

# Chapter 11

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# The sun protection environment at swimming pools in Victoria, 2000–2001

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## Introduction

Skin cancer is a significant health problem in Australia (AIHW & AACR 2002), in fact Australia has the highest incidence of skin cancer in the world (Kricke & Armstrong 1996). Epidemiological studies have shown that there is a strong association between ultraviolet (UV) radiation exposure and subsequent development of melanoma (IARC 1992). Australia has a large fair-skinned population highly susceptible to skin cancer (Kricke & Armstrong 1996). Fortunately, while skin cancer is the most common cancer in Australia (AIHW & AACR 2002), mortality rates are low and it is also one of the most preventable (Green et al. 1999).

Unprotected sun exposure, particularly in early life or exposure that is intense but intermittent, is found to significantly increase the risk of developing malignant melanoma (NHMRC 1996; English et al. 1997; IARC 1992). Stern, Weinstein and Baker (1986) calculated that regular use of sun protection factor (SPF) 15+ sunscreen in the first 18 years of life would lead to a 78% decrease in lifetime incidence of non-melanocytic skin cancers. Therefore reduction of the level of UV radiation exposure, especially in childhood, is the primary concern of preventive efforts.

The Cancer Council Victoria has run a skin cancer control program since 1980, which broadly aims to reduce the incidence of, and the morbidity and mortality from, skin cancer in Victoria (SunSmart 2003). Short-term objectives include changing attitudes, beliefs and behaviours which affect an individual's skin cancer risk and promoting the modification of environments to facilitate skin protection.

Public swimming pools and recreational facilities at outdoor swim centres are a setting with great relevance to skin cancer control. Swim centres are attended by hundreds of Victorians every summer and represent an obvious challenge in terms of UV radiation exposure. Water is highly reflective of UV radiation and many fair-skinned people burn in a short time when outdoors in summer wearing only the brief clothing typical of swimwear. In addition to swimming, public swimming centres often provide a range of outdoor recreational facilities and areas in which people can relax, play and socialise. Furthermore, large numbers of adolescents and children attend public swimming pools as they provide a controlled and supervised environment for swimming.

Swimming centres therefore represent a community venue with a high risk of UV radiation exposure to both patrons and staff unless sun-protective behaviours are adopted. The Ottawa Charter (1986) outlines the role environments play in influencing health behaviours and disease outcomes (WHO 1986). Swimming centres' physical environment, policies, regulations and staff behaviours have the capacity to facilitate and actively promote sun protection or constitute barriers to protection. As such, swimming centres may facilitate the reduction of UV radiation exposure of both staff and patrons.

<sup>1</sup> We wish to thank the Royal Life Saving Society Australia for their extensive work in visiting swimming pools throughout Victoria to collect the data for this study.

There have been few investigations or intervention studies of swimming pools. Nonetheless, there have been some promising interventions implemented in the United States. One used pool lifeguards to role model sun-protective behaviour at swimming centres, with positive impact on the sun-protective behaviours of staff and patrons (Lombard et al. 1991). A larger study included a range of educational and environmental strategies to engage children and parents' sun-protective behaviour whilst they participated in aquatic recreational programs over the summer months (Glanz et al. 2002). Such results are encouraging but there is a need for further research to determine the current environment for sun protection in swimming centres in Victoria as a step toward assessing the need for more targeted interventions to decrease UV radiation exposure of patrons and staff.

SunSmart has promoted sun protection in swimming pools through its work with local government (Borland, Pratt & Noy 1994; Montague, Borland & Whitty 1995; Dobbinson et al. 1999; Dobbinson, Inglis & Hilditch 2004). In addition, SunSmart has worked closely with the peak bodies for lifesavers to successfully provide positive role models for sun protection on beaches in Victoria (Dobbinson, Borland & Anderson 1999). A secondary benefit to this relationship has been to encourage lifesavers' peak bodies to be strong advocates for sun protection. The Royal Life Saving Society Australia was contracted to provide a safety audit of swimming pools across the state. Their visits to pools, required for the audit, enabled them to assess the sun protection environments at pools. If the role were ongoing it would provide a further opportunity to implement a targeted intervention in swimming pools in following years.

A survey of the sun protection policies and practices of all public swimming centres in Victoria was initiated in partnership with the Royal Life Saving Society Australia, the Centre for Behavioural Research in Cancer and SunSmart. This study, which builds on data provided in a pool managers survey in 1989–90 (Broadstock et al. 1992), was designed to collect data that could both guide the development of future health promotion strategies in relation to skin cancer control at swimming centres and provide a baseline against which the impact of interventions could be evaluated.

