

# **GUIDANCE NOTES FOR THE PROTECTION OF WORKERS FROM SOLAR UV RADIATION**

Prepared by the  
Occupational Safety and Health Service  
Department of Labour  
Wellington  
New Zealand

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## **Introduction**

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These guidelines have been prepared jointly by the Health and Technical Services section of the Occupational Safety and Health Service of the Department of Labour and the Cancer Society of New Zealand Incorporated. The impetus for guidance on means to prevent skin cancer is provided by the current high incidence of skin cancer, particularly melanoma, in New Zealand and concerns about possible increases in UV radiation.

Short-term exposure to the sun can result in sunburn and injuries to the eye. The effects of sunburn include reddening of the skin, blistering, swelling, and later, peeling of the skin. The symptoms of eye damage from acute UV radiation exposure include 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. Permanent damage is unlikely.

Prolonged exposure to sunlight is a well-established cause of skin cancer, including melanoma. It is the UV radiation component of sunlight which is harmful. Even on cloudy days, the UV level may be sufficient to be harmful. Long-term effects on the eye include damage to the cornea, and formation of cataracts.

People with fair skin that freckles and burns readily are at greater risk compared with those with darker skin. Overall, the risk of skin cancer is higher for outdoor workers because of their prolonged sun exposure. In the case of melanoma, intense periods of exposure to the sun appears to be the most significant factor. While people with certain skin types may be at greater risk, it is important that everyone should protect their skin from prolonged exposure to solar UV radiation.

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## **Duties of Employers and Employees**

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The Health and Safety in Employment Act 1992 requires employers to identify hazards faced by their employees and, if it is found that a hazard is significant, apply the hierarchy of actions — elimination, isolation and minimisation — to ensure that a significant hazard does not result in harm to employees. Where the hazard cannot be eliminated or isolated then, as well as minimising the hazard, the employer is required to provide protective equipment, monitor exposure and, with consent, health in relation to exposure. Employers also have to ensure that information is provided to employees about identified hazards and the steps to be taken to minimise the likelihood that the hazards will cause harm. Employees and self-employed people are required to take all practicable steps to protect themselves from harm.

This document provides guidance on solar UV radiation and outlines the factors that are to be considered by employers of outdoor workers in fulfilling their obligations under the Act to provide a safe place of work.

Employers clearly have a responsibility to minimise the risk faced by those who are required to work out of doors, but workers also have individual responsibilities to look after their own health. Exposure to solar UV radiation will occur outside of work hours, and the intensity of and exposure time to solar UV radiation will vary considerably within and between the wide range of occupations covered by these guidance notes. It is therefore recommended that a consultative approach be taken in determining how far the responsibilities of the employer extends. It is not reasonable to suggest that particular actions, such as the provision of shade, protective clothing or sunscreen, or monitoring, be mandatory for all employers of outdoor workers. In some situations, the employer's obligations may not extend beyond hazard (exposure) assessment and the provision of information to employees.

The order that the various means for limiting exposure to solar UV radiation are set out in the guidelines — job organisation, shade and personal protection — reflects the hierarchy required by the HSE Act.

An example of an exposure assessment and the options that may be taken to minimise exposure are given in Appendix 1.

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## **Exposure Assessments**

For each group of employees, an assessment should be made of the solar UV radiation to which they are likely to be exposed. This should include identification of the tasks with the time of day they are carried out and the period involved. The greatest risk occurs during the summer daylight saving months, between 11 am and 4 pm.

Other factors that may influence exposure to UV radiation should also be identified. These may include the shade provided by the working environment; reflective surfaces such as water, snow or bright building surfaces; or any photosensitising substances associated with the work.

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## **Minimising Exposure**

Employers should ensure that the risk posed by exposure to solar radiation is minimised. In some instances, this may be achieved by taking actions such as simply changing the time of day when a task is carried out. This is the preferred option but where this is not practical, protection should be provided. The steps that may be taken to reduce the risk posed by solar radiation include working under cover when the sun is most intense, the use of shade and providing suitable personal protection.

