

# Public health strategies for preventing non melanoma skin cancers

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## Abstract

Non-Melanoma Skin Cancers (NMSC) are the most common cancers in the world. Australia has the highest rates of NMSC in the world. NMSC have a low mortality rate, however they are one of the most costly cancers to treat. One of the biggest risk factors for the development of NMSC is ultra-violet radiation exposure. Preventative strategies focus on minimizing sun exposure. Successful prevention strategies need to be socio-culturally acceptable to the target demographic. Strategies should focus on each primary-school aged children, adolescents, working-age and retirement-age subpopulations. This article discusses potential strategies to prevent non-melanoma skin cancers in each subgroup.

## Review

Australia has the highest rates of skin cancers in the world [1,2]. Non-Melanoma Skin Cancer (NMSC) is a term used to describe Basal Cell Carcinomas (BCC) and Squamous Cell Carcinoma (SCC), two forms of skin cancer [2,3]. BCC and SCC make up the majority of NMSC. Roughly 80% of NMSC are BCC and almost 20% are SCC [4]. Incidence of NMSC is 2448 per 100,000 people in 2011 and these figures are rising [5]. NMSC have a relatively low mortality rate. Despite this, they are an important public health concern as they are one of the most costly cancers in Australia. The total cost of treating NMSC in 2010 (including diagnosis, treatment and pathology) was calculated to be \$511 million, and this cost is estimated to increase to \$703 million in 2015 [2].

The biggest risk factor for NMSC is Ultraviolet Radiation (UVR) from sun exposure [6]. Up to 90% of NMSCs are thought to be attributed to UVR. This is supported by the increased frequency of NMSC in areas with high levels of sun exposure [6,7]. Studies have shown that there is a 43% higher risk of BCCs and 77% higher risk of SCCs in individuals with occupational exposure to sunlight (i.e. working outdoors) [8,9]. Other risk factors include the phenotype of an individual. Individuals with fair skin, blue eyes, red hair and/or freckling are predisposed to the development of NMSC [10]. Occupational exposure to chemicals including coal tar, pitch, creosote, arsenic or radium can increase the risk of NMSC development [11]. For this reason, occupations that are associated with a higher risk of NMSC include: industrial worker, farmer, fisherman, cleaners, manufacturing workers [11].

A successful prevention program is socio-culturally relevant, focuses on reducing risks, encourages community involvement, promotes equality and diversity and encourages the development of personal skills. Possible solutions to reducing the already growing NMSC numbers would draw upon many of the strategies already used in the SunSmart and sun protection programs in Australia and overseas. Currently, a highly effective primary prevention program call SunSmart exists to inform patients about the risks of sun exposure and the potential to develop melanomas. The SunSmart program began in 1987 under the 'Slip! Slop! Slap!' banner which encouraged the public

to slip on protective clothing, slop on sunscreen and slap on a hat [12,13]. The campaign utilized mass media education, and promoted SunSmart policies within schools. While there is increased public awareness about melanomas there is no data regarding the general awareness surrounding NMSC.

The first strategy would be to create an awareness of NMSC. The public should be informed of what NMSC are, risk factors that cause development and how to identify NMSC lesions. This information could be disseminated via a number of mediums including TV advertising, social media advertisements and displays at schools or sporting events. In Australia, a study conducted by Hill et al found that in the first 3 years of implementing a sun-protection education campaign the proportion of the population who had sunburns reduced from 11% to 7% [14]. The sun-protection message continued to grow and peaked after 10 years of the program commencement. During the period of 2010-2011, the cancer council found that 34% of 14-69 year olds in Victoria used sunscreen over a weekend in summer [15]. This figure had doubled since 1987 [15]. This sun-protection message is waning in Australia, particularly in the adolescent age group and any strategies to reduce NMSC rates need be strengthened by an effective education campaign [16].

Prevention strategies will vary as the target group's age changes. Children and teens would be the main focus, as most of the damage resulting in NMSC occurs in childhood or teen years. Strategies at an early learning or primary school age may include developing policies for mandatory sun protection rules to be in place at all schools in Australia. Currently schools can register to become SunSmart, which requires the development of rules and regulations within the school to encourage sun protection. So far, the evidence in the literature is

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contradictory with a study by Jones et al finding that schools with the SunSmart policies had better sun-protection practices with schools that do not [17]. Conversely, further studies have found that there was no significant difference in sun-protection behaviors between SunSmart and non-SunSmarten rolled schools [18,19]. This could have been attributed to the fact that many schools do not regularly review their policies. The number of schools with SunSmart policies varies from state to state with 90% of primary schools in Victoria registered compared to 47% of schools in Sydney in 2013 [20,21]. Current policies could be implemented to ensure mandatory sun-protection policies in are implemented in all schools in Australia and that these are reviewed regularly. These policies should be in place for successful accreditation of a school to occur. Such accreditation processes should be extended to high-schools.

