



Key Sun Safety Messages

Research Review



Executive Summary

The purpose of this project is to conduct an environmental scan of current sun safety messages and compile available supporting documentation and rationale. A scan of global literature and key sources revealed four central themes in which public information messages are framed: **sun avoidance, sun protection, sunscreen usage, and knowledge**. A systematic review of current evidence was then aligned to themes and messages.

Academic literature indicates an overall sun protection messaging strategy includes: avoiding time spent in the sun during peak UV hours, the avoidance of sunburn through the proper application and reapplication of sunscreen, and the covering up with clothes and a hat. Overall, public information messaging from international, national and provincial sources supported these findings.





Overview

Methodology

The purpose of this document is to: a) *conduct an environmental scan of current sun safety messages* and b) *compile available supporting documentation and rationale*. An open scan of global Internet sources using common search engines (i.e. Google, Yahoo) revealed commonalities among key sources. Selection criteria of “common messages” were based on frequent similarities and universal statements among English-speaking international, national and provincial websites. Search terms included: country, province/territory and cancer care, cancer board, melanoma, sun tips, and sun safety.

A scan of global sources revealed four central themes in which public information messages are framed:

- > **Sun avoidance** (i.e. avoid peak UV times, shade)
- > **Sun protection** (i.e. clothing and hats)
- > **Sunscreen usage** (i.e. application, SPF, broad-spectrum)
- > **Knowledge** (i.e. high risk individuals, skin type, UV Index)

Messages and themes were then used to guide specific evidence gathering, along with key term searches related to sun, UV, skin cancer, melanoma, etc. The systematic review of current evidence used PubMed and Medline as the primary search and retrieval system. Evaluation and summary findings are below, organized into Scientific Evidence, Provincial, National and International findings, and Conclusions and Gaps.

The scope of this document is limited to the relationship between solar UVR and skin. Therefore, the ocular effects of UVR (including the use of sunglasses) and indoor tanning were excluded.

Background

Sun exposure is the main environmental cause of skin cancer and ultraviolet radiation (UVR) is the solar wavelength involved in skin cancer.¹ The most significant preventable risk factor for developing skin cancer is exposure to the sun’s UV radiation.

Skin cancer is currently the most common form of cancer in Canada. It is estimated that 73,900 Canadians will be diagnosed with skin cancer in 2007.² There are three main forms of skin cancer: basal cell carcinoma (BCC), squamous cell carcinoma (SCC) – together referred to as non-melanoma skin cancer – and melanoma. It is estimated there will be approximately 53,000 cases of BCC and 16,000 cases of SCC diagnosed in Canada this year.² Though prevalent, non-melanoma skin cancer rarely metastasizes or causes death, and occurrence is found to be roughly a 2:1 male to female ratio. Melanoma, a less common but more serious form of skin cancer will be diagnosed in approximately 4,600 people this year and claim the lives of an estimated 900 people.² Melanoma rates are on the rise, with increases of about 2% annually for men and 1.1% for women between 1994 and 2003. Overall, skin cancer remains one of the most rapidly increasing cancers in Canada, for both incidence and mortality.

Both pattern (continuous vs. intermittent) and amount of sun exposure influence the development of skin cancers. Continuous patterns of sun exposure, as seen in outdoor occupations, appears to be related to SCC, whereas intermittent or intense (sunburns) exposure are implicated in the development of BCC and melanoma.³



Scientific Evidence

This section focuses on the most current literature available. The literature scan is framed by recent academic sources and scientific evidence pertaining to selected key messages and themes.

Sun Avoidance

- > When the sun's ultraviolet radiation is at its strongest, sun avoidance is an important method of protection. Environmental research shows 57% of the daily total solar ultraviolet radiation (UVR) occurs within two hours of solar noon. Also, 77% of the day's total UVR occurs approximately three hours on either side of solar noon, when UVB rays are at their strongest.⁴ Solar noon refers to a time when the sun has reached its highest point in the sky and is more appropriate to use than "clock noon" as it reflects changes in location and time of year within a time zone.
- > Though evidence has shown seeking shade is vital in an overall sun safety strategy, studies have found many shade structures and trees do not offer adequate UV protection.^{5,6} The amount of protection offered by a shade structure varies with the angle of the sun and the nature of the shade structure. A shadow cast may not always be directly beneath the shade structure.

Sun Protection

- > Research shows the relative density of each skin cancer, BCC, SCC and melanoma, is highest, or nearly so, on body sites commonly exposed to the sun. Conversely, skin cancers are found to be rare on sites seldom exposed to the sun.^{3,7} Effective sun protective behaviours include wearing protective clothing to cover all body parts exposed to the sun. Closely woven, dark clothing provides an effective physical barrier to UVR.^{8,9}

- > Many factors play a role in the amount of protection provided by fabrics. Two very important factors include weave (the more closely woven the fabric the less UVR is transmitted) and colour (dark colours of the same fabric type will absorb UVR more strongly than light pastel shades and will consequently have a higher ultraviolet protection factor or UPF).⁸ Clothing specifically designed for sun protection is labelled with an ultraviolet protection factor (UPF); a fabric with a high UPF will absorb most of the UV radiation and reduces the amount of UV radiation the skin is exposed to. It is recommended that clothing has a UPF rating of 50+ to provide excellent protection¹⁰, although many fabrics that have not been tested have excellent UPF values, e.g. denim.
- > Most white fabrics provide less protection than a sunscreen with SPF 15. The presence of dyes however, increased protection considerably. Dark clothing can provide an effective barrier to UVR but careful selection of closely woven fabrics is also important to achieve an SPF of at least 15.⁹
- > Compared to the vertex of the scalp, the forehead receives about 40% more exposure, the nose 50% more, and the back of the neck about 30% more. Hats with a wide brim are necessary in order to provide reasonable protection factors around the nose and cheeks.¹¹

Sunscreen

- > A scan of key academic literature reveals numerous studies on the benefits of sunscreen use. Application as a form of sun protective behaviour is shown to decrease skin cancer risk.^{12,13} Sunscreen acts as a physical and chemical barrier; physically sunscreen can block UVA and UVB radiation if it contains titanium dioxide or zinc oxide and chemically it can absorb UVA and UVB radiation.¹⁴



- > Recent evidence reveals that regular application of sunscreen has prolonged preventive effects on squamous cell carcinoma (SCC) and solar keratoses, but appears to provide no clear benefit in reducing basal cell carcinoma (BCC).^{15, 16} Sunscreen may also attenuate the development of nevi in children; this is important because up to 50% of cutaneous malignant melanoma (CMM) is thought to originate in pre-existing nevi¹⁷ and the number of nevi is an independent risk factor for the development of melanoma.¹⁸
- > Sunscreens showed increase protection against sunburns, with the best results coming from an SPF of 15 or greater.^{17, 19} Increased SPF offers better protection against sunburns and did not result in greater duration of sun exposure.²⁰ An SPF 15 sunscreen blocks 93% of UVB radiation and SPF 30 blocks 97% of UVB radiation. It is important to note that sunscreens with SPF 30 have been more effective at protecting against other endpoints apart from erythema, such as immunosuppression.
- > Sunscreen application 15 to 30 minutes prior to exposure followed by reapplication 15 to 30 minutes after sun exposure begins is postulated to be the most effective method of application, attempting to account for poor application by humans.²¹ Proper reapplication provides a two- to three-fold increase in protection from sunburn.^{22, 23}
- > Intermittent exposure at all ages to high levels of sunlight and, in particular, a severe burn during childhood or adolescence is found to be a strong determinant of skin cancer risk,³ including melanoma.²⁹ However, cumulative exposure is found to be more predictive of squamous cell cancer.³⁰
- > The UV Index measures the intensity of UVB radiation and is affected by the angle of the sun throughout the day. The UV Index varies with seasons, cloud cover, pollution and ozone layer. It is important to note that UVA radiation is closer to the general solar curve throughout the day, gradually increasing and decreasing whereas UVB radiation peaks during midday.^{31, 32} Implications for sun safety messaging include avoiding peak UVR hours, messaging around duration and intensity of UV, and stressing the usage of broad-spectrum sunscreens and appropriate clothing and shade.

