of hypersensitivity and allergies to sunscreens cannot be excluded, and any history of individual reaction or preference for a particular type of sunscreen should be taken into account. Rather than not wearing a sunscreen under such circumstances, another sunscreen type should be used.

4.33 Adequate supplies of sunscreen should be maintained at any outdoor work location. Bracket-mounted pump-packs of sunscreen are available from some suppliers, and can be mounted in change rooms, near time clocks or in vehicles. Simple preparations, such as zinc cream (SPF 30+, broad spectrum, water resistant sunscreen) will provide economical protection to essential areas such as the nose, lips and top of the ears. Zinc cream must be applied thickly but cannot be used on large areas of the body because it prevents sweat evaporation in hot conditions.

Lip Protection

4.34 Lip cancer from prolonged exposure to sunlight is common. This is because lips do not contain melanin which provides some natural protection. Lips should be protected with sunscreen or a lipstick which has an SPF 30+ rating.

Eye Protection

4.35 Eye protection from solar UV radiation is recommended, particularly in highly reflective environments. Where eye protection is required, two issues should be considered - safety and health.

4.36 Where safety is the over-riding concern, glasses which comply with Australian Standard AS 1337 *Eye Protectors for Industrial Applications* are recommended. This standard includes tinted and untinted protectors which afford UV protection.

4.37 Where health is the over-riding concern (for example protection from cataract formation), sunglasses designated as specific purpose type (b) in Australian Standard AS 1067.1 *Sunglasses and Fashion Spectacles - Part 1: Safety Requirements* may be worn.

EDUCATION AND TRAINING PROGRAMS

Objectives

4.38 Employers should provide training where the need is identified in an (exposure) risk assessment of the type mentioned in Section 4. This will help employees understand the control measures being introduced and also what is expected of them throughout the workplace. Having identified this need, the training program should be on-going, as necessary, and be included in the induction of new employees (including contractors). The target groups requiring training are those people responsible for organising outdoor work and those people receiving prolonged exposure to solar UV radiation.

4.39 The objectives of training and education should include:

- increasing recognition of the harmful health effects of solar UV radiation
- the promotion of safe working procedures consistent with the control strategy outlined in this guidance note and
- the provision of information on self-screening for skin cancer.

Content

4.40 The content of any training program should be developed in consultation with employees and/or health and safety representatives, and tailored to the specific needs of the employees being trained, in the language(s) appropriate to the workplace, and to the environmental conditions identified.

4.41 Cancer Councils in each State or Territory are an excellent source of simple but effective education and training packages on this issue.

4.42 Topics to be dealt with in such a training program should include:

- the nature of solar UV radiation, including seasonal changes, and the daily pattern of intensity
- the effects of solar UV radiation, with particular reference to the risk factors associated with the development of skin cancer
- the control strategy to be utilised in the work activity
- self-screening for skin cancer and
- protection from photosensitising substances, where applicable.

Workplace Education Program

4.43 Support services (including workplace education programs) are available from state and territory cancer councils.

Online Training Courses

4.44 Online training courses are available and are an effective, cost efficient method of training for employees. Refer to your state or territory cancer council for further information.

DEVELOPING A POLICY

Please refer to appendix 3 for a sample workplace policy.

4.45 A UV radiation policy can be used in the workplace to record why and how the UV radiation risk will be managed by the workplace. The policy should be developed in consultation with employees and/or health and safety representatives and should include:

- rationale and identification of the UV radiation hazard
- details of daily measures employed to minimize the hazard
- details of education requirements for management, workers and other staff
- an outline of who is responsible for implementation and monitoring
- details of review processes, and
- periodic UV radiation risk assessments to ensure your policy is current and up to date.

MONITOR COMPLIANCE AND REVIEW THE PROGRAM

4.46 Regular monitoring of the effectiveness of workplace UV radiation protection programs is important, especially if the nature of the work has changed. The program can be reviewed by:

- asking staff for comments on concerns or issues they have with the new policy and/or practices
- asking staff whether there have been any difficulties experienced while implementing UV radiation control measures
- repeating the UV risk assessment process to provide information on changes in UV radiation risk levels and whether control measures are working
- examining information compiled during monitoring such as the degree of compliance with UV radiation control measures, and
- examining current sunburn rates and skin-related compensation claims and comparing to rates prior to introducing the program.