## Method

Four Royal Life Saving Society Australia members were trained in observation and survey completion by researchers at the Centre for Behavioural Research in Cancer. The training involved inspection of one metropolitan pool to improve consistency in observation of shade and facilities. Swimming centres across Victoria were attended by one of these trained observers over spring–summer 2000/2001.

After seeking permission from the pool manager, the life saving society member first completed a survey form detailing their observation of the extent and type of shade available in outdoor areas, displays and regulations that encouraged patrons to protect skin from sun damage, and outdoor staffs' level of sun-protective clothing and behaviour. They then interviewed the manager of the swimming centre, completing questions on centre policies, regulations, provision of protective clothing and sunscreen for staff and future plans relating to sun protection. Validation of reports of sun protection policies was also sought to confirm policy details. The use of two methods of data collection, namely direct observation and manager report, facilitates validation of the data and can highlight discrepancies between policy or regulations and actual behaviours.

Data were collected on 208 public swimming centres in Victoria between November 2000 and December 2001. Observation surveys were completed for 205 pool centres but for two of these centres only data on facilities available were recorded. A survey with the pool manager was conducted following the observations at 185 of these centres. Data from five pool centres were not considered in this report as shade observations were not made (namely,  $n=2$  with facilities recorded only and  $n=3$  completing only a manager interview). Thus we report on shade provision and other supports for patrons and staff' sun protection at 203 pools.

A number of pools, mainly in rural areas, were not visited owing to difficulties in access due to limited opening times. Six of the swimming centres not surveyed were river, dam and beach pools and one was an indoor aquatic centre. Approximately 73% of public swimming pool centres in Victoria (N~280) are represented by the completed observation surveys.

The time of observations ranged from 9 am to 7.30 pm with a mean and median of 2 pm. Maximum daily temperature on the day of observation ranged from 17°C to 38°C, with an average of 29°C. Humidity was reported as generally 'low' (83% dry) and wind 'slight' (62%).

### **Recording observations**

Observers completed a survey form recording their observations of centre facilities, weather conditions (digital thermometer provided), displayed regulations and sun protection messages, outdoor staffs' level of sun protection and the extent and type of shade observed at swimming pools and 'other' areas.

The *extent* of shade observed in various areas in the swimming centres was rated in three categories: 'shade available in most areas', 'shade limited to small areas or certain times of the day' or 'no adequate shade'. The *type* of shade provided was described using three categories: 'Permanent or fixed shade' was provided by fixed structures developed specifically for that purpose, such as 'sails'. This type of shade is intended to shade all people using that particular facility. 'Portable shade' was shade provided by umbrellas or other portable structures; these provide shade to particular groups or individuals choosing to use them. 'Natural shade' described shade provided by existing structures, such as walls or trees. This type of shade may not have been deliberately planned, for example perimeter fences or shrubs planted for beautification rather than shade purposes, and therefore may provide limited sun protection. This shade may be less consistent or effective, limited to certain times of the day or less able to be modified to suit changing conditions or individual needs.

### **Analysis**

Basic descriptive analyses have been used throughout the report to provide comprehensive baseline data and description of the sun protection policies and practices of Victorian swimming centres. Missing data have been included in analyses unless otherwise stated.

### **Composite sun protection score**

Observations of outdoor staffs' clothing and zinc use were used to calculate a composite sun protection score for each staff member working outdoors at the time of the survey. Each area of clothing (hat, shirt, etc.) was rated between 0 and 100 according to the level of sun protection provided, with 100 being the best level of cover and 0 the absence of cover. For example, wearing no hat was assigned 0, narrow-brimmed hats or peaked caps were assigned 50 and legionnaire-style or broad-brimmed hat added 100. These were weighted and summed to calculate a score between 0 and 100 representing the proportion of the body protected: so a person's score increased as their level of protection from the sun increased.

## **Results**

### **Outdoor facilities at swimming centres**

The facilities at swimming centres consist of pools for swimming and a range of facilities for other water activities (water slides, spas, diving pools) and for recreation or leisure (barbeques, lawns, seats, playgrounds, crèche playgrounds and sports equipment). The majority of the 203 swimming centres surveyed had outdoor facilities only (78%) and a small proportion had either indoor facilities only (10%) or both indoor and outdoor

facilities (12%) (see Table 11.1). Ninety-one per cent of swimming centres had at least some outdoor pool facilities.