## **Job organisation**

Where the job involves some work that does not have to be conducted outdoors, the potential for excessive solar exposure may be able to be reduced by working under cover when the sun is most intense, that is between 10 am and 3 pm (11 am and 4 pm during daylight saving). The risk of excessive solar exposure is negligible during winter months.

## **Shade**

Wherever possible, use should be made of natural shade, such as that provided by buildings and trees. If there is no natural shade available, then it may be feasible to erect temporary shade in the form of a canopy or screen. Glass is also effective in reducing the level of UV radiation. In driving long distances, UV exposure can be lessened by keeping the windows up in the car.

Shade will reduce the impact of the sun's direct UV radiation but it is still possible to get sunburn from reflected and scattered rays while in the shade. Additional personal protection may also be required.

## **Personal protection**

Personal protection is an important component in any plan to control exposure to solar radiation. An effective plan will usually involve protective clothing, hat and a sunscreen. Complete reliance should not be placed on any one form of protection. Sunscreen should be applied to all uncovered skin.

Care must be taken to ensure that the personal protection selected to reduce UV exposure does not create other dangers. Excessive clothing may lead to discomfort and heat stress; very loose clothing may be hazardous when worn near machinery; wide brimmed hats may restrict vision.

## **Clothing**

Clothing is reasonably effective in screening out IJV radiation. The factors to be considered in selecting appropriate clothing are:

- Tightness of weave or knit;
- Permeability of the material to assist the evaporation of sweat; and
- Design.

Tighter woven fabrics do provide the best protection from solar UV radiation but they are warmer, and a balance has to be reached between clothing that will screen out UV radiation and the need for clothing that keeps the person cool. Clothing made from impermeable materials, such as some disposable overalls with plastic coatings, does not allow sweat to evaporate and will increase discomfort and the risk of heat stress in some circumstances. Providing protection against chemical hazards may also be a consideration.

Loose-fitting clothes are more comfortable as they allow ventilation and do not restrict movement. A collar on clothing is preferred as it will offer some protection to the neck. Cotton fabrics are generally tightly woven and are comfortable and cool as they allow evaporation of sweat. Lighter coloured fabrics are cooler as they reflect more of the sun's radiation. Long-sleeved shirts and full-length trousers or skirts provide the best protection.

A reasonable compromise between coolness and UV protection is afforded by the use of loose-fitting, light-coloured cotton clothing.

## **Hats**

A dark-coloured, wide-brimmed hat will protect the scalp, ears and forehead, and partially protect the lower face. "Foreign-Legion" style caps, that have flaps to protect the neck and ears, are also effective. White wide-brimmed hats may in some circumstances increase the amount of sun exposure to the lower face by reflection. Allowance should be given to the fact that hats will not necessarily protect the wearer from reflected solar radiation.

Hats with brim sizes in the order of 7-12 cm are recommended. Hard hats and other protective hats could be fitted with broad brims and neck flaps during summer.

## **Sunscreen**

Sunscreens provide additional protection to skin not effectively covered by clothing. A broad spectrum sunscreen with a sun protection factor (SPF) of 15+ is recommended. The higher the SPF, the greater the protection against UV-B radiation — a factor of 15 gives 15 times the skin's natural protection.

In practical terms, this means that if a person applies a sunscreen with an SPF of 15, they can remain in the sun 15 times longer before burning than if they had not used protection. Broad-spectrum sunscreens block out both UV-B and UV-A radiation. UV-B rays are responsible for sunburn and are the main cause of skin cancer. UV-A rays cause drying and premature ageing of the skin and are thought to be involved in the development of skin cancer.