5. HEALTH SURVEILLANCE

5.1 In most cases, health surveillance for skin cancer involves self-screening, that is, people examining their bodies themselves. However, employers may wish to provide a screening programme for those employees exposed to UV radiation, even if the exposure occurs on an intermittent or part-time basis. High risk individuals[1] should be examined by their general practitioner every 12 months.

5.2 Employers should ensure that workers are provided with information on self-screening for skin cancers. Pamphlets which describe what to look for are available from the State or Territory Cancer Councils. These Cancer Councils are listed in Appendix 5. Further information on 'self-examination' is provided at Section 5.7.

5.3 It is important for people to regularly check all parts of the body, in particular, the areas most often exposed to the sun, that is, the ears, face, neck, shoulders, arms and hands.

5.4 If any abnormalities are detected that may indicate the presence of a skin cancer or sunspots (keratoses), a medical practitioner should be consulted promptly.

5.5 Early detection of skin cancer is important in ensuring effective treatment of the condition.

5.6 Employers should ensure that workers are provided with information on the hazards of solar UV radiation and its effects on health, for example, by making this guidance note available.

5.7 The following information is an extract on 'self-examination' taken from the SunSmart Information Sheet on *Early Detection and Treatment of Skin Cancer.*

Self-examination

All adults should check their skin for changes at least every three months. Unlike many other cancers, skin cancer is often visible, making it easier to detect in the early stages. Early detection is crucial if skin cancer is to be cured.

Use a hand-held mirror to check the skin on your back and the back of your neck, or ask someone else to have a look for you. Don't forget to check your armpits, inner legs, ears, eyelids, hands and feet. Use a comb to move sections of hair aside and inspect your scalp.

The A.B.C.D of early detection – what to look for

A: Asymmetry – One half of the spot doesn't match the other

B: Border – The edges are irregular, ragged, notched, or blurred

C: Colour – The colour is not the same all over and may include shades of brown or black, red, white or blue.

D: Diameter – The spot is larger than 6mm across (about ¼ inch) or is growing larger.

Also be aware of any mole or freckle which:

- changes over a period of months
- grows in size
- changes shape

[1] Individuals at high risk of melanoma are those with multiple atypical naevi (moles) who have a history of melanoma in themselves or in one or more first degree relatives. Individuals who are at high risk of non melanoma skin cancer are those with a fair complexion, a tendency to burn rather than tan, have freckles, light eye colour, light or red hair colour and previous non-melanoma skin cancer (NMSC)

- becomes mottled in colour
- has a persistent itch.

Photographs of any suspicious areas can be useful to record any changes. People worried about changes that might indicate skin cancer should talk to their doctor.

Appendix 1 CHARACTERISTICS OF SOLAR ULTRAVIOLET RADIATION

A1.1 Ultraviolet radiation is a component of the electromagnetic radiation (EMR) spectrum emitted by the sun.

A1.2 All forms of EMR are characterised by wavelength. The unit of measurement of wavelength for UV radiation is the nanometre (nm) which is 1,000,000,000th of a metre.

A1.3 The UV radiation range is traditionally divided into four sub-divisions:

- UV-A 315-400 nm
- UV-B 280-315 nm
- UV-C 200-280 nm and
- Vacuum UV 100-200 nm.

A1.4 Wavelengths in the vacuum UV and UV-C ranges do not reach the Earth through the atmosphere from the Sun. Sunlight contains more UV-A than UV-B, but UV-B is much more active in causing skin damage. Broad-spectrum sunscreens are effective against UV-B rays and at least part of the UV-A spectrum.

A1.5 The factors which affect the intensity of solar UV radiation (particularly of UV-B and, to a lesser extent, UV-A) are:

- time of day
- cloud cover
- season of the year
- proximity to the equator
- stratospheric ozone concentration
- altitude
- extent of reflection and
- extent of shade.

