



Many people are aware of the need for protection from the sun between September and April, especially between 10 am and 4 pm. However, throughout the whole year, when you are at high altitude or in snow (eg. when skiing or tramping), sun protection is necessary as the risk of sunburn is increased.

Ultraviolet Radiation

Ultraviolet radiation (UVR) from the sun can cause skin damage and sunburn to exposed skin. UVR cannot be felt and does not provide heat, so your skin can burn even if you feel cool. Skin damage and sunburn increase the risk of developing skin cancer later in life.¹

Skin damage is caused by:

- UVA, which penetrates and damages the deeper layers of the skin, and
- UVB, which causes damage and sunburn to the top layer of skin.

How does altitude affect the UVR level?

UVR transmitted from the sun passes through the atmosphere where some of the UVR is absorbed. The higher you are from sea level, the higher the UVR levels, so the amount of UVR reaching a mountain will be higher than UVR at the beach. With every 1,000 metre increase in altitude, UVR levels increase by approximately 10 percent.²

How does snow affect the UVR level?

Snow is a very reflective surface. This means that a person surrounded by snow receives UVR from the sky, as well as UVR reflected off the snow. The reflections from fresh snow can almost double the amount of UVR you are exposed to.²

The peak UVR level at a New Zealand ski field (altitude 2,010 metres), has been found to be 20 to 30 percent higher than UVR at sea level, as measured on the same day.³

How does cloud affect the UVR level?

UVR can penetrate cloud cover. Light cloud makes little difference to the level of UVR and the risk of sunburn.² Even on a cloudy day, UVR is scattered around you. In very heavy cloud the sunburn risk is low.

How does UVR affect the eyes?

Eyes are sensitive to UVR which can affect the eyelids and the eye tissue, including the cornea, conjunctiva and lens.⁴ Short-term effects of UVR on the eyes are similar to sunburn² and can cause 'snow blindness'.⁵ Four to 10 hours after being in the sun your eyes may feel irritated, gritty and may water. In severe cases there may be pain and light sensitivity (photophobia). The symptoms may last up to 48 hours.

When around snow, protect your eyes by wearing sunglasses or goggles that comply with the sunglass safety standard AS/NZS 1067:2003.⁶ Most sunglasses will have information about how much UVR protection they give. Check with the retailer or pharmacist if you are unsure. Make sure your sunglasses are a close-fitting, wrap-around style.

Long-term exposure to UVR can cause permanent eye damage and increase the risk of cataracts^{2,4} and ocular melanoma.

Preventing skin cancer

When you are at high altitude or in snow it is essential to use sun protection. This is particularly important when there is a combination of both high altitude and snow, such as when skiing. A New Zealand study of 226 skiers and snowboarders found almost half had been sunburnt in the past while skiing or snowboarding.⁷

To avoid sunburn, use the following:

- Cover up with a balaclava or a hat that covers your head and ears.
- Wear protective clothing. If you get hot while skiing and remove some clothing, remember you still need to protect your skin and eyes from the sun.
- Protecting your face is especially important if you are going to be in the sun for a long time (eg. when skiing). The reflection from the snow means that skin areas not usually receiving a lot of UVR exposure, such as under the chin and nose, will be particularly at risk. Protect your face and any other exposed skin with sunscreen.
- Protect your lips with broad spectrum SPF30+ lip balm or zinc cream.
- As UVR levels are highest in the middle of the day, take a break indoors or in shade at this time, if possible.
- Wear sunglasses or goggles to protect your eyes from UVR.

Sunscreen

Use an SPF30+, broad spectrum, water-resistant sunscreen that complies with the sunscreen standard (AS/NZS 2604:1998).⁸

Apply sunscreen to exposed skin 15 minutes before sun exposure. Apply a thick, even coat of sunscreen to skin. Reapply every two hours, or more frequently if it is rubbed or washed off.

Use zinc on areas such as your nose. Especially protect under your nose and chin, ears and lips. These areas are extremely sensitive and frequently forgotten.

Children

Be particularly careful to protect children from sun exposure, sunburn and eye damage. Sunburn and excessive sun exposure, especially during childhood and adolescence, can lead to the development of melanoma and other types of skin cancer in later life.⁹

The Ultraviolet Index (UVI)

The UVI is an international, scientific measure of the level of UVR in the environment. The higher the UVI number, the greater the risk of skin damage.

The Cancer Society advises **sun protection between September and April (especially between 10am and 4pm)**, or when the UVI is 3 or higher.

Check out the Sun Protection Alert on the Met Service website: www.metservice.com or in the weather section of your daily newspaper. The Sun Protection Alert includes local real time advice.

Remember: You can get sunburnt on a cool, cloudy or cold day!

Do not use sunscreen as your only protection against the sun. Cover up whenever possible with a hat and protective clothing and use sunscreen on exposed skin.

References

- 1 Armstrong, B. K. (2004). How sun exposure causes skin cancer: An epidemiological perspective. In D. Hill, J. M. Elwood, & D. R. English (Eds.), *Prevention of skin cancer* (Vol. 3, pp. 89-116). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- 2 World Health Organization. (2010). *Ultraviolet radiation and the INTERSUN programme. Which environment factors affect a person's UV exposure?* <http://www.who.int/uv/faq/whatisuv/en/index3.html>
- 3 Allen, M., & McKenzie, R. (2005). Enhanced UV exposure on a ski-field compared with exposures at sea level. *Photochemistry Photobiology & Science*, 4(5), 429-437. doi: 10.1039/b418942f

- 4 Ellerton, J. A., Zuljan, I., Agazzi, G., & Boyd, J. J. (2009). Eye problems in mountain and remote areas: Prevention and onsite treatment—official recommendations of the International Commission for Mountain Emergency Medicine ICAR MEDCOM. *Wilderness & Environmental Medicine, 20*(2), 169-175. doi: 10.1580/08-weme-rev-205r1.1
- 5 World Health Organization. (2010). *Health effects of UV radiation. Eye*. http://www.who.int/uv/health/uv_health2/en/index2.html
- 6 Standards New Zealand. (2003). Australian/New Zealand Standard: AS/NZS 1067: 2003. *Sunglasses and fashion spectacles*. <http://www.standards.co.nz/web-shop>
- 7 Price, J., Ness, A., Leary, S., & Kennedy, C. (2006). Sun-safety behaviors of skiers and snowboarders in the South Island of New Zealand. *Journal of Cosmetic Dermatology, 5*(1), 39-47. doi: 10.1111/j.1473-2165.2006.00221.x
- 8 Standards New Zealand. (1998). Australian/New Zealand Standard: AS/NZS 2604:1998. *Sunscreen products - Evaluation and classification*. <http://www.standards.co.nz/web-shop>
- 9 Oliveria, S. A., Saraiya, M., Geller, A. C., Heneghan, M. K., & Jorgensen, C. (2006). Sun exposure and risk of melanoma. *Archives of Diseases in Childhood, 91*(2), 131-138. doi: adc.2005.086918 [pii]10.1136/adc.2005.086918