For more detailed information, see Appendix A – Scientific Evidence.

Knowledge

- > All three types of skin cancer are more common among persons with light skin pigmentation, persons who burn easily and those who tan poorly.²⁴ Additionally, there is a higher risk for squamous cell cancer and melanoma among persons with organ transplants on immunosuppressant drugs.²⁵
- > There is an increased risk of developing subsequent skin cancer among those persons with a past history of skin cancer.²⁶ People who have a history of skin cancer must reduce sun exposure, which may enable them to avoid further skin cancer.²⁷
- > Childhood and adolescence are identified as key periods in the etiology of melanoma.^{28, 29}



Key Messages

Below are the common, key messages used to evaluate provincial, national and international sources:

- | | |
|-----------------------|--|
| Sun Avoidance | <ul style="list-style-type: none">> Seek shade or create your own.> Sun protection behaviours are important 11 a.m. – 4 p.m., April through September. |
| Sun Protection | <ul style="list-style-type: none">> Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.> Wear a hat with a wide brim to shade your face and neck. |
| Sunscreen | <ul style="list-style-type: none">> Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.> Wear a broad spectrum (UVA & UVB) sunscreen.> Apply sunscreen 15 – 30 minutes before going out, reapply every two hours. |
| Knowledge | <ul style="list-style-type: none">> A burn as a child increases the risk of skin cancer.> The amount of UV you receive depends on both the strength of the sun's radiation (measured by the UV Index) and the amount of time you spend in the sun. |



Provincial Messages

Looking at key provincial skin cancer agencies revealed several key, universal sun safety messages. Provincial agencies that provided no information or redirected viewers to either the CCS or CDA were: Saskatchewan, Newfoundland, Prince Edward Island and Nunavut.

- > Most provinces aligned with the Canadian Cancer Society and/or Canadian Dermatology Association for messaging content.
- > Saskatchewan, Newfoundland and Nunavut cancer and health agencies do not have any easily accessible sun safety messaging, nor do they redirect viewers to a site providing sun safety tips. Other provinces make sun safety messaging difficult to access.
- > Sun protection through the use of clothing that covers the arms, trunk and legs is advised (BC Cancer Agency, Cancer Care Ontario), as are wide-brimmed hats (Alberta Cancer Board, Cancer Care Nova Scotia).
- > Avoiding exposure to the sun between 11 a.m. – 4 p.m. is also common. No source however adjusted messaging to account for daylight saving time or latitude.
- > Most agencies recommend seeking shade and creating your own if none is available. However, only a few agencies provide information on how to create your own shade such as carrying an umbrella or staying under trees (Alberta Cancer Board, Prince Edward Island Government, B.C. and Yukon Cancer Care).
- > As with international and national key informants, provincial agencies consistently promote the use of a broad spectrum, SPF 15+ sunscreen. The promotion of an SPF 30 or greater however appeared infrequently. Only Manitoba and PEI specifically state that a sunscreen with SPF 30 should be worn if working outside or if a person is going to be spending the day outside.
- > Generous application of sunscreen 20 to 30 minutes before exposure is also recommended (Alberta Cancer Board, Foundation Quebecoise de Cancer).
- > Only three agencies address high risk individuals through messaging aimed at children and adolescents (BC Cancer Agency, NWT and Foundation Quebecoise de Cancer). Full UV protection when the UV index is six or higher is strongly recommended for all ages.

For more detailed information, see Appendix B – Provincial Messages.



National Messages

The Canadian Cancer Society, Canadian Dermatology Association, Health Canada and Environment Canada provide numerous sun safety messages.

- > Covering sun exposed skin through tightly woven, loose fitting clothing is recommended (Canadian Cancer Society, Canadian Dermatology Association). Given that two of the three most common skin cancers form on the face and neck, broad-rimmed hats that protect these areas are also highly recommended (Canadian Dermatology Association).
- > Avoiding the peak UVR hours of 11 a.m. – 4 p.m. is consistent across national sources. Canada's latitude is acknowledged in that avoidance messaging is stressed for the months of April to September (Environment Canada).
- > The Canadian Cancer Society recommends creating shade if there is none available and Health Canada recommends selecting shaded areas for outdoor activities.
- > Consistent information regarding sunscreen includes the use of SPF 15 (or higher), broad-spectrum protection. An SPF of 30+ is recommended for individuals who plan on spending significant time outdoors (Canadian Cancer Society).
- > The application of sunscreen 15 to 30 minutes before sun exposure, reapplication every two hours thereafter, and reapplication after vigorous activity that could remove the product are stressed (Health Canada). Similar to international messaging, Canadian sources stress sunscreen use should be in addition to other sun safe behaviours, not in isolation (Health Canada, Canadian Dermatology Association).
- > Though the Canadian Dermatology Association urges UV protection around snowy surfaces and other sources, a gap in prominent winter sun messaging is evident. Research has shown sun safety behaviours during winter months are important in reducing UV risks in certain situations.
- > Messaging aimed at high risk individuals is also common among national sources. Precautions aimed at babies, children and adolescents emphasize protection behaviours and avoidance of sunburn, which reduces their risk of developing skin cancer as adults (Health Canada, Environment Canada, and Canadian Dermatology Association). Messages aimed at organ transplant recipients have been put forward by the Canadian Dermatology Association. The Canadian Dermatology Association targeted outdoor workers last year, and published a new, revised guide to sun protection for this group.

For more detailed information, see Appendix C – National Messages.



International Messages

Global sun safety messages from the American Cancer Society, American Academy of Dermatology, National Cancer Institute (USA), Center for Disease Control and Prevention, Cancer Research UK, the Cancer Council Victoria (Australia), and Cancer Society of New Zealand were examined.

- > Sun avoidance appears to be of great importance in international messaging. The aversion of outdoor activities between 10 a.m. – 4 p.m. is relatively consistent across international sources. This is different than the 11 a.m. start time recommended in Canada. Caution is also recommended near reflective surfaces such as water, snow, sand and ice (American Academy of Dermatology; National Cancer Institute).
- > Cautions for fair-skinned people and those who sunburn easily were found (American Cancer Society, Cancer Society of New Zealand). Avoiding excessive sun exposure and, in particular, sunburns are key messages put forth by several sources.
- > Seek shade or create your own are consistent international messages. It is stressed that the most important time to seek shade or create your own is between 10 a.m. – 4 p.m. (American Academy of Dermatology, Cancer Research UK, Centre for Disease Control and Prevention, Cancer Society of New Zealand).
- > Wearing protective clothing and hats are consistent key messages. Specifically, dark coloured, tightly woven long sleeved shirts, long skirts and long pants are recommended (American Cancer Society, Cancer Research UK). The Cancer Council of Victoria also recommends specially designed clothing with at least 50+ ultraviolet protection factor (UPF) be worn.
- > Hats, with a wide (two to three inches) brim to cover the ears and neck, are commonly suggested (National Cancer Institute; American Cancer Society, and Cancer Society of New Zealand).
- > International messages consistently recommend individuals generously apply a broad-spectrum sunscreen with an SPF of at least 15 (The Cancer Council Victoria recommends SPF 30+), with a higher SPF for longer periods of outdoor activity.
- > Several key informants also include messaging that sunscreen is not to be used on its own, but rather in conjunction with other sun protection methods (The Cancer Council Victoria). Proper application of sunscreen, even on cloudy days, and reapplication of sunscreen after physical activity is stressed (American Academy of Dermatology).

