

Trends in sun protection: Use of sunscreen, hats and clothing over the past decade in Melbourne, Australia

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Abstract. The human health effects of exposure to UV radiation can be modified by individuals' sun protection behaviour. For more than a decade the Anti-Cancer Council of Victoria (Australia) has monitored the sun protection behaviour of Melbourne residents during the summer months. In weekly interviews, residents aged 14-69 years were asked about their sun-related behaviour during the previous weekend. This data contributes to both our understanding of the behavioural aspects of skin cancer and more directly in evaluating the ongoing skin cancer prevention program in Victoria, Australia.

Results to date indicate that over time Melbourne residents have improved their sun protection behaviour during outdoor activity. Sunscreen and hat wearing has become more prevalent while changes in use of protective clothing remains constant. The data also suggests a change in pattern of exposure with a small reduction in the average time spent outside on summer weekends and more people choosing to stay indoors as a means of reducing their exposure to UV-radiation. Nonetheless, while increased use of sunscreen and hats was encouraging the prevalence of their use remains low. This would suggest continued program efforts are required to maintain reductions in risk of skin cancer.

Introduction

Skin cancer is a significant health problem in Australia. Many Australians will be treated for non-melanocytic skin cancer (NMSC) in their lifetime (Staples *et al.* 1998) and approximately 1000 Australians will die of malignant melanoma and squamous cell carcinoma each year (AIHW & AACR, 2000; Thursfield *et al.* 1995).

Skin cancer control efforts in the Australian state of Victoria began in 1980 with 'Slip! Slop! Slap!' (Rassaby *et al.* 1983) followed by a more extensive program 'SunSmart' in 1988 (Sinclair *et al.* 1994). These programs have focused mainly on prevention rather than early detection of skin cancer. The key strategies include use of mass media to raise public awareness of skin cancer and working with organisations and local community groups to establish supportive environments encouraging sun protection behaviour through policy development. Strategies target various groups however early efforts were targeted at protecting young children as a priority (Noy & Rassaby 1992). Another priority for the program was to reverse a prominent negative role model for sun protection on our beaches, the sun-bronzed life saver, by sponsoring the Life Saving Associations in Victoria (Dobbinson *et al.* 1999).

For more than a decade the Cancer Council of Victoria has monitored the sun protection behaviour of Melbourne residents in Victoria during the summer months. The data from this study has provided valuable insight into the behavioural aspects of skin cancer as well as providing a means of evaluating ongoing skin cancer prevention efforts.

Method

In weekly telephone interviews, residents aged 14-69 years are asked detailed questions about their sun-related behaviour during the previous weekend between 11am & 3pm. Approximately 100 interviews are conducted each Monday evening for the 13 weeks of summer between December and February. Resulting in approximately 1300 interviews relating to summer weekends. The survey provides point prevalence measures of sun protection behaviour, which is preferred to minimise recall bias and avoid context specific descriptions related to 'usual' behaviour measures. Use of a specific measure also allows analysis of trends in sunburn incidence adjusting for UV (ARPANSA) and temperature (Bureau of Meteorology) (Hill *et al.* 1993).

A number of behavioural and non-behavioural factors are considered to be important in determining skin cancer risk (Hill & Boulter 1996). Personal attitudes and social norms toward sun protection and sun exposure; the availability of shade and other sun protective aids; and activity demands (including work and recreation) influence the behavioural aspects of skin cancer risk. Temperature and other weather conditions also influence behavioural risk through choice of outdoor activities and clothing. The UV environment and susceptibility of skin are non-behavioural components of risk less amenable to intervention.

In the early stages of developing the skin cancer control program it was important to establish that modifying behaviour could potentially reduce risk. Multi-variate analysis of baseline data in 1987/88 showed sun protection behaviour could sufficiently contribute to incidence of sunburn (an intermediate marker for skin cancer risk) (Hill *et al.* 1992).