A1.6 Stratospheric ozone depletion is now recognised as a major future determinant of solar UV radiation at ground level. The World Health Organization has stated that a decrease in stratospheric ozone by 1 per cent would lead to an increase in the incidence of non-melanoma skin cancers by 3 per cent. An ozone depletion of 5 per cent would lead to an increase of incidence by 16 per cent. Such depletion, if it occurs, is most likely to particularly affect Tasmania and southern parts of the Australian continent.

A1.7 Solar UV radiation is likely to be at its greatest intensity between the hours of 10.00am and 2.00 pm (adjusted to 11.00 am and 3.00 pm for daylight saving) because the sun is highest in the sky between these times. On sunny days, a useful rule of thumb is to avoid direct (unprotected) exposure when your shadow is shorter than yourself. Cloud cover will reduce the intensity of solar UV radiation, however, more solar UV radiation may be transmitted than is expected from the apparent density of the cloud, and sunburn can still occur on a cloudy day.

A1.8 On average, over summer the peak intensity of solar UV radiation is at 12.00 noon (1pm where daylight savings is in effect). Between the hours of 10.00 am and 2.00 pm (11am and 3pm), two hours before and two hours after the peak intensity, approximately 65 per cent of the total solar UV radiation responsible for skin cancer is received.

A1.9 This is why it is recommended that people should particularly avoid direct exposure to sunlight between the hours of 10.00 am and 2.00 pm (11am and 3pm during daylight savings). This general approach should apply throughout Australia.

A1.10 During the winter months, the sun is lower in the sky and the amount of solar UV radiation received in Australia is less than that received during summer. However, the preventive strategies given in Chapter 4 still need to be applied during this time whenever the UV Index reaches 3 or above, which can be year round in the tropical north of Australia. The SunSmart UV Alert is issued when the UV Index is predicted to reach 3 or above, and preventive strategies should be employed. The UV Index is a simple and informative way of describing the daily solar UV radiation intensity. The UV Alert is issued by the Bureau of Meteorology and indicates when the UV index is forecast to reach 3 or above and shows the period of the day that sun protection is required. When the UV index is 3 or above, it can damage your skin and lead to skin cancer. Between 10 am and 2.00 pm (11.00 and 3.00 pm during daylight savings) the UV index is usually in the High (6-7) range or above.

A1.11 The intensity of solar UV radiation increases with height above sea level. For example, workers in the Australian Capital Territory and Southern Highlands of New South Wales may be exposed to higher solar UV radiation levels than those received by workers in some parts of Queensland. Some natural surfaces, such as fresh snow, are highly reflective of solar UV radiation. Exposures of Australian ski-field workers to solar UV radiation in winter can be just as intense as summer exposures at sea level. Other natural surfaces which are reflective include sand, rock, snow and water. There is also major reflection from other surfaces such as metallic roofing and concrete.

A1.12 While most of the heat radiation of the Sun comes directly from the Sun, half to two thirds of solar UV radiation is scattered from the sky. Substantial solar UV radiation exposure is therefore possible even when direct sun rays are shaded.

A1.13 Solar UV radiation levels are generally low indoors. People who work near windows will be exposed to solar UV radiation, the level of which will depend on the direction the window is facing, the type of glass in it, shading from nearby objects and whether the window is open or shut. Ordinary window glass effectively blocks out all UV-B and should therefore offer some protection against skin cancers.

A1.14 Clear car glass has a protection factor of about 13, which is equivalent to a good sunscreen, while some window tints, for example, film tinting for car windows, have protection factors of 500.

Appendix 2 SOME SUBSTANCES WHICH CAUSE PHOTOSENSITIVITY

A2.1 Photosensitivity is an abnormally high reactivity in the skin or eyes to UV radiation or natural sunlight. It ***may*** be induced by ingestion, inhalation or skin contact with certain substances known as photosensitisers. Symptoms will vary with the amount of UV radiation, type and amount of photosensitiser, skin type, and age and sex of the person exposed.

INDUSTRIAL CHEMICALS

A2.2 Photosensitisation of the skin and eyes can be caused by exposure to specific industrial chemicals. The skin can be affected by dermal exposure or inhalation. The eyes can be affected by volatile fumes. In certain occupations, the risk from exposure to particular photosensitising chemicals and solar UV radiation is severe. For example, exposure to tar and sunlight can cause precancerous and cancerous skin lesions. Exposure to coal tar fumes can cause simultaneous inflammation of the conjunctiva and cornea.