For more detailed information, see Appendix D – International Messages.



Conclusions

- > It is important to note that the majority of international, national and provincial sun safety messages are supported by scientific documentation. The rationale of these messages is sound, with commonalities occurring frequently across resources.
- > Most provinces aligned with the Canadian Cancer Society and/or the Canadian Dermatology Association for messaging content. Not much translation or adaptation was observed between provincial and national sources.
- > Many questions remain about the relationship between sun exposure and skin cancer. Though limited research has found evidence linking infrequent, intense exposure (sunburns) to an increased risk of skin cancer, many sources are hesitant to draw firm conclusions.
- > Several key informants highlighted sunscreens' inability to absorb all of the sun's UV radiation. Sunscreen must be used along with shade, clothing and hats, not in isolation.
- > The development of appropriate messaging to take reasonable precautions to protect against skin cancer is important to appeal to individual sensibilities. This would be so that recommendations do not become too rigid and then individuals consequently may tune out and may not comply with even the most basic messages.
- > There are very few key informants that specifically tailor messages to children and adolescents. Several organizations have developed "kid-friendly" visuals (slogans and mascots), but the majority of messaging is still geared towards parents/adults. Research reveals this age group to be a high risk group, to which more focused sun safety messages should be targeted.

Gaps

- > Increased messaging, guidelines and policy are needed to improve shade provision, especially around child care centers and schools. The protective function of shade structures needs to be stressed and is more important than their aesthetic appeal. Although policies exist in some municipalities in Canada for sun protection for children attending day centers and schools, widespread regulation should be encouraged.
- > A greater emphasis on dark, tightly woven clothing is needed in messaging. However, though fabric weave and clothing colour play a very important role in an overall sun protection strategy, it is also prudent to have realistic messages and advocating for dark clothing in the summer does not seem to be practical.
- > Although most messages advise individuals to wear wide brim hats in place of a baseball cap, greater detail is needed encouraging an all-around, wide brim or an alternative hat that will protect the ears and neck.
- > Evidence reveals over three-quarters of the day's total UVR occurs approximately three hours on either side of solar noon – a better measure reflecting changes in location and time of year within a time zone. Consistencies need to be determined, as well as messaging surrounding varying intensity durations of UVA and UVB radiation throughout the day.
- > With some provinces having none or very little access via the Internet to sun messaging, increasing awareness and availability is needed at the provincial level.
- > Most messaging emphasized the use of at least an SPF 15 sunscreen. There needs to be a greater focus on higher SPF sunscreen (30+) and more of a focus on the UV Index and its potential capability to guide behaviours.



- > Generally, an SPF 15 sunscreen filters out 95% of UVB radiation, SPF 30 filters out 96% and a SPF 50 sunscreen filters out 97% of UVB radiation. Conclusions need to be established around the benefits of minimal increases in UVB radiation blocked as SPF levels increase. However, sunscreens with SPF 30 have been more effective at protecting against other endpoints apart from erythema, such as immunosuppression. SPF only tells us about one endpoint, erythema (sunburn). At present, the only way to determine if a sunscreen provides adequate UVA protection is to read the label for the names of particular sunscreen ingredients or to look for the words "broad spectrum".
- > Sunscreens are reported to be the most frequently used sun safety method worldwide, but they cannot substitute for physical protection. Additionally, a large proportion of people do not apply them correctly. Public campaigns, together with changes in fashion, including the value of a tan, and the right role models can still offer a lot in persuading people to change their habits towards a more sun-protected life.
- > Other gaps in messaging identified: tanning equipment; winter vacations to sunny places; winter sun safety/seasonal variations in messaging; targeted messaging aimed at children and youth; policies around schools, workplaces, and daycare settings.

Future Targets

- > Sunscreen use has been shown to decrease the incidence of actinic keratoses (pre-cancerous lesions) and squamous cell carcinoma. The role of sunscreens in the prevention of BCC and melanoma has not been established, although sunscreens have been shown to prevent the onset of nevi in children, with number of nevi being a risk factor for melanoma development. More research is needed in this area in order to develop prominent key messages.
- > The relationship between sun exposure and melanoma is well known but has not been entirely defined. Sun exposure in childhood and adolescence may be of particular importance.
- > Additional information is needed (literature, evidence, messaging scans, etc.) that capture emerging issues such as: indoor tanning, outdoor workers, West Nile Virus/use of DEET, sunscreen – UVA ratings, and vitamin D. The Canadian Dermatology Association has produced a statement about the risks of sun exposure and vitamin D, suggesting oral supplements of vitamin D in place of increased time in the sun.
- > Key sources might include:
 - o Gallagher, R. P., J. J. Spinelli, and T. K. Lee. 2005. "Tanning Beds, Sunlamps, and Risk of Cutaneous Malignant Melanoma." *Cancer Epidemiology Biomarkers Prevention* 14:562-566.
 - o Sinclair, C. 2007. "Vitamin D – an emerging issue in skin cancer control. Implications for public health practice based on the Australian experience." *Recent Results Cancer Res* 174:197-204.
 - o Sinclair, Craig. 2006. "Risks and benefits of sun exposure: Implications for public health practice based on the Australian experience." *Progress in Biophysics and Molecular Biology* 92:173-178.
 - o The International Agency for Research on Cancer Working Group on artificial ultraviolet light and skin, cancer. 2007. "The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: A systematic review." *International Journal of Cancer* 120:1116-1122.