Overall 84% of centres had at least one pool outdoors suitable for swimming (a pool between 18 m and 50 m in length or a learner pool). In addition, 88% of centres had a toddler or wade pool outdoors.

With respect to swimming centres with both indoor and outdoor facilities (n=24), the majority had an outdoor 25 m or 50 m pool (75%) and 88% had an outdoor toddler pool. It could be expected that during warm weather patrons would be likely to spend considerable time outdoors using these facilities, therefore sun protection issues are also very relevant for these centres.

Skin cancer control issues are in general less critical at centres with indoor pool facilities only (n=20) as UV radiation exposure is limited to time spent at any outdoor recreational facilities provided rather than swimming and water activities. Sixty per cent of these centres had other recreational facilities outdoors, which probably get more use in the summer months. Therefore data on the shade provided at these other recreational facilities is also described later in this report.

**Table 11.1 Summary of facilities available at all pools surveyed and by pool type**

	Indoor only n=20	Indoor/outdoor n=24	Outdoor only n=159	Total with facilities n=203
	%	%	%	(n) %
<i>Indoor facilities</i>				
50 m pool	5%	17%	–	(5) 3%
25 m pool	95%	67%	–	(35) 17%
Learner pool	50%	50%	–	(22) 11%
Toddler pool	65%	29%	–	(20) 10%
Water slide	5%	8%	–	(3) 2%
Dive pool	0%	4%	–	(1) 0.5%
Spa pool	45%	46%	–	(20) 10%
<i>Outdoor facilities</i>				
50 m pool	–	50%	30%	(62) 30%
25 m pool	–	29%	41%	(72) 36%
18–33 m pool <sup>†</sup>	–	0	25%	(39) 19%
Learner pool	–	42%	31%	(60) 30%
Toddler pool	–	88%	99%	(178) 88%
Water slide	–	29%	6%	(17) 8%
Dive	–	21%	4%	(12) 6%
Spa	–	4%	0%	(1) 0.5%
River/sea bed pools	–	0	3%	(4) 2%

*Note 78% of pools had some outdoor pool facilities.*

<sup>†</sup>*Note one 33 m pool with a wade pool section was treated as two separate pools.*

## Physical environment of the swimming centres: shade

As described in the method section, observers described both the extent and type of shade available at outdoor swimming pools and in other outdoor areas. It is important to note that 'permanent shade' generally provided the most comprehensive level of sun protection, generally being designed specifically for that purpose. Shade provided by existing structures ('natural shade') may not have been intended for sun protection and therefore may be less effective for a number of reasons: it may be less consistent or effective, limited to certain times of the day, or less able to be modified to suit changing conditions or specific needs.

### Shade available at outdoor pools

Table 11.2 describes the extent and type of shade available for each specific outdoor pool type and overall totals for all pools surveyed. It is apparent that most outdoor pools have less than optimum shade in terms of sun protection, with the notable exception of wade and toddler pools. As shown in Table 11.2, most pools had either shade available in small areas, at certain times of the day or had no adequate shade. Of note are the 49% of main outdoor pools having no adequate shade.

Encouragingly however, infants and toddlers (and their attendant adult) appeared to be better provided for, with 76% of toddler pools being shaded in most areas. Furthermore, most of these pools were shaded by permanent shade structures, such as 'sails' (83%).

Where shade was available over the main pool was most commonly provided by 'natural' shade (43%). A very small number of facilities had permanent shade over their main outdoor pool (3%), while shade provided at learner pools was markedly better and a mixture of permanent (37%) and natural (17%) shade.

**Table 11.2 Extent and type of shade available at each type of outdoor pool and for all pools**

	Centres with each outdoor pool type only				All pools surveyed	
	Main pool	Toddler	Learner	Dive pool	Main pool	Toddler
	n=174	n=178	n=60	n=12	n=203	n=203
Extent of shade						
Available in most areas	2%	76%	15%	0%	(3) 2%	(136) 67%
Limited to small areas/ times	40%	17%	35%	33%	(74) 37% <sup>†</sup>	(31) 15%
No adequate shade	52%	5%	38%	67%	(91) 45%	(8) 4%
Observation was not recorded for the facility	6%	2%	12%	0%	(10) 5%	(3) 2%
Indoor pool only/no facility	–	–	–	–	(25) 12%	(25) 12%
Type of shade provision ( <i>multiple responses</i> )						
Natural eg. trees, walls	43%	23%	17%	42%	N/A	N/A
Permanent e.g. sails	3%	83%	37%	0%		
Portable	0%	1%	0%	0%		
No adequate shade at the facility	52%	5%	38%	67%		

<sup>†</sup> Includes observations of shade at four river/sea pools.