A2.3 The industrial chemicals listed below have been identified as photosensitisers following dermal exposure[2]:

Dyes

acridine

bromofluorescein

eosin

erythrocin

fluorescein

methylene blue

rhodamine

rose bengal

Coal Tar and Derivatives

anthracene

phenanthrene

pitch

creosote

Chlorinated Hydrocarbons

chlorobenzols

diphenyls

triphenyls

DRUGS

A2.4 Ingestion or topical application of particular medications may cause photosensitivity in some individuals. Photosensitivity may occur in every person, is usually dose related and may not happen the first time the drug is taken. It should be stressed that administration of the medication should not stop until medical advice has been sought. Avoiding exposure to direct sunlight will control the photosensitivity in the meantime. Consult a doctor or pharmacist about the availability of alternative medications.

A2.5 The following drugs have been identified as photosensitisers from either occupational exposure and/or therapeutic administration[2,3]:

Drug	Exposure Route	Drug	Exposure Route
sulphonamides	*oral*	diethylstilbestrol	*oral*
p-aminobenzoic acid and esters	*oral*	estrogens	*oral*
sulfonlyureas	*oral*	triethylenemelamine	*oral*
chlorothiazides	*oral*	quinine	*oral*
chlorosalicylanildes	*oral*	riboflavin	*oral*
griseofulvin	*oral*	estrone	*dermal*
phenothiazines	*oral*	nalidixic acid	*dermal*
demethylchlor-tetracycline	*oral*	naproxen	*dermal*
Diphenhydramine hydrochloride (Benadryl)	*oral*	fluorouracil	*dermal*
promethazine (Phenergan)	*oral*	furocoumarins	*oral*
tetracyclines	*oral*	thiazides and related sulphonamide diuretics	*oral*

PLANTS

A2.6 The following plants found in Australia are known to cause photosensitivity through skin contact with the plant or its juices[2,3.] Gardeners, people in the food processing industry, surveyors, construction workers, horticulturalists, florists, and agricultural and forestry workers are among the occupational groups most likely to be exposed to these plants. Oil-based sunscreens provide greater protection against plant-related photosensitivity than water-based sunscreens as the oil-based sunscreens will assist in providing a barrier to plant juices.

Common Name	Botanical Name	Common Name	Botanical Name
agrimony	*Agrimonia eupatoria*	giant hogweed varities	*Heracleum species*
bergamot	*Citrus bergamia*	goosefoot	*Chenopodium species*
bind weed	*Convolvulus arvensis*	Indian mustard	*Brassica juncea*
bishop's weed	*Ammi majus*	lichen species	------
buttercup	*Ranunculus species*	lemon	*Citrus limon*
carrot	*Daucus carota*	lime	*Citrus aurantifolia*
celery	*Apium graveolens*	milfoil, yarrow	*Achillea millefolium*
citron	*Citrus medica*	parsnip	*Pastinaca sativa*
chrysanthemum	*chrysanthemum species*	St. John's wort	*Hypericum perforatum*
dill	*Anethum graveolens*	Scurfy-pea,bavchi	*Psoralea corylifolia*
fat hen	*Chenopodium album*	seville orange	*Citrus aurantium*
fennel	*Foeniculum vulgare*	stinking mayweed, corn chamomile	*Anthemis cotula*
fig	*Ficus carica*		

MISCELLANEOUS

A2.7 Some oils and fragrances used in cosmetics and other products, and, very occasionally, sunscreen additives, have been identified as possible photosensitisers following dermal exposure[2]:

Oils and Fragrances	Sunscreen Additives
angelica root oil	digalloyl trioleate
bergamot oil	6-methylcoumarin
cumin oil	p-aminobenzoic acid (PABA)
lemon oil	PABA derivatives
lime oil	
orange oil bitter	
rue oil	
cedarwood oil	
lavender oil	
neroli oil	
orange peel oil	
sandalwood oil	
musk ambrette	

Appendix 3 A SAMPLE SUN PROTECTION POLICY FOR WORKPLACES

This sample sun protection policy is intended as a guide only. Organisations should use aspects to tailor a policy that suits the needs and practicalities of their own organisation.