Surveys have been conducted in the summers of 1987/88, 1988/89, 1990/91, 1991/92, 1994/95, 1997/98, 1999/2000 and 2000/2001. Certain trend data are available from 1990 onward with additional questions on the type of swimwear worn wearing of sunglasses and sun avoidance added about this time. The key demographic characteristics of the surveys are consistent across the

years. Equal numbers of males and females are surveyed. Young people are over-represented in the sample compared to Melbourne population estimates, as younger people are more likely to spend time outside this allows a larger sample when considering sun protection behaviours during outdoor activities. A high proportion of people with susceptible skin types are surveyed.

Results and Discussion

Tan preferences have changed dramatically especially in the early years of the SunSmart program from 60% in 1987/88 to 34% in 1994/95 prefer a suntan (Figure 1). More recently with cycles in fashion and strong marketing of solariums we have seen a slight rise in the number of people with a preference for a tan again, increasing to 45% in 2000/2001. However, the depth of tan preferred is still considerably lighter than in the past with the majority of people now preferring either 'no tan at all' or a 'light tan'.

In addition the results also suggest more wide-spread use of certain sun protection strategies by Melbourne residents on summer weekends although the rate of uptake has slowed in recent years (Figure 2). Significant improvements were noted for hat-wearing, increasingly more common at 19% of people in 1988 and 42% in 2001. The use of wide brimmed/protective style hats is also now more common. Similarly sunscreen use increased from 12% in 1988 to 37% in 2001. In addition, more people report they chose to stay indoors to avoid the sun for at least some of the time during the peak UV.

For this reason we also expected to see a significant decrease in the time people spent outside. A simple bivariate analysis of the difference in mean time spent outside by survey year showed only a weak linear trend. However, an ANCOVA controlling for temperature confounding, showed a stronger trend overall and by gender (Figure 3). The average time spent outside during the four hours between 11am and 3pm declined from 128 minutes in 1988 to 115 minutes in 2001.

Despite these changes there was no evidence of change in use of covering clothing which remains rare, with only 12% of people wore long-sleeved tops for sun protection in 2001. Nonetheless, the majority of people wear a top with at least short-sleeves on summer weekends (82% of people outdoors in 2001). Heat and comfort may be at issue here. Further analyses are needed to explore the nature of this issue. In addition the prevalence of sunscreen use (29% of males and 46% of females) and use of hats (50% of males and 33% of females) was still relatively low suggesting further program efforts are required.

Patterns of exposure and sun protection tend to vary by age and gender. These differences were generally consistent across the years. Recent survey data for 2001 (Figure 4) illustrates the variation in sun protection by gender. Males were more likely than females to spend time outside during the peak UV. Females were more likely to chose to stay indoors between 11 & 3 to avoid the sun.

Males more commonly wore hats while outdoors than females, while wearing of more protective broad-brimmed styles were less common generally with no significant difference by gender. Similarly the wearing of clothing with long-sleeves for sun protection was rare among both males and females. Females were significantly more likely to use sunscreen when outdoors on the weekend. They were also slightly more likely to stay mostly in the shade while outdoors.

As mentioned previously, exposure and sun protection also varies by age (Figure 5). The patterns by age were fairly stable across the years except for shade use, which tended to vary by year. Generally people under 50 years of age were more likely to be outside on the weekend. During outdoor activity younger people were less likely to use most forms of sun protection. Use of long-sleeve tops and sunscreen was similar across age groups. Sunglasses were more likely to be worn by people under 50 years of age while older people were more likely to have worn a protective style of hat.

Recent studies of the incidence of skin cancer in Australia, by the Cancer Epidemiology Centre of the Cancer Council Victoria, also show promising trends for skin cancer control. The incidence rates of basal cell carcinoma decreased in age cohorts under 50 years of age between 1985 and 1995 (Staples *et al.* 1998). Similarly the incidence of malignant melanoma in Australia decreased in younger cohorts under 60 years of age between 1982 and 1993 (Giles & Thursfield 1996). These improvements may in part relate to changing public attitudes and behaviour to sun exposure and sun protection.

Conclusion

Ongoing monitoring of trends in sun related behaviours and skin cancer incidence will be valuable in determining the resilience of these changes and guiding future skin cancer control efforts.