### Types of shade

Most outdoor pools were observed to have one type of shade only (see Table 11.3). For example, only 2% of facilities were observed to have both permanent and natural shade over their main pool. A combination of permanent and natural shade was slightly more common for the toddler pools (11%), and two facilities were observed to have all three shade types at their toddler pools. All the learner and dive pools were observed to have one type of shade only.

In a few cases, some type of shade structure (usually natural trees) was observed but the shade it provided was considered inadequate (this was recorded as 'No adequate shade' in Table 11.3 below). This highlights the value of using purpose-built shade structures as trees can take a considerable time to provide shade underneath them and some tree species have only limited value for shade.

**Table 11.3 Breakdown of the types of shade combinations at outdoor pools**

	Permanent/fixed e.g. sails	Natural e.g. trees, wall	Portable e.g. umbrellas	n (%)
<b>Main pool</b>				n=174
	✓	✓		0.6%
	✓			1%
		✓		37%
Type or extent not observed	-	-	-	9%
No adequate shade	-	-	-	52%
Total (column %)	(3%)	(43%)		100%
<b>Wade/toddler pool</b>				n=178
	✓	✓	✓	1%
	✓	✓		11%
	✓			70%
		✓		11%
Type or extent not observed	-	-	-	3%
No adequate shade	-	-	-	5%
Total (column %)	(83%)	(23%)	(1%)	100%
<b>Learner pool</b>				n=60
	✓			17%
		✓		33%
Type or extent not observed	-	-	-	12%
No adequate shade	-	-	-	38%
Total (column %)	(37%)	(17%)		100%

<b>Dive pool</b>				n=12
		✓		33%
Type or extent not observed	–	–	–	0
No adequate shade	–	–	–	67%
<b>Total (column %)</b>		<b>(33%)</b>		<b>100%</b>

*\*For a few pool facilities natural shade was observed to be inadequate and in this table the facility is considered to have 'No adequate shade'.*

### **Shade available in other outdoor areas**

As mentioned earlier, swimming centres commonly had a variety of other facilities for recreation and leisure, such as lawns (41%), seats (74%), eating areas (42%) including barbeque areas (10%), playgrounds (4%), and sports equipment (6%). Observations were also made of the extent and type of shade available at these outdoor areas (see Table 11.4). Almost all centres with some outdoor pools (n=173) had a concourse area. Shade was also observed for the pool concourse. Table 11.4 includes data for pools that had these facilities.

**Table 11.4 Extent and type of shade available at other outdoor areas for all pools surveyed**

	<b>Concourse</b>	<b>Spectators seating</b>	<b>Food/eating</b>	<b>Other Recreational areas</b>
	<b>n=173</b>	<b>n=151</b>	<b>n=85</b>	<b>n=124</b>
<b>Extent of shade</b>				
Available in most areas	4%	48%	55%	59%
Limited to small areas/ certain times	78%	46%	34%	33%
No adequate shade	19%	6%	11%	8%
<b>Type of shade (multiple responses possible)*</b>				
Natural e.g. trees, walls†	67%	69%	57%	87%
Permanent e.g. sails	29%	66%	49%	34%
Portable	4%	7%	4%	4%
No adequate shade at the facility	19%	6%	11%	8%

*\* Up to 4% of facilities with shade extent observed were missing observations of type of shade.*

*† Note a few facilities that had natural shade did not provide adequate shade.*

Over half of the food eating areas (55%) and other recreational areas (59%), and nearly half of seated areas (48%) had shade 'available in most areas'. Concourse areas tended to have less shade, with only 4% with shade 'available in most areas', while natural and permanent shade was nevertheless more commonly provided than over the outdoor pools.

Apart from toddler pools, with the vast majority attaining high levels of shade, these other recreational facilities were generally better shaded than the outdoor swimming pools (see Tables 11.4 and 11.5 compared with Tables 11.2 & 11.3). Moreover, all three types of shade—permanent, natural and portable—were more common in the non-pool areas, with several of the facilities using combinations of the three types of shade. It may be that there are barriers to developing shade over larger pool areas. For example, outdoor pools may

become less popular if too cold for swimming (their primary use), over-hanging trees may produce too much pool litter and developing suitable shade structures over large pool areas might prove expensive.