Sources

- 1 IARC. Solar and ultraviolet radiation. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. 1992;55.
- 2 Canadian Cancer Society/National Cancer Institute of Canada. Canadian Cancer Statistics 2007. Toronto, Canada 2007.
- 3 Armstrong BK. How Sun Exposure Causes Skin Cancer: An Epidemiological Perspective. In: Hill D, Elwood M, English D, eds. Prevention of Skin Cancer. Dordrecht, Netherlands: Kluwer Academic Publishers 2004:89-116.
- 4 Gies P, Roy C, Udelhofen P. Solar and ultraviolet radiation. In: Hill D, Elwood J, English D, eds. Prevention of Skin Cancer. Dordrecht, Netherlands: Kluwer Academic Publishers 2004:21-54.
- 5 Parsons PG, Neale R, Wolski P, Green A. The shady side of solar protection. Med J Aust. 1998;168(7):327-30.
- 6 Turnbull DJ, Parisi AV. Effective shade structures. Med J Aust. 2006;184(1):13-5.
- 7 Armstrong BK, Kricger A, English DR. Sun exposure and skin cancer. Australas J Dermatol. 1997;38(1):S1-6.
- 8 Gies PH, Roy CR, Toomey S, McLennan A. Protection against solar ultraviolet radiation. Mutat Res. 1998;422(1):15-22.
- 9 Davis S, Capjack L, Kerr N, Fedosejevs R. Clothing as protection from ultraviolet radiation: which fabric is most effective? Int J Dermatol. 1997;36(5):374-9.
- 10 The Skin Cancer Foundation. Sun-Protective Clothing: Get in on the Trend 2007 [cited 2007 November 7]; Available from: <http://www.skincancer.org/sun-protective-clothing/sun-protective-clothing-get-in-on-the-trend.html>
- 11 Diffey BL, Cheeseman J. Sun protection with hats. Br J of Dermatol. 1992;127(1):10-2.
- 12 Green A, Williams G, Neale R, Hart V, Leslie D, Parsons P, et al. Daily sunscreen application and betacarotene supplementation in prevention of basal-cell and squamous-cell carcinomas of the skin: a randomised controlled trial. Lancet. 1999;354(9180):723-29.
- 13 Thompson SC, Jolley D, Marks R. Reduction of solar keratoses by regular sunscreen use. New Engl J Med. 1993;329:1147-51.
- 14 Holmes C, Foley P, Freeman M, Chong AH. Solar keratosis: Epidemiology, pathogenesis, presentation and treatment. Australasian J of Dermatol. 2007;48(2):67-76.
- 15 van der Pols JC, Williams GM, Pandeya N, Logan V, Green AC. Prolonged Prevention of Squamous Cell Carcinoma of the Skin by Regular Sunscreen Use. Cancer Epidemiol Biomarkers Prev. 2006 December 1, 2006;15(12):2546-8.
- 16 Naylor MF, Boyd A, Smith DW, Cameron GS, Hubbard D, Neldner KH. High sun protection factor sunscreens in the suppression of actinic neoplasia. Arch of Dermatol. 1995;131(2):170-5.
- 17 Gallagher RP, Rivers JK, Lee TK, Bajdik CD, McLean DI, Coldman AJ. Broad-Spectrum Sunscreen Use and the Development of New Nevi in White Children A Randomized Controlled Trial. Am Med Assoc. 2000;283:2955-60.
- 18 Gandini S, Sera F, Cattaruzza MS, Pasquini P, Picconi O, Boyle P, et al. Meta-analysis of risk factors for cutaneous melanoma: II. Sun exposure. European Journal of Cancer. 2005;41(1):45-60.
- 19 Bakos L, Wagner M, Bakos RM, Leite CSM, Sperhacke CL, Dzekaniak KS, et al. Sunburn, sunscreens, and phenotypes: some risk factors for cutaneous melanoma in southern Brazil. Int J Dermatol. 2002;41(9):557-62.
- 20 Dupuy A, Dunant A, Grob J-J. Randomized Controlled Trial Testing the Impact of High-Protection Sunscreens on Sun-Exposure Behavior. Arch Dermatol. 2005 August 1, 2005;141(8):950-6.
- 21 Diffey BL. When should sunscreen be reapplied? J Am Acad Dermatol. 2001;45(6):882-5.
- 22 Odio MR, Veres DA, Goodman JJ, Irwin C, Robinson LR, Martinez J, et al. Comparative efficacy of sunscreen reapplication regimens in children exposed to ambient sunlight. Photodermatol Photoimmunol Photomed. 1994;10(3):118-25.
- 23 Pruijm B, Green A. Photobiological aspects of sunscreen re-application. Australasian J Dermatol. 1999;40(1):14-8.
- 24 Elwood JM. Who gets skin cancer: individual risk factors. In: Hill D, Elwood M, English DR, eds. Prevention of skin cancer. Dordrecht: Kluwer 2004:3-20.
- 25 Lindelöf B, Sigurgeirsson B, Gäbel H, Stern RS. Incidence of skin cancer in 5356 patients following organ transplantation. Br J of Dermatol. 2000;143(3):513-9.
- 26 Marcil I, Stern RS. Risk of Developing a Subsequent Nonmelanoma Skin Cancer in Patients With a History of Nonmelanoma Skin Cancer: A Critical Review of the Literature and Meta-analysis. Arch Dermatol. 2000;136(12):1524.
- 27 Kricger A, Armstrong BK, Goumas C, Litchfield M, Begg CB, Hummer AJ, et al. Ambient UV, personal sun exposure and risk of multiple primary melanomas. Cancer Causes and Control. 2007;18(3):295-304.
- 28 Whiteman DC, Whiteman CA, Green AC. Childhood sun exposure as a risk factor for melanoma: a systematic review of epidemiologic studies. Cancer Causes Control. 2001;12(1):69-82.
- 29 Elwood M, Jopson J. Melanoma and sun exposure: an overview of published studies. J. Cancer. 1997;73:198-203.
- 30 Neale RE, Davis M, Pandeya N, Whiteman DC, Green AC. Basal cell carcinoma on the trunk is associated with excessive sun exposure. J Amer Acad Dermatol. 2007;56(3):380-6.
- 31 Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease 1 2 3 4. Am Soc Nutrition. 2004;80 (6):1678S-88S.
- 32 Grant WB, Holick MF. Benefits and requirements of vitamin D for optimal health: a review. Altern Med Rev. 2005;10(2):94-111.



Appendix A – Scientific Evidence

Public Information Messages

Rationale And Documentation

Sun Avoidance

Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest.

One hour either side of solar noon (1pm DST; 12 – 2 p.m.) contains 30% of the daily total UVR, 11 a.m. – 3 p.m. = 57%, 10 a.m. – 4 p.m. = 77%, 9 a.m. – 5 p.m. = 90%. These percentages vary for different latitudes and locations, as well as different times of year. (*Gies et al., 2004*)

UVA rays are of more constant intensity throughout the day, whereas UVB rays peak during midday. (*Holick, 2004; Grant and Holick, 2005*)

Sun Protection

Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.

The highest or near highest densities of each kind of cancer are on body sites that are usually exposed to the sun when outdoors. All skin cancers are rare on sites that are rarely exposed to the sun. (*Armstrong, 2004; Armstrong et al., 1997*)

Many factors which play a role in the amount of protection provided by fabrics. In approximate order of importance, these factors are as follows: Weave (the more closely woven the fabric the less UVR is transmitted), Colour (dark colours of the same fabric type will absorb UVR more strongly than light pastel shades and will consequently have higher UPFs), Weight, Stretch, Water, Washing, and UVR absorbing additives. (*Gies et al., 1998*)

Of 28 white fabrics tested, 19 offered less protection than a sunscreen with SPF 15. Polyester fabrics offered increased protection over cotton. The presence of dyes increased protection considerably. This study indicates that clothing can provide an effective barrier to UVR but careful selection of fabrics is important to achieve an SPF of at least 15. Fabrics which are closely woven have a higher SPF than those that are loosely woven. (*Davis et al., 1997*)

Wear a hat with a wide brim to shade your face and neck.

Compared to the vertex of the scalp, the forehead receives about 40% more exposure, the nose more than 50%, and the back of the neck about 30% more. Hats with a wide (>7.5 cm) brim are necessary in order to provide reasonable protection factors (>3) around the nose and cheeks. (*Diffey and Cheeseman, 1992*)

Sunscreen

Wear a minimum SPF 15 or 30 if you will be outdoors for an extended period of time.

Regular application of sunscreen has prolonged preventive effects on SCC, but with no clear benefit in reducing BCC. (*van der Pols et al., 2006; Green et al., 1999*)

Wear a broad-spectrum (UVA & UVB) sunscreen.