(Organisation Name) sun protection policy

Background

Australia and New Zealand have the highest rates of skin cancer in the world. Despite being an almost entirely preventable disease it continues to affect at least two in every three Australians by the age of 70. Of all new cancers diagnosed in Australia each year, 80% are skin cancers. Employees who work outdoors for all or part of the day have a higher than average risk of skin cancer. This is because ultraviolet radiation in sunlight or 'solar UVR' is a known carcinogen. All skin types can be damaged by exposure to solar UVR. Damage is permanent and irreversible and increases with each exposure.

(Organisation Name) has an obligation to provide a working environment that is safe and without risks to health. This obligation includes taking proper steps to reduce the known health risks associated with exposure to solar UVR for outdoor workers.

Aims

This policy aims to eliminate, and where not practicable, reduce worker exposure to solar UVR by implementing appropriate sun protection control measures.

Our commitment

(Organisation Name) will conduct a risk assessment in consultation with health and safety representatives and employees to identify employees who have a high risk of exposure to solar UVR, and work situations where exposure to solar UVR occurs.

(Organisation Name) will reduce employees' exposure to solar UVR by requiring the use of sun protection control measures by outdoor workers when the UV Index is 3 and above, and at all times when working in alpine regions or near highly reflective surfaces.

(Organisation Name) recognises that a combination of sun protection control measures, which includes engineering and administrative controls, personal protective equipment and clothing, provides the best protection to employees from exposure to solar UVR.

(Organisation Name) recognises that the SunSmart UV Alert is issued whenever the UV Index is forecast to reach 3 and above, and will use the time period displayed to inform employees when it is necessary to use sun protection control measures while working outdoors.

(Organisation Name) recognises that supervision of outdoor workers and monitoring of the use of sun protection control measures is required to ensure compliance.

(Organisation Name) recognises that standard company grievance procedures will be initiated where an employee fails to comply with sun protective control measures.

(Organisation Name) will ensure injury reporting procedures are followed when an incident of sunburn or excessive exposure to solar UVR occurs in the workplace.

Management will:

- provide shaded areas or temporary shade where possible
- encourage workers to move jobs where possible to shaded areas

- consider applying window tinting to work vehicles
- modify reflective surfaces where possible
- identify and minimise contact with photosensitising substances
- provide indoor areas or shaded outdoor areas for rest/meal breaks
- schedule outdoor work tasks to occur when levels of solar UVR are less intense, such as earlier in the morning or later in the afternoon
- schedule indoor/shaded work tasks to occur when levels of solar UVR are strongest, such as the middle part of the day
- encourage employees to rotate between indoor/shaded and outdoor tasks to avoid exposing any one individual to solar UVR for long periods of time
- provide daily access to the SunSmart UV Alert
- provide and ensure use of appropriate sun protective PPE in line with SunSmart guidelines including:

  -sun protective work clothing

  -sun protective hats

  -sunglasses

  -sunscreen
- provide training to employees to enable them to work safely in the sun
- ensure training is provided as part of induction for new employees
- ensure employees are provided with information to effectively examine their own skin
- ensure managers and supervisors act as positive role models
- adopt sun protection practices during all company social events and
- promote the use of sun protection measures ‘off the job’.

Employees will:

- cooperate with all measures introduced by management to minimise the risks associated with exposure to solar UVR
- comply with instructions and advice in regards to the use of sun protection control measures
- participate in sun protection education programs
- act as positive role models and

Review

This policy will be reviewed on a regular basis, or at least every two years.

Name (please print):

Position:

Signature:

Date:

Date of next policy review:

SOLAR ULTRAVIOLET RADIATION EXPOSURE CHECKLIST

Please print details of the location, task performed, and the length of time in hours, in the boxes below.

Date	
Site location	
Task description	
Hours per day outdoors	

Time of Day

Indicate the time of day during which exposure occurs by placing a tick in the corresponding box. If the exposure varies throughout the day, please write further details in the box provided.

Before 10 am	☐ YES	☐ NO	12 – 2 pm	☐ YES	☐ NO
10 am – 12 pm	☐ YES	☐ NO	After 2 pm	☐ YES	☐ NO

Variable

Shade

In the boxes provided below, please indicate the type (such as buildings or trees) and extent (such as sparse or plentiful) of available shade.