The most common type of shade available at the recreational areas was 'natural' shade (57% to 87% of each type of recreational area), while 'permanent' shade was also reasonably common at spectators' seated areas (66%) and food eating areas (49%). Only a few areas had provided 'portable' shade structures at these areas, at between 4% and 7% of centres with the recreational areas.

As mentioned earlier, combinations of shade were common at these other recreational areas. Table 11.5 shows a number of these areas were observed to have permanent shade combined with 'natural' shade: 36% of the seated areas, 27% of the other recreational areas and 18% of the food eating areas provided these types of shade in combination. Few centres had provided the three types ('natural', 'permanent' and 'portable') of shade in combination at recreational areas.

**Table 11.5: Breakdown of the combinations of shade types available at other outdoor facility areas**

	Permanent/ fixed e.g. sails	Natural e.g. trees, wall	Portable e.g. umbrellas	n (%)
<b>Concourse</b>	✓	✓	✓	5 (3%)
	✓	✓		26 (15%)
	✓		✓	2 (1%)
	✓			17 (10%)
			✓	84 (49%)
Type or extent not observed				6 (4%)
No adequate shade				33 (19%)
Total had shade type (%)	(29%)	(67%)	(4%)	n=173
<b>Seated spectators areas</b>	✓	✓	✓	7 (5%)
	✓	✓		55 (36%)
	✓		✓	2 (1%)
		✓	✓	1 (0.7%)
	✓			32 (21%)
			✓	39 (26%)
				✓
Type or extent not observed				5 (3%)
No adequate shade				9 (6%)
Total had shade type (%)	(66%)	(69%)	(7%)	n=151

	✓	✓	✓	1 (1%)
	✓	✓		15 (18%)
<b>Food/eating areas</b>	✓		✓	1 (1%)
	✓			25 (29%)
		✓		32 (38%)
			✓	0
Type not observed				2 (2%)
No adequate shade				9 (11%)
Total had shade type (%)	(49%)	(57%)	(4%)	n=85
	✓	✓	✓	3 (2%)
<b>Other recreation areas</b>	✓	✓		33 (27%)
		✓	✓	1 (0.8%)
	✓			5 (4%)
		✓		68 (55%)
Type not observed				4 (3%)
No adequate shade				10 (8%)
Total had shade type (%)	(34%)	(87%)	(4%)	n=124

*\*Shade combination data excludes a few cases where natural shade was observed to be 'inadequate' at the facility. These areas are listed here as having 'No adequate shade'.*

### **Managers' reports of recent changes to shade provided**

Managers were asked whether the shade provided at the swimming centre had changed over the last three years and 174 managers responses were recorded. Fifty-two per cent of managers believed there was 'now more shade' provided at their centres, 43% believed the shade provided was 'about the same', only 2% believed there was 'now less shade' at their centre and 4% were 'unsure'. Their subjective opinions suggest that a number of swimming centres have been active in shade development in recent years.

### **Managers' reports of future plans for shade development**

Encouragingly, 41% of managers reported that they were planning to increase the shade provided at their centre over the next three years. The details of shade plans were not provided for all the centres intending to increase shade and it may be that managers reported on a general intention to increase shade at the centre rather than plans for specific areas. Table 11.6 shows the details given of the shade plans. Of those centres with specific plans to increase shade (n=76), it appears that recreational areas and the concourse will receive most shade development, while permanent shade for several centres' main and wade or toddler pools are also planned. The majority of shade plans were for permanent shade but some were to develop a mixture of permanent and natural shade.

**Table 11.6** Details of shade plans for the next three years at swimming centres by facility/area & type of shade

	% of those with shade plans (n=76)	Type of shade planned for area	%
<i>Shade for pool areas</i>			
Main pool	21%		(n=16)
		Permanent	94%
		Natural	31%
		Portable	6%
Toddler pool	17%		(n=13)
		Permanent	92%
		Natural	23%
		Portable	7%
Learner pool	9%		(n=7)
		Permanent	86%
		Natural	0
		Portable	14%
Dive pool	0%		–
<i>Shade for other recreational areas</i>			
Concourse	30%		(n=23)
		Permanent	87%
		Natural	26%
		Portable	4%
Spectators seating	9%		(n=7)
		Permanent	86%
		Natural	14%
		Portable	29%
Food/eating areas	7%		(n=5)
		Permanent	80%
		Natural	0
		Portable	20%
Other recreational areas	43%		(n=33)
		Permanent	85%
		Natural	24%
		Portable	0

*Note: multiple responses allowed.*

## Other environmental supports at swimming centres

The provision of shade at pool facilities, as described in the previous sections, is an important component of creating supportive environments for skin cancer control at public swimming centres. Nonetheless, there are a number of other strategies such as policy and practice that pools can use to enable and provide incentives for staff and patrons' sun protection. A number of these policies and practices were assessed in the management interviews (185 completed) as well as by observation and are examined in the following sections.