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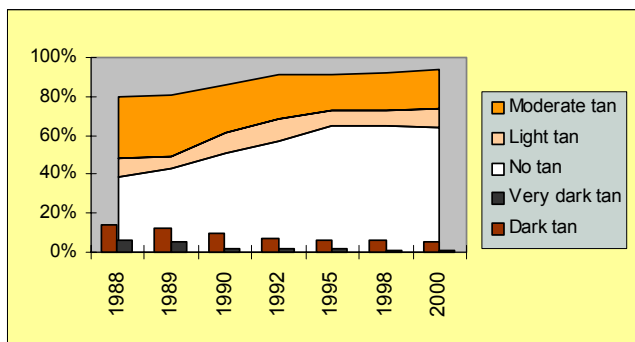


Figure 1. Trends in tan preference

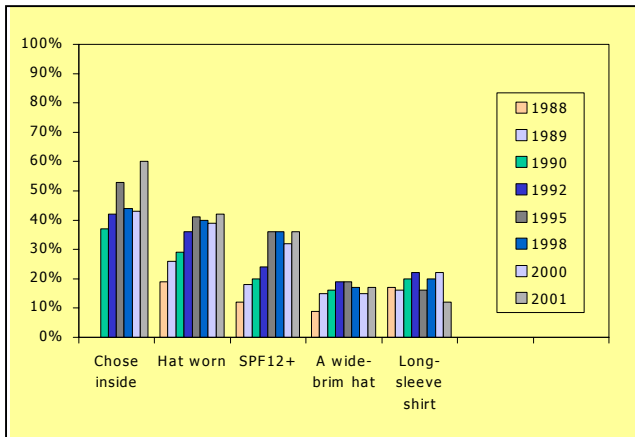


Figure 2. Weekend sun protection

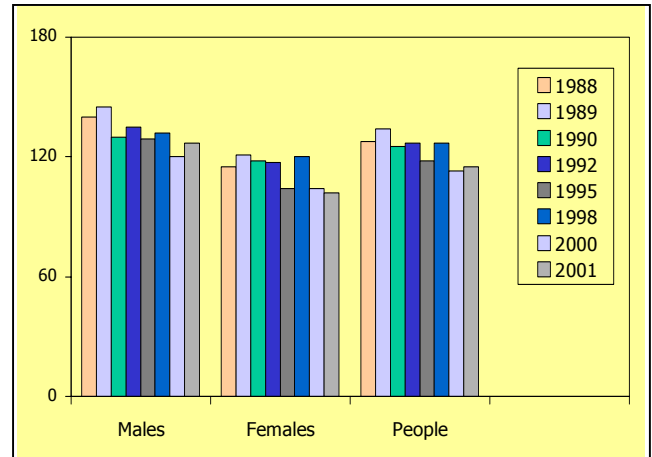


Figure 3. Mean Time Outside in Peak UV 11am to 3pm adjusted for temperature

	Males	Females	Overall
Chose to stay out of the sun*	58%	63%	60%
Outside on Sunday or Saturday***	80%	66%	73%
When outside 11-3 used/wore ...			
Hat, cap or sun visor***	50%	33%	42%
Wide-brimmed hat	16%	18%	17%
Long-sleeved or ¾ sleeved top	11%	15%	12%
SPF 12+ sunscreen***	29%	44%	36%
Sunglasses*	52%	59%	55%
Mostly in the shade*	22%	29%	25%

*p<.05, **p<.01, *** p<.001

Figure 4. Patterns of sun protection behaviour by gender

	14-29 yrs	30-49 yrs	50-69 yrs
Chose to stay out of the sun*	55%	63%	69%
Outside on Sunday or Saturday*	76%	74%	66%
When outside 11-3 used/wore ...			
Hat, cap or sun visor***	34%	50%	48%
Wide-brimmed hat***	10%	21%	30%
Long-sleeved or ¾ sleeved top	11%	13%	14%
SPF 12+ sunscreen	33%	40%	35%
Sunglasses**	53%	62%	47%
Mostly in the shade***	20%	29%	30%

*p<.05, **p<.01, *** p<.001

Figure 5. Patterns of sun protection behaviour by age