The following should be considered in selecting and using a sunscreen:

- Ensure that the sunscreen is broad spectrum and has an SPF rating of 15+.
- Where the job may involve working with water, use a water-resistant sunscreen.
- Check that it complies with either AS2604:1986 or NZ/AS2604:1993.
- Put on the sunscreen at least 15 minutes before going out in the sun and reapply as required by the manufacturer's instructions. More frequent application may be required if sweating is profuse.
- Put sunscreen on dry skin by "wiping" it on, not rubbing it into the skin.

- Ensure that sunscreen is applied to all exposed skin including the face, neck, arms and the back of the hands.

### **Lip protection**

Lips are particularly susceptible to damage from solar radiation, with lip cancers being relatively common among outdoor workers. Lips should be protected with sunscreen or lipstick with a SPF rating of 15+ which provides broad-spectrum protection.

### **Sunglasses**

Ultraviolet radiation also adversely affects the eyes. Eye protection from UV radiation is essential for eye health, and eye shade is important for safety reasons in many outdoor jobs. Sunglasses meeting appropriate standards for protection can provide both.

Sunglasses should meet AS1067:1990 and allow less than 5% UV-A transmission. Sunglasses should be worn by workers who work outdoors between 11 am and 4 pm.

Some safety glasses now also offer adequate sun protection.

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## **Training and Education**

Where an exposure assessment has identified a need for action to minimise workers' exposure to solar UV radiation, training should be provided. To be effective, this training should be ongoing and focused on those responsible for organising outdoor work, new employees and those who are receiving prolonged exposure to solar UV radiation.

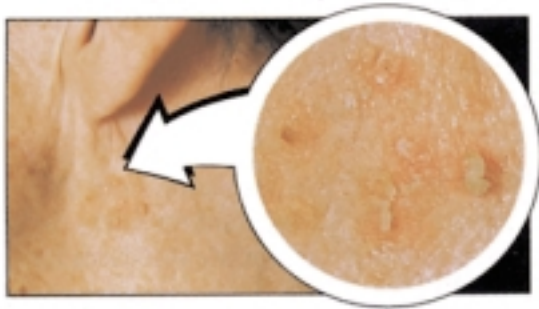
Specifically training should be designed to achieve:

- Awareness on the effects of excessive solar UV radiation;
  - Promotion of the means that may be used to control the risk posed by excessive solar UV radiation (identified in the exposure assessment); and
  - Awareness of the availability of information on the early detection of skin cancer by self-checking.
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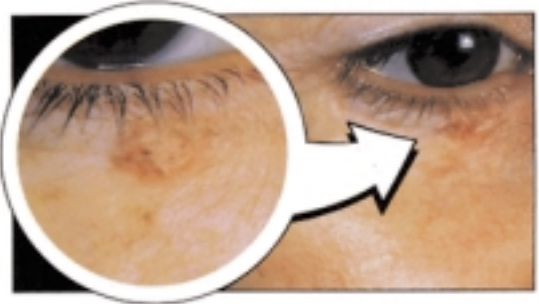
## **Early Detection of Skin Cancers**

Early detection of skin cancers is important in ensuring that effective action is taken to treat the condition. Self checking — examining your body for possible skin cancers — is recommended as a routine practice. All of the body should be checked as melanomas can occur anywhere.



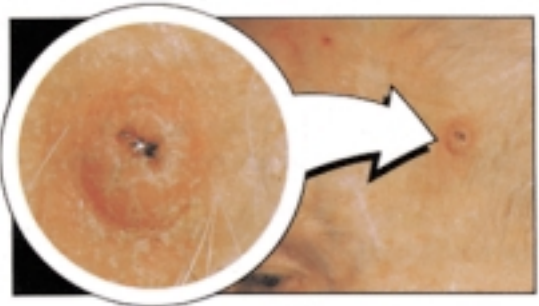
### **Solar Keratoses (Sunspots)**

These rough dry and firm spots are not skin cancers but they do show that your skin has had an overdose of UV radiation. Very occasionally sunspots turn into cancers.