### *Sun protection policies*

According to managers, a sun protection policy was not particularly common among centres. Only 28% of centres had a written sun protection policy or procedure and a further 4% were in the process of developing one. Only half of the policies (52%) were available for the interviewer to check its details. Of swimming centres with a written policy (n=52), most had addressed sun-protective clothing for staff working outdoors. Other strategies to enhance staff and patrons' level of protection from the harmful effects of the sun were less commonly addressed (see Table 11.7).

**Table 11.7 Aspects of sun protection covered in the policy or guideline (n=52)**

	Specified in policy or guideline
Sun-protective clothing/uniforms for staff working outdoors	71%
Minimising time spent outdoors between 11 am and 3 pm for staff	21%
Minimising programs/activities held outdoors between 11am and 3 pm	19%
Advocating the provision of permanent/portable shade in outdoor areas	17%
Monitoring the implementation of the policy	15%

A vital aspect of any policy is ongoing monitoring of the implementation and compliance with the guidelines. Only 15% of centres reported monitoring of some kind. The type of monitoring varied and included regular inspections from local government safety committees, staff training and management reminders, and inspection or regulation of staff uniform.

### *Sun protection items provided for staff*

Managers were asked to report on whether their centre provided any sun-protective items for staff and whether staff were required to use/wear them when working outside. The majority of centres provided sunscreen and staff were required to wear it when working outdoors. Broad-brimmed and legionnaire-style hats were also quite commonly provided for staff, but were less commonly required to be worn. Few centres provided or required staff to wear long-sleeved shirts, trousers or sunglasses (see Table 11.8).

**Table 11.8 Managers' report of provision for staff sun protection (of centres with at least some facilities outdoors: n=166)**

	Provided	Required to wear outdoors
Sunscreen (SPF 15+ or higher)	82%	59%
Broad-brimmed or legionnaire-style hats	56%	39%
Sunglasses	11%	25%
Long-sleeved shirts	28%	13%
Trousers	8%	5%

### ***Promotion of patrons' sun protection***

#### ***Signs promoting sun protection***

The display of permanent signage encouraging patrons to protect themselves from the sun or detailing desirable behaviours with respect to sun protection was observed at the time of the survey. As shown in Table 11.9, such messages were not common at the swimming centres surveyed, although 21% had at least some sun protection message and 16% displayed signs and posters including the SunSmart logo. None of the indoor centres displayed these messages.

**Table 11.9 Permanent signage detailing the sun protection messages**

	n=203
Wear SPF 15+ sunscreen	10%
Avoid sun between 11 am and 3 pm	6%
Wear a hat	9%
Wear covering clothing	9%
Other	7%
Signs/posters with SunSmart logo	16%

#### ***Other practices encouraging patrons' sun protection***

Managers' reports and observations of strategies used to promote patrons' sun protection were recorded for swimming centres with at least some outdoor facilities (n=183). Table 11.10 shows all but a few centres allowed sun-protective clothing to be worn in the pool, with only 2% directly prohibiting such behaviour. Other practices were less common.

Over one-third of centres with outdoor facilities promoted 'pass-outs' for patrons wishing to leave the pool in the hottest part of the day. A further 23% of managers indicated a 'pass-out' was available at the manager's discretion but not actively promoted. In one case a pass-out was available for lunch as a practical measure rather than for protection from the sun during the hottest part of the day.

It was disappointing that maximum protection sunscreen was not more commonly available at pool kiosks; only one-third of centre kiosks were observed to sell maximum protection sunscreen (SPF 15+ or 30+). Two centre managers reported that sunscreen was provided 'free' to everyone. Moreover, few centres had portable shade available for patrons although without exception, where it was available (20%), it was free of charge to patrons. Two centres indicated they also had some portable shade available 'for hire' (perhaps of a higher quality).