Regular use of sunscreens prevents the development of solar keratoses and, by implication, possibly reduces the risk of skin cancer in the long term. (*Thompson et al., 1993; Naylor et al., 1995*)

The use of a broad-spectrum, high-sun protection factor (SPF) sunscreen may attenuate development of nevi in white children, especially if they have freckles. This is important, as up to 50% of CMM are thought to originate in pre-existing nevi. (*Gallagher et al., 2000*)

Application of a broad-spectrum sunscreen has been observed to reduce the incidence and promote the regression of solar keratoses, reduce the incidence of SCC, and reduce the incidence of precursor lesions to melanoma. (*Armstrong, 2004*)

**Public Information Messages****Rationale And Documentation****Sunscreen** *(continued)*

Apply sunscreen 20 minutes before going out, reapply every two hours.

Compared to the first application, the second sunscreen application afforded 3.1 times more protection against minimal UVR-induced erythema. The combined effect of two sunscreen applications gave on average 2.3 times better protection from UVR than a single sunscreen application. Health authorities worldwide have recommended sunscreen reapplication for the prevention of sunburn for some time. This is the first quantitative study to substantiate such recommendations. (*Pruim and Green, 1999*)

Knowledge

Some people are more prone to sun damage.

All three types of skin cancer are more common in light skinned and lightly pigmented individuals, and those who burn easily and tan poorly on sun exposure. (*Elwood, 2004*)

People who have had a melanoma can expect to reduce their risk of a further melanoma by reducing recreational sun exposure whatever their age. The same is probably true for a person who has never had a melanoma. (*Kricker et al., 2007*)

A burn as a child increases the risk of skin cancer.

Childhood and adolescence have been identified as key periods in the etiology of melanoma in adulthood.

Exposure to high levels of sunlight in childhood is a strong determinant of melanoma risk, but sun exposure in adulthood also plays a role. (*Whiteman et al., 2001*)

Adolescent target cells are immature (*Hurwitz, 1988*) and the skin is thinner and more sensitive (*Aquilina et al., 2004*).

A history of sunburn to the skin increases risks of SCC, BCC and melanoma. (*Armstrong, 2004; Elwood and Jopson, 1997; Gandini et al., 2005*)

BCC and melanoma are most strongly associated with intermittent (non-occupational) sun exposure and sunburn, while SCC is most strongly associated with lifetime (total) and occupational sun exposure. (*Armstrong, 2004; Zanetti et al., 2006; Mackie, 2006*)



Appendix B – Provincial Messages

Public Information Messages	Key Informants BC Cancer Agency	Alberta Cancer Board	Saskatchewan Cancer Agency	Cancer Care Manitoba
	http://www.bccancer.bc.ca/PPI/TypesofCancer/SkinNonMelanoma/default.htm	http://www.cancerboard.ab.ca/PS/Prevention/	http://www.saskcancer.ca/	http://www.cancercare.mb.ca:443/Communications/pdfs/melanoma_awareness_FS_052803.pdf
Sun Avoidance				
Seek shade or create your own.		If outside, trees and umbrellas make great shade stops.		Seek shade or create your own.
Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest.	Reduce exposure to the sun between 11 a.m. and 4 p.m.	UV rays from the sun are most powerful between 11 a.m. and 4 p.m. so plan your outdoor activities around this window of time.		Reduce sun exposure between 11 a.m. and 4 p.m. when the sun's rays are at their strongest.
Sun protection behaviours are important 11a.m. – 4 p.m., April through September.		UV radiation also is the greatest from April to September.		
Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.	SLIP on clothing to cover your arms and legs/trunk	Wear a wide-brimmed hat that covers your face and neck, but does not reduce your visibility. Wear polarized sunglasses that reduce glare from water reflection.		SLIP on clothing to cover your arms and legs/trunk. Cover your skin with loose fitting, tightly woven and lightweight clothing.
Wear a hat with a wide brim to shade your face and neck.	SLAP on a wide brimmed hat (brim of hat should be three inches or 7.5 cm)			SLAP on a wide brimmed hat and sunglasses.
Sun Protection				
Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.	SLIP on clothing to cover your arms and legs/trunk	Wear a wide-brimmed hat that covers your face and neck, but does not reduce your visibility. Wear polarized sunglasses that reduce glare from water reflection.		SLIP on clothing to cover your arms and legs/trunk. Cover your skin with loose fitting, tightly woven and lightweight clothing.
Wear a hat with a wide brim to shade your face and neck.	SLAP on a wide brimmed hat (brim of hat should be three inches or 7.5 cm)			SLAP on a wide brimmed hat and sunglasses.
Sunscreen				
Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.	SLOP on broad spectrum sunscreen with SPF 15 or higher	Apply a broad-spectrum sunscreen with an SPF 15 or higher on all exposed skin.		SLOP! on a sunscreen with SPF (Sun Protection Factor) #15 or higher – SPF 30 if you work outdoors or if you will be outside for most of the day.
Wear a broad spectrum (UVA & UVB) sunscreen.	Use a "broad spectrum" sunscreen to absorb both UVB and UVA rays			Use a "broad spectrum" sunscreen to absorb both UVB and UVA rays
Apply sunscreen 20 minutes before going out, reapply every two hours.		Apply sunscreen on all exposed skin 20 minutes before you go outside. And remember to reapply it at least once every two hours.		Apply sunscreen 20 minutes before going out, reapply every two hours



Public Information Messages

Key Informants
BC Cancer Agency

Alberta Cancer Board

Saskatchewan Cancer Agency

Cancer Care Manitoba

Knowledge

A burn as a child increases the risk of skin cancer.

Sunburn occurring in childhood, adolescence, and post-adolescence contributes to a higher risk for basal cell cancer and melanoma.

The amount of UV you receive depends on both the strength of the sun's rays (measured by the UV Index) and the amount of time you spend in the sun.

There is direct evidence available at present that sunscreens help to prevent squamous cell carcinoma skin cancer. There is insufficient evidence so far, indicating that sunscreens actually prevent basal cell or melanoma skin cancers.

Over 90% of UV can penetrate light cloud. 60% of UV is received between 10 a.m. and 2 p.m. daily

UV increases by 10% – 12% for each 1,000 meter increase in altitude

At half a meter depth in water, UV is still 40% as intense as at the surface

Fresh snow can reflect as much as 80% of UV; dry beach sand 15%



Public Information Messages

**Key Informants
Cancer Care Ontario**

**Foundation
Québécoise de Cancer**
(Translated into English)

**Newfoundland
Cancer Treatment and
Research Foundation**

PEI

http://www.cancercare.on.ca/index_cancerFactsmelanomaSkinCancer.htm

<http://www.fqc.qc.ca/prevent2.asp?prev=4>

<http://www.nctrf.nf.ca/>

<http://www.wcb.pe.ca/index.php3?number=1015566>

Sun Avoidance

Seek shade or create your own.

Seek shade when you are outside – or create your own

Seek shade or create your own shade at the worksite. Consider an umbrella for shade when shade is not available

Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest.

Avoid the summer sun when it's highest in the sky – between 11 a.m. and 4 p.m.

To avoid the exposures to the hottest hours of the day between 11 hours and 16 hours of the day

Reduce sun exposure between 11 a.m. and 4 p.m. or any time of the day when the UV Index is 3 or more.

Sun protection behaviours are important 11 a.m. – 4 p.m., April through September.

Sun Protection

Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.