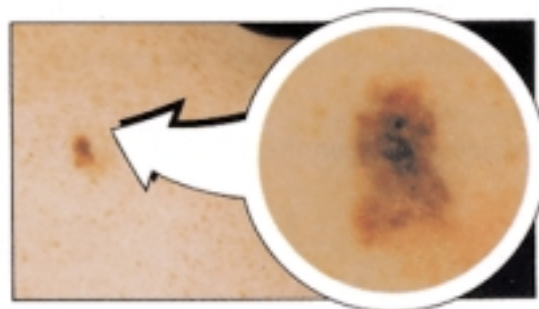
### **Basal Cell Carcinoma (BCC)**

This is the most common but least dangerous type of skin cancer usually found 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 sunlight, this cancer can occur on the lips, particularly the lower lip. SCCs appear as red scaly areas that may bleed easily and turn into ulcers, or can look like a sore that doesn't heal.



### **Melanoma**

Melanoma is the least common but most dangerous skin cancer. It can be fatal but nearly all melanomas are cured when treated early. A melanoma usually starts as a new freckle or mole on the skin that changes colour, thickness or shape over weeks or months. It may also develop from an existing mole or appear on parts of the body that have not been exposed to the sun. Melanomas can be black brown to black, red or blue-black or a combination of colours with an irregular outline or shape. Melanomas can spread to internal organs and cause death if not detected and removed promptly.

## **Photosensitising Substances**

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Some substances have the potential to increase the absorption of UV radiation. This may be as a result of taking medication orally, or skin contact with chemicals or plants. Coal tar pitch is an example of a substance that can dramatically increase the skin's response to solar radiation. Although a number of substances may cause photosensitisation, it is rare for individuals to be affected.

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## **Where to Find Further Information**

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Further information on skin cancer is available through the Cancer Society of New Zealand. This information includes the publications:

- *Freckles, Moles, Sores and Sunspots — Guidelines for the Management of Skin Cancer.*
- *The Prevention and Early Detection of Melanoma in New Zealand.*

The National Radiation Laboratory of the Ministry of Health can provide more technical information on the characteristics of solar UV radiation.

The addresses of organisations that may be contacted for more information are set out in appendix 2.

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# **Appendix 1: Exposure Assessment and Management**

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## **Example — Parks and reserves staff**

Forty permanent staff are employed in a parks department. Over the summer holiday period, up to ten casual staff are employed. During fine weather a considerable proportion of their time is spent outdoors: equipment maintenance and administration work in greenhouses is usually carried out on wet days. Hours of work are from 8.30 am to 5 pm, with lunch taken between 12 noon and 1 pm.

## **Options to minimise exposure**

- **Job organisation**

There is limited opportunity to reschedule tasks to enable work to be performed inside during fine weather or when the sun is most intense. The number of days with inclement weather provide for more than sufficient hours to carry out the indoor tasks.

- **Shade**

At many of the work sites, trees provide natural shade. At other sites there is no shade but it is possible to adjust the work programme to allow work in these open areas to be completed early in the day. Some tractor mowers are fitted with canopies.

- **Personal protection**

Outer garments in the way of trousers, pullover and boots are provided. On hot days it is common for staff to wear shorts and tee-shirts. There is a need to consider the use of clothing that offers better protection, broad-brimmed hats, sunglasses and sunscreens.

## **Approach adopted**

- Training on the means to minimise exposure to UV rays and the importance of early detection of skin cancers extended to all staff including casual workers taken on over the summer period.
  - Canopies fitted to the tractor mowers that previously had no cover.
  - Supervisors advised to consider availability of natural shade when scheduling jobs in the heat of the day.
  - Changes made to the clothing supplied — light-weight, long-sleeved shirt and trousers and hat.
  - Sunscreen made available to employees at their depot.
  - Measures that have been introduced recorded and reviewed regularly.
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