**Table 11.10 Practices encouraging sun protection (of n=183 centres with at least some outdoor facilities)**

	Observer report	Manager report
	n=183	n=166
Allow wearing of T-shirts, rash vests or wet suits in pool	92%	98%
Promote pass-outs for patrons leaving pool between 11 am and 3 pm	34%	57%
Offer patrons portable shade to borrow	20%	22%
SPF 15+ or 30+ sold at kiosk (n=168, 15 without kiosk)	33%	–

#### *Swim program scheduling to avoid peak UV radiation periods*

Seventy-three centres ran learn-to-swim and other programs outdoors during school terms. Sixty-six per cent of managers at these centres reported that ‘at least some’ of these programs were scheduled to minimise time outside between 11 am and 3 pm, while only 22% scheduled ‘all’ term programs outside peak UV radiation periods. It was a similar pattern for school holiday programs. The majority of centres (72%) with these programs limited ‘at least some’ and a smaller proportion (36%) scheduled ‘all’ school holiday programs outside these times.

#### *Sun protection education*

Eighty centres ran programs for children, of which the majority (58%) included a component on sun protection education.

#### *Solariums*

In recent years there has been considerable growth in the solarium industry in Victoria (Fox 2001), despite some evidence for increased risk of skin cancer associated with the use of artificial sources of UV radiation (Autier 2004). It is encouraging that as yet solariums are not a standard facility at public swimming centres.

Of the 203 centres surveyed, only 3% operated a solarium (two centres with indoor-only facilities, and three with both indoor and outdoor facilities). Observers confirmed 91% did not have a solarium, while this detail was not always reported, and at a further 6% of centres there may have been a solarium. At one of the centres with a solarium the manager indicated it was about to be closed.

### **Staff sun protection: observations at time of audit**

#### *Staff working outdoors*

At the time of the audit, most of the centres with some outdoor facilities (83%) had staff working outdoors (excluding eight centres missing observations and 20 indoor centres). A total of 208 staff members were observed to be working outdoors. At most centres only one or two staff were outside but at a few there were up to six staff working outdoors. Sun protective-behaviours were recorded for 201 of the outdoors staff.

Most (70%) of the staff working outdoors were observed to be aged between 20 and 49 years, 23% were 14 to 19 years old and 7% were 50 years or older. Slightly more women (52%) than men (48%) were observed (n=200).

### Protective clothing and behaviours observed

The level of sun protection employed by each staff member was recorded in terms of the extent of cover provided by hat, shirt, collar and leg wear, and the use of sunglasses and zinc cream. The use of shade and application of sunscreen were also noted but are anecdotal only as shade availability varied and sunscreen may have been applied although not observed at the time of the survey.

A high proportion of the staff working outside were wearing shirts with collars and sleeves to elbow length. Shorts or skirts were generally worn to mid-thigh or knee length, a hat and sunglasses were also commonly worn (see Table 11.11). Thus in general staff were observed wearing clothing with a moderate level of protection.

**Table 11.11 Observed sun protection used (n=201)**

n=201			
Head		Neck	
No hat	36%	No collar	11%
Narrow-brimmed hat	8%	Collar	89%
Peaked cap	22%		
Legionnaire-style hat	0		
Broad-brimmed hat	34%		
Torso		Legs <sup>†</sup>	
None or bikini/crop top	0.5%	Brief swimmers only	1%
Singlet	1.5%	Mid-thigh shorts/skirt	47%
1/4 length sleeved shirt	24%	Knee-length shorts/skirt	45%
Elbow-length sleeved shirt	60%	3/4 length shorts/skirt	2%
3/4 length sleeved shirt	3%	Ankle-length trousers/skirt	4%
Wrist-length shirt	11%		
Sunglasses		Zinc <sup>‡</sup>	
No	18%	Not visible	98%
Yes	82%	Visible	1.5%
Shade		Observed applying sunscreen <sup>§</sup>	
Not in shade	53%	Yes	7%
In partial shade	28%	No	93%
In full shade	19%		

<sup>†</sup> Missing data on two staff at one centre.

<sup>‡</sup> Missing data on four staff at one centre.

<sup>§</sup> Missing data on one staff.

In terms of the ideal level of sun-protective clothing: over one-third wore broad-brimmed hats, 11% wore wrist length shirts, 89% wore collars to protect the neck, 4% wore ankle length leg cover, 82% wore sunglasses, less than 2% wore visible zinc and 19% were working in full shade. Thus eyes, torso and necks

were commonly well protected from the sun, while improvements would be beneficial in terms of heads, arms below the elbows and legs.

### **Composite sun protection score**

As described in the method section, data on outdoor staffs' clothing and zinc use were combined to estimate the overall cover provided as a proportion of the total body (excluding data for feet and hands). Sun protection scores were calculated for each staff member and potentially ranged between 0 and 100 increasing as the level of protection from the sun increased.