Wear clothing that covers your arms, back and legs

Equip your children with clothing whose fibers are woven tight and cap them of a hat with broad edge which will protect the face, the ears and the neck.

Wear lightweight, tightly woven and loose fitting clothing to cover your arms and legs.

Wear a hat with a wide brim to shade your face and neck.

Wear a wide-brimmed hat that shades the back of your neck, your ears and your face.

Wear a wide-brimmed hat that covers your head, face, ears and neck. Hats without a wide-brim, like baseball caps, do not give you enough protection.

Sunscreen

Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.

Liberally apply broad-spectrum sunscreen with an SPF of at least 15 to exposed skin.

Apply sun lotions to strong index of protection. Apply to your children a solar shield with broad spectrum, whose factor of solar protection (FPS) is 15 or more. The solar shield must be applied 30 minutes before the exposure to the sun. Repeat the application every hour and after each bath.

Use a sunscreen with SPF (Sun Protection Factor) 30 when you will be outside for most of the day.

Wear a broad spectrum (UVA & UVB) sunscreen.

Apply sunscreen 20 minutes before going out, reapply every two hours.

Apply sunscreen generously 20 minutes before outdoor activities. Reapply every two hours.



Public Information Messages

Key Informants
Cancer Care Ontario

Foundation
Québécoise de Cancer
(Translated into English)

Newfoundland
Cancer Treatment and
Research Foundation

PEI

Knowledge

A burn as a child increases the risk of skin cancer.

The frequent exposure to the sun during childhood can contribute to the appearance of cancer of the skin at adulthood

The amount of UV you receive depends on both the strength of the sun's rays (measured by the UV Index) and the amount of time you spend in the sun.

Remember, when the UV Index is six or seven (high), full protection is required. If it is eight or more (very high), extra precautions are required

While the effectiveness of early detection efforts has not been demonstrated and is therefore not recommended for the general population, it may be prudent for physicians to conduct periodic skin examinations of high risk individuals.



Public Information Messages

**Key Informants
New Brunswick
Cancer Network**

**Cancer Care
Nova Scotia**

Yukon

**Northwest
Territories**

Nunavut

<http://www.gnb.ca/0051/cancer/index-e.asp>

<http://www.cancercare.ns.ca/inside.asp?cmPageID=335>

<http://www.hlthss.gov.nt.ca/>

<http://www.gov.nu.ca/>

<http://www.yhssa.org/resources/pdfs/Sun%20Safety.pdf>

Sun Avoidance

Seek shade or create your own.

Select shaded areas for outdoor activities.

Use an umbrella to shade yourself.

Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest.

Avoid overexposing yourself to the sun, especially between 11 a.m. and 4 p.m. during the summer months

The sun's rays are the strongest between 11 a.m. and 4 p.m. If you can, plan your outdoor activities before or after this time.

Minimize sun exposure: Stay out of the sun, especially between the hours of 10 a.m. to 2 p.m. when the sun's rays are most intense.

Sun protection behaviours are important 11 a.m. – 4 p.m., April through September.

Avoid overexposing yourself to the sun, especially between 11 a.m. and 4 p.m. during the summer months

Sun Protection

Wear a hat with a wide brim to shade your face and neck.

Wear a broad-brimmed hat.

Slap! On a wide brimmed hat.

Most cancers occur on the face and neck, so this area needs extra protection. Wear a hat with a wide brim that covers your head, face, ears and neck. Hats without a wide brim, like baseball caps, do not give you enough protection.

Sunscreen

Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.

If you can't cover up, use a sunscreen lotion with a Sun Protection Factor (SPF) of 15 or higher. If you work outdoors or will be outside most of the day use SPF 30.

The Canadian Dermatology Association and the Canadian Cancer Society recommend using an SPF of 15 or higher.

The Canadian Dermatology Association and the Canadian Cancer Society recommend using an SPF of 15 or higher.

Wear a broad spectrum (UVA & UVB) sunscreen.

Make sure it has both UVA and UVB protection.

Make sure the product offers both UVA and UVB protection (usually labelled "broad-spectrum").

Read the ingredients on the sunscreen label carefully and make sure that the product offers both UVA and UVB protection.

Apply sunscreen 20 minutes before going out, reapply every two hours.

Apply liberally to exposed skin 15 to 30 minutes before going out in the sun, followed by re-application to exposed areas 15 to 30 minutes after sun exposure begins. Further application is necessary after vigorous activity that could remove the product, such as swimming, towelling or excessive sweating.

Apply to clean, dry skin at least 20 minutes before you go out. Don't forget your ears, nose, neck and any bald spots, as these are areas where skin cancers most often occur. Reapply often (every 2 hours), especially after swimming or sweating. Don't forget to apply sunscreen on cloudy days and during the winter

Sunscreen should be applied to all exposed skin surfaces 30 minutes prior to sun exposure. After swimming, sweating or towelling, sunscreens should be reapplied even "waterproof" or "water resistant" ones.



Public Information Messages

Key Informants
New Brunswick
Cancer Network

Cancer Care
Nova Scotia

Yukon

North West
Territories

Nunavut

Knowledge

A burn as a child increases the risk of skin cancer.

One or more bad sunburns during childhood doubles the risk of developing skin cancer later on in life.

The amount of UV you receive depends on both the strength of the sun's rays (measured by the UV Index) and the amount of time you spend in the sun.

The risk of skin cancer is higher for people who have light-coloured skin, eyes and hair; work, play or exercise in the sun for long periods of time, had several blistering sunburns as a child and take drugs that make them more sensitive to UV light.



Appendix C – National Messages

Public Information Messages

**Key Informants
Canadian Cancer Society**

Canadian Dermatology Association

Health Canada

**Environment Canada
*(Follows WHO Standards)***

http://www.cancer.ca/ccs/internet/standard/0,3182,3172_13247__langId-en,00.html

http://www.dermatology.ca/patients_public/info_patients/sun_safety/sun_vision.html

http://www.hc-sc.gc.ca/iyh-vsv/diseases-maladies/cancer_e.html

http://www.msc.ec.gc.ca/education/uvindex/who_newstd2_e.html

Sun Avoidance

Seek shade or create your own.

If you can't find shade, create your own. Take along an umbrella. That way you can create shade wherever you need it.

Select shaded areas for outdoor activities

Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest. Use caution April to September.

Protect yourself and your family particularly between 11 a.m. and 4 p.m. when the sun's rays are at their strongest, or any time of the day when the UV Index is three or more.

Use safety precautions: Between 11 a.m. and 4 p.m. The sun's radiation is strongest from noon to 2 p.m.

Avoid overexposing yourself to the sun without protection, especially between 11 a.m. and 4 p.m. during the summer months.

Reduce your time in the sun – seek shade, particularly between 11 a.m. and 4 p.m. from April to September.

Consult UV index for daily forecasts for UV radiation intensity.

The sun's radiation is strongest during the summer months. However, you should protect yourself from early spring right through to the fall. People often get sunburns in late April and May because the weather is cool they don't think the sun is strong enough to burn if they can't feel its heat.

If you are working on a snowy surface, protection is required because there is a good deal of reflection of ultraviolet radiation off the surface of the snow.

Sun Protection

Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.

Cover your skin to protect it from the sun. Choose clothing that is: loose fitting – like a t-shirt, tightly woven and lightweight.

Wear a broad-brimmed hat and clothing with a tight weave, including a long-sleeved shirt, long pants and gloves, if you have to spend long periods in the sun.

Cover up, wear a broad-brimmed hat, a shirt with long sleeves and wrap-around sunglasses or ones with side shields.