Type	
Extent	

Reflective Surfaces

If reflective surfaces are present in your work environment, please identify them from the selection given below. `Other' includes surfaces such as snow.

Concrete	☐ YES	☐ NO	Sand	☐ YES	☐ NO
Glass	☐ YES	☐ NO	Other	☐ YES	☐ NO

If OTHER, specify

Photosensitising Substances

Are photosensitising substances present? ☐ YES ☐ NO

If YES, specify

Appendix 4 STATE AND TERRITORY CANCER COUNCILS

A5.1 Information and advice about skin cancer and sun protection is available from:

Cancer Council Australia

www.cancer.org.au/cancersmartlifestyle/SunSmart/Sunprotectionintheworkplace.htm

Cancer Council Victoria
1 Rathdowne Street
CARLTON VIC 3053
Tel: (03) 9635 5000
Email: enquiries@cancervic.org.au
www.sunsmart.com.au

Cancer Council New South Wales
153 Dowling Street
Woolloomooloo
SYDNEY NSW 2011
Tel: (02) 9334 1900
Email: feedback@nswcc.org.au
www.cancercouncil.com.au/sunsmart

Cancer Council Queensland
553 Gregory Terrace
FORTITUDE VALLEY QLD 4006
Tel: (07) 3258 2200
Email: info@cancerqld.org.au
www.cancerqld.org.au/

Cancer Council South Australia

202 Greenhill Road
EASTWOOD SA 5063
Tel: (08) 8291 4111
Email: cancersa@cancersa.org.au
www.cancersa.org.au

Cancer Foundation Western Australia
46 Ventnor Avenue
WEST PERTH WA 6005
Tel: (08) 9212 4333
Email: inquiries@cancerwa.asn.au
www.cancerwa.asn.au

Cancer Council Tasmania
180-184 Collins Street
HOBART TAS 7000
Tel: (03) 6233 2030
Email: infotas@cancer.org.au
www.cancertas.org.au

Cancer Council Northern Territory
Unit 2 Casi House
Vanderlin Drive
CASUARINA NT 0810
Tel: (08) 8927 4888
Email: admin@cancernt.org.au
www.cancercouncilnt.com.au/

Cancer Council Australian Capital Territory
Building 44
5 Richmond Avenue
FAIRBAIRN ACT 2609
Tel: (02) 6257 9999
Email: reception@actcancer.org.au
www.actcancer.org/

Appendix 5 ACKNOWLEDGEMENT AND REFERENCED DOCUMENTS

The Australian Safety and Compensation Council gratefully acknowledges the assistance of the Cancer Council of Australia in the preparation of this guidance note.

The Australian Safety and Compensation Council also acknowledges The Cancer Council Victoria's 'SunSmart' skin cancer prevention program as a source in the preparation of this guidance note.

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2. Adapted from Adams, R. M., *Occupational Skin Disease*, Grune and Stratton, New York, 1983.

3. Adapted from Mitchell, J. C. and Fisher, A.A., `Dermatitis due to Plants and Spices', in Fisher, A. A. (ed), *Contact Dermatitis*, Lea and Febiger, Philadelphia, 1986.

Appendix 6 FURTHER READING

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Jensen, J., Noy, S. and Marks, R., *Occupational Skin Cancer: Guidelines for Reducing Exposure to Ultraviolet Radiation in the Workplace*, Cancer Council of Victoria/Association of Draughting, Supervisory and Technical Employees (Victorian Branch), Melbourne, 1988.

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Noy, S., Cardiff, D., Vivian, S. and Setchell, G., *A Comprehensive Guide to Becoming a Sunsmart Council*, Cancer Council of Victoria, Melbourne, 1990.

Standards Australia, AS 1067.1 *Sunglasses and Fashion Spectacles - Part 1: Safety*

Requirements, Sydney.

---AS 1337 Eye Protectors for Industrial Applications, Sydney.

---AS 2604 Sunscreen Products - Evaluation and Classification, Sydney.

World Health Organization, *Ultraviolet Radiation*, Environmental Health Criteria 14, World Health Organization, Geneva, 1979.