The lowest level of sun protection observed was a score of 11.2 (for a male with no hat, sunglasses or shirt and only wearing mid-thigh shorts) and the highest score was 100 (for a male wearing a broad-brimmed hat, sunglasses, shirt with collar and wrist-length sleeves and ankle length trousers). Table 11.12 shows the average of sun protection scores for all staff was 66.5, standard deviation (SD) =9.6, confirming that most staffs' sun protection covered more than half of the body (not taking into account sunscreen or shade used whilst outside). The average level of sun protection for males was slightly higher than for females ( $t=2.0$ ,  $df=196$ ,  $p<.05$ ) but was not significantly different by age ( $F=2.7$ ,  $df=196$ ,  $p>.05$ ).

**Table 11.12 Composite sun protection scores**

	<b>Mean body cover †</b>	<b>Standard deviation</b>	<b>p-value</b>
Males	67.9	(SD=10.4)	.043
Females	65.1	(SD=8.5)	
14–19 years	66.1	(SD=8.7)	.067
20–49 years	67.2	(SD=8.9)	
50+ years	60.9	(SD=16.0)	
Overall	66.5	(SD=9.6)	

† Mean score of all staff outdoors.  
n=2 missing data.

### **Overview of regional differences**

Seventy-four per cent of swimming centres surveyed were located in rural or provincial areas and 26% were located in metropolitan Melbourne (this classification was based on postcode). There were a number of interesting similarities and differences between the two groups as described in Table 11.13.

Table 11.13 Summary of the sun-protective environment at swimming centres by location

	Metropolitan	Rural	Overall
Observations over all centres	n=52	n=151	n=203
<b>Centres with...</b>			
Only 'outdoor' facilities ***	50%	88%	78%
At least 'some shade' at the main pool (n=174 main pools)	51%	39%	42%
Extensive shade in 'most areas' at toddler pools (n=178 toddler pools) *	62%	81%	76%
Sunscreen sold at kiosk † (n=159 with kiosk) **	56%	31%	37%
Permanent sun protection messages displayed	17%	22%	21%
SunSmart signs displayed *	12%	17%	16%
Pass outs in the middle of the day promoted (n=183 with outdoor facilities) ***	5%	43%	34%
A solarium *	8%	0.7%	3%
<b>Management reports</b>			
Portable shade available for patrons	21%	21%	21%
More shade now (compared with 3 years ago)†	50%	52%	52%
Plans to increase shade†	40%	42%	41%
SunSmart education in children's swim & other programs (n=80 with swim classes)	62%	55%	58%
A written sun protection policy† ***	42%	23%	28%
Provision of broad-brimmed hats to staff (n=166 with outdoor facilities) ***	80%	48%	56%
Provision of long-sleeved shirts to staff (n=166 with outdoor facilities)	35%	25%	28%
Provision of sunscreen to staff (n=166 with outdoor facilities) ***	93%	79%	82%

† This item excludes missing data.

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

Metropolitan Melbourne centres generally had a greater range of pool facilities. The vast majority of swimming centres in rural and provincial areas had only outdoor pool facilities (88%) whereas only half of the metropolitan centres were solely outdoor facilities. One-third of metropolitan centres had both indoor and outdoor facilities (compared with 5% of rural and provincial centres) and 17% had only indoor facilities (compared with seven percent of rural and provincial centres).

The shade provided at the main outdoor pool was similar for both rural and provincial centres and metropolitan centres. The majority of centres had no adequate shade at the main outdoor pool, but a fair proportion had shade limited to certain areas and times of the day.

In contrast, shade was generally widely available over outdoor toddler pools (76%) and of good quality. There were some regional differences, with extensive shade over outdoor toddler pools less common at metropolitan pools (62%) compared with rural and provincial centres (81%). Nonetheless, almost all centres, regardless of area, had at least some level of shade available at outdoor toddler pools (95% of metropolitan and 94% of rural and provincial centres).

Manager reports of shade development over recent years and plans for future shade at centres were similar across areas. Provision of portable shade at centres was also similar by area.

There were a few regional differences for promotion of patrons' sun protection. Notably, sale of maximum protection sunscreen was far less common at rural and provincial swimming centres compared with metropolitan centres (31% cf. 56%); but rural and provincial centres were far more likely to promote pass-outs between 11 am and 3 pm (43% cf. 5%). Display of permanent sun protection messages was generally similar and very low for both groups, however SunSmart signs were somewhat more common at