Wear a hat with a wide brim to shade your face and neck.

Most skin cancers happen on the face and neck. These areas need extra protection. Wear a hat with a wide brim that covers your head, face, ears and neck. Hats like baseball caps won't give you enough protection.

Two of the three most common skin cancers appear on the face, head and neck. Almost all of these tumours are caused by sun exposure over a long period of time. Protect these areas, including the ears, by wearing a broad-brimmed (more than eight cm or three inches) or legionnaire-style hat with a back flap.



Public Information Messages

**Key Informants
Canadian Cancer Society**

Canadian Dermatology Association

Health Canada

Environment Canada
(Follows WHO Standards)

Sunscreen

Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.

Use a sunscreen with a sun protection factor (SPF) 15 or higher and SPF 30 if you work outdoors or if you will be outside for most of the day.

The Canadian Dermatology Association advises seeking shade, keeping out of the sun between 10 a.m. and 4 p.m., wearing protective clothing and using at least an SPF15 broad-spectrum sunscreen, that is, one that protects against UVA and UVB rays. Such sun safety precautions will help protect against sunburn and sun-damaged skin and will reduce the risk of skin cancer and premature aging in the future.

If you cannot cover up, use a sunscreen lotion with a Sun Protection Factor (SPF) of at least 15.

Wear a broad spectrum (UVA & UVB) sunscreen.

Look for “broad spectrum” on the label. This means that the sunscreen offers protection against both UVA and UVB ultraviolet rays. Apply generously, at least 20 mins before going outdoors.

Wear a SPF15 broad-spectrum sunscreen, that is, one that protects against UVA and UVB rays

Make sure [your sunscreen] has both UVA and UVB protection.

Apply sunscreen 20 minutes before going out, reapply every two hours.

Reapply about every two hours. Don’t forget to cover your nose, ears and the tops of your feet. Use a waterproof sunscreen if you’re in or near water.

Apply liberally to exposed skin 15 to 30 minutes before going out in the sun, and reapply 15 to 30 minutes after sun exposure begins. You should also reapply sunscreen after vigorous activity that could remove the product, such as swimming, towelling or excessive sweating and rubbing.

Knowledge

Some people are more prone to sun damage.

The risk of skin cancer is higher in for people who:

- > have light-coloured skin, eyes and hair
- > work, play, or exercise in the sun for long periods of time
- > had several blistering sunburns as a child
- > take drugs making them more sensitive to UV light.

Precautions are especially important for babies and children, who are at greater risk than adults because of their more sensitive skin.

UVB damage is cumulative. However, diligent use of sunscreens during the first 18 years of life could reduce the lifetime incidence of non-melanoma skin cancers by 78%. Helping our youth protect themselves from the sun now will go a long way toward preventing serious health problems later in their lives.

A burn as a child increases the risk of skin cancer.

Keep babies under 12 months out of direct sunlight. Babies need extra protection because their skin is very sensitive. Put the stroller, playpen or carriage in the shade – under trees or an umbrella. Babies over six months can wear sunscreen.

The studies indicate that people who have suffered severe and frequent sunburns during childhood are at greater risk of developing skin cancer. The features most closely associated with intolerance to sun exposure include fair or freckled skin, blue eyes, and light-coloured or reddish hair.

The amount of UV you receive depends on both the strength of the sun’s rays (measured by the UV Index) and the amount of time you spend in the sun.

Sunscreen can’t absorb all of the sun’s rays. Use it along with shade, clothing and hats, not in isolation. Use sunscreen as a backup in your sun protection plan.

The sun’s ultraviolet radiation penetrates the skin and harms the DNA within the cells of the skin and other parts of the skin. In the short term, sunburns and suntans result from sun exposure. Both are signs of skin damage.

The amount of UV you receive depends on both the strength of the sun’s rays (measured by the UV Index) and the amount of time you spend in the sun.

You can never be completely safe from the sun. Over time, exposure to UV rays can cause skin cancer.



Appendix D – International Messages

Public Information Messages

Key Informants American Cancer Society

American Academy Of Dermatology

National Cancer Institute

The Cancer Council Victoria

http://www.cancer.org/docroot/PED/content/ped_7_1_Skin_Cancer_Detection_What_You_Can_Do.asp#radiation

<http://www.aad.org/public/Publications/pamphlets/SkinCancer.htm>

<http://www.cancer.gov/cancertopics/pdq/prevention/skin/HealthProfessional>

http://www.sunsmart.com.au/browse.asp?ContainerID=sun_protection

Sun Avoidance

Plan outdoor activities before 10 a.m. and after 4 p.m. when the sun's UV rays are the weakest.

UV rays are most intense during the middle of the day, usually between the hours of 10 a.m. and 4 p.m.

Seek shade when appropriate, remembering that the sun's rays are the strongest between 10 a.m. and 4 p.m. Use extra caution near water, snow and sand as they reflect the damaging rays of the sun which can increase your chance of sunburn.

It is best to avoid the midday sun whenever possible. You also should protect yourself from UV radiation reflected by sand, water, snow, and ice. UV radiation can penetrate light clothing, windshields, and windows.

Ultraviolet (UV) radiation is most intense 10 a.m. – 2 p.m. (or 11 a.m. – 3 p.m. during daylight savings).

Sun Protection

Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.

Clothes provide different levels of protection, depending on many factors. Long-sleeved shirts, long pants, or long skirts are the most protective. Dark colors generally provide more protection than light colors. A tightly woven fabric protects better than loosely woven clothing.

Wear protective clothing, such as a long-sleeved shirt, pants, a wide-brimmed hat and sunglasses, where possible.

Wear long sleeves, long pants, a hat with a wide brim, and sunglasses with lenses that absorb UV.

The Cancer Council Victoria recommends clothing that protects the wearer from as much UV radiation as possible, such as collared shirts, and at least three-quarter-length trousers and tops. Clothing specially designed for sun protection will have an ultraviolet protection factor (UPF) rating on their tags. The UPF rating indicates the percentage of UV radiation transmitted through unstretched, dry material.

Any fabric rated above UPF 30 provides good protection against UV, but 50+ is recommended.

Wear a hat with a wide brim to shade your face and neck.

A hat with at least a two to three inch brim all around is ideal because it protects areas often exposed to the sun, such as the neck, ears, eyes, forehead, nose, and scalp.

Hats: broad-brimmed hats with a brim of at least 7.5 cm

Legionnaire-style hats (the side flap and front peak should meet to provide protection to the side of the face), bucket or surfie style hats with a brim of at least six cm (for primary school children and older) or five cm (for pre-school children).

Wear sunglasses that absorb the UV radiation. Wear wrap-around sunglasses or ones with side shields.

Research has shown that long hours in the sun without eye protection increases the chances of developing eye disease. UV-blocking sunglasses can help protect your eyes from sun damage.

Wear close-fitting, wrap around style sunglasses that meet Australian Standards.



Public Information Messages

Key Informants American Cancer Society

American Academy Of Dermatology

National Cancer Institute

The Cancer Council Victoria

Sunscreen

Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.

Experts recommend products with an SPF of at least 15. The SPF number represents the level of protection against UVB rays provided by the sunscreen -- a higher number means more protection.

Generously apply sunscreen to all exposed skin using a Sun Protection Factor (SPF) of at least 15 that provides broad-spectrum protection from both ultraviolet A (UVA) and ultraviolet B (UVB) rays.