At a teenage and young adolescent age, levels of sun protection were found to be markedly reduced [22]. A recent survey examining high school studies in Canberra found that 75% of participants had more than 1 sunburn in the previous summer [22]. A potential strategy to target this age group could include the use of social-media pages to educate teens and young adults. Facebook and YouTube advertisements with pictures of BCC and SCC would help alert users on how to identify lesions and what parts of the body they are most predominant on. Advertisements could also educate users on how to prevent getting such lesions. Further suggestions include developing applications for iPhone and android phones, with daily UV levels and suggestions for hats and accessories to wear. One of the main issues with this target age group is that hats and sunscreen are culturally not seen as "cool". Suggestions to change the cultural norms around sun protection would be to encouraging broad-rimmed sun hats in Australian fashion and clothing stores. Encouraging designer and clothing shops for including a certain percentage of sun-protective clothing and hats in stores would shift the focus from these items being seen as purely sun-protective or health-related. Rather, they would be seen as a fashion accessory or normal attire. While this approach has never been trialed before, it has been acknowledged in literature that changing the cultural norms around sun-protective behaviors is important in targeting this group [16].

The focus for the working-age group would be looking at strategies which encourage sun protection in the work place. Work Safe Australia ran a campaign in 2003 which aimed to educate workers in the construction industry on the dangers of UV radiation which resulted in an increase in wearing sun-protective clothing within 3 years [23]. This strategy could be taken one step further: the implementation of policies to provide outdoor workers with sunhats, sunscreens and sun-protective gear could be made mandatory. Regular 'skin-check days' could be conducted at work places by a General Practitioner (GP). If a suspicious lesion is identified then workers can be advised to attend their usual GP or skin specialist for further treatment. These regular skin-checks should be strongly encouraged within industries with higher risks including exposure to the sun or chemicals like arsenic or coal tar [11].

Within the retirement age-group, while sun protection would be encouraged, prevention would be focused on screening for the disease and the early detection of any cancers to prevent further morbidity. This age-group should be encouraged to attend their local GP or skin specialist, via an invitation in the post or a GP recall letter, for at least yearly skin cancer checks if they are at moderate-high risk of developing NMSC. Strategies at broader level could also be implemented. One approach would be to encourage the provision of adequate sunscreen

and shading at both community and major sporting events. A current project already exists to fund shade sails within the community. Both schools and communities can apply via a grant to obtain funding to erect shades in playgrounds and parks [24]. Only organizations catering for children up to 17 years of age are eligible [24]. This concept could be extended to include providing shade to major sporting events, for example the national and international cricket and football games.

Further resources could be aimed at collecting data on NMSC incidence rates. Understanding the trends in NMSC incidence and prevalence assists in understanding the effectiveness of the prevention program and what target groups prevention could be focused on. Currently, Tasmania is the only state in Australia to collect NMSC information via mandatory reporting [25]. Unfortunately, due to the high numbers of NMSC that occur each year, the cost of collecting information on NMSC would be far too high. Alternative methods of potentially collecting NMSC data have been suggested within the literature. One cost-effective method that has already been described is to examine the number of Medicare Australia billings for the treatment of NMSC [2,5]. Data can be gathered by location, age and gender. Funding could be aimed at gathering and exploring this data at various levels of the population (by state/town, age group, gender and patients who have multiple NMSC excised) so that program strategies can be modified in the future based on trends in incidence and prevalence.

NMSC is the most common cancer in Australia and incidence is rising each year [2]. Sun exposure is the biggest risk factor for the development of NMSC. Prevention strategies need to focus on education surrounding sun protection, particularly towards the adolescent and young adult age group. Strategies in the older age groups need to focus on early detection of skin cancer to prevent the cosmetic and functional impacts of having NMSC. Mass media education and development of SunSmart policies in many Australian schools has already improved sun-protective behaviours [17]. Future research should be aimed at monitoring NMSC numbers in all populations in a cost-effective way so that prevention strategies can be adjusted to target various groups within the population.

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