Use sunscreen. Sunscreen may help prevent skin cancer, especially sunscreen with a sun protection factor (SPF) of at least 15. But sunscreens cannot replace avoiding the sun and wearing clothing to protect the skin.

For best protection, choose sun protection factor (SPF) 30+ broad spectrum water resistant sunscreen and use with clothing, hats, and shade -- don't just use sunscreen -- "Sunscreen should be the last method of sun protection"

The short-term results of unprotected exposure to ultraviolet (UV) rays are sunburn and tanning. Long-term exposure causes prematurely aged skin, wrinkles, loss of skin elasticity, dark patches (lentigos, sometimes called "age spots" or "liver spots"), and precancerous skin changes (such as actinic keratoses).

Wear a broad spectrum (UVA & UVB) sunscreen.

While UVA and UVB rays make up only a very small portion of the sun's wavelengths, they are primarily responsible for the damaging effects of the sun on the skin. UVB radiation damages the DNA of skin cells. Recent research has found that UVA also contributes to skin cancer formation. Scientists now believe that both UVA and UVB rays damage skin and cause skin cancer. There are **no** safe UV rays.

Apply sunscreen 20 minutes before going out, reapply every two hours.

Reapply every two hours, even on cloudy days, and after swimming or sweating. Proper use of sunscreens can help prevent actinic keratoses even after extensive sun damage has already occurred.

Knowledge

Some people are more prone to sun damage.

Everyone's skin and eyes can be damaged by the sun and other UV rays. Although people with light skin are more likely to have sun damage, darker skinned people, including African Americans and Hispanic Americans, also can be affected.

Fair-skinned people who sunburn easily are at a particularly high risk for developing skin cancer.

A burn as a child (or adult) increases the risk of skin cancer.

Excessive sun exposure, especially sunburn, is the most important preventable cause of melanoma. Overexposure to ultraviolet light (sunlight or tanning lamps) is the most preventable risk factor for skin cancer.

It is not known if avoiding sunburns reduces a person's chance of developing melanoma skin cancer.

The amount of UV you receive depends on both the strength of the sun's rays (measured by the UV Index) and the amount of time you spend in the sun.

Individuals' risk of melanoma increases with time outdoors, especially in high-sunlight areas

As UV radiation is not related to temperature, many people get sunburnt when the temperature is between 18 and 27 degrees. People are most likely to get burnt when taking part in activities like gardening or sitting in the park.



Public Information Messages

**Key Informants
Cancer Research UK**

**Center for Disease Control
and Prevention**

**Cancer Society of
New Zealand**

<http://info.cancerresearchuk.org/healthyliving/sunsmart/>

http://www.cdc.gov/cancer/skin/basic_info/howto.htm

<http://www.cancernz.org.nz/HealthPromotion/SkinCancerControl/HowtoSunSmart/>

Sun Avoidance

Seek shade or create your own.

You can find or create shade in many different ways. For example: trees and foliage
umbrellas and parasols
canopies and awnings
tents and shelters
wide-brimmed hats.

Seek shade under a tree, an umbrella or a pop-up tent.

Slip into some shade, especially between 11 a.m. and 4 p.m. (between October and March inclusive) when the ultraviolet rays are most fierce.

Plan outdoor activities before 11 a.m. and after 4 p.m. when the sun's UV rays are the weakest.

The sun's UV rays are strongest in the hours around midday. This is why it's best to spend time in the shade between 11 a.m. and 3 p.m.

Seek shade, especially during midday hours (10 a.m. – 4 p.m.), when UV rays are strongest and do the most damage.

Sun Protection

Wear protective clothing to cover your arms and legs. Cover your skin with dark, loose, but tightly woven clothing.

Look for materials with a close weave, as they will block out the most UV rays. Natural fibers such as linen and cotton are cooler, especially if they are loose-fitting.

Although a long-sleeved shirt and long pants with a tight weave are best, they aren't always practical. A T-shirt, long shorts or a beach cover-up are good choices too.

Before you go out in the sun, make sure you have clothing and a hat to protect your face, ears, nose, shoulders, trunk, arms and legs.

Wear a hat with a wide brim to shade your face and neck.

Hats are great for protecting the face, eyes and head (especially if you happen to be thin on top!). A wide-brimmed hat can reduce the UV radiation reaching your face and eyes by over 50%.

Hats that shade the face, scalp, ears, and neck are easy to use and give great protection. Baseball caps are popular among kids but they don't protect their ears and neck.

Slap on a hat with a brim or a cap with flaps. More people get burned on the face and neck than any other part of the body, so a good hat is important.

Sunscreen

Wear a minimum sun protection factor (SPF) 15 or SPF 30 if you work outdoors or if you will be outside for most of the day.

The reason experts recommend factor 15, is that this represents the best balance between protection and price. You will get over 90 per cent protection from UVB rays with SPF 15. Above SPF 30 you don't get much additional protection from higher factors

Rub on sunscreen with sun protective factor (SPF) 15 or higher.

Use an SPF30+ broad-spectrum sunscreen. Wipe it on thickly at least 15 minutes before going outdoors.

Wear a broad spectrum (UVA & UVB) sunscreen.

Broad spectrum sunscreens block out UVA rays as well as UVB.

Rub on sunscreen with both UVA and UVB protection.

Put sunscreen on any skin not covered by clothes. Choose a sunscreen that meets the Australian and New Zealand Standard AS/NZS2604.

Apply sunscreen 20 minutes before going out, reapply every two hours.

Try to apply it 15 – 30 minutes before going out in the sun; then re-apply every two hours or more frequently if washed, rubbed or sweated off.

For most effective protection, apply sunscreen generously 30 minutes before going outdoors. Take sunscreen with you to reapply during the day, especially after your child swims or exercises.

Reapply; do this 15 minutes after the first application to ensure complete coverage, and also after physical activity, swimming or towel drying.

Knowledge

A burn as a child increases the risk of skin cancer.

Experts believe that sunburn during childhood can significantly increase your risk of malignant melanoma. Some say your chances of developing this type of skin cancer are doubled by just one blistering sunburn before the age of 20.

Just a few serious sunburns can increase your child's risk of skin cancer later in life.

Light skin type, large numbers of moles and excessive sun exposure (particularly intermittent episodes of sunburn), especially in childhood and adolescence, are the major predictors of melanoma risk.



Contact Us

Cancer Prevention Program
Division of Population Health & Information
Alberta Cancer Board
Holy Cross Site, Box ACB 2210 2 Street SW
Calgary, Alberta T2S 3C3
Tel: (403) 355-3270
Fax: (403) 355-3292
E-mail: prevention@cancerboard.ab.ca
Website: www.albertacancer.ca

Acknowledgements of Contribution

External review and guidance was provided by the National Skin Cancer Prevention Committee, **Dr. Loraine Marrett** (Cancer Care Ontario), **Dr. Cheryl Rosen** (National Director, Canadian Dermatology Association's National Sun Awareness Program), **Craig Sinclair** (Director, Cancer Education Unit – Cancer Council Victoria), **Angus Fergusson** (Senior Program Meteorologist, Stratospheric Ozone and UV, Environment Canada), and **Dr. Heather Bryant** (Vice President, Cancer Control for the Canadian Partnership Against Cancer).

Internal review and comments were provided by **Ellen Murphy** (Director, Prevention), **Corinne Parker** (Unit Lead, Environment) and members of the **Alberta Cancer Board's Cancer Prevention Program**, including research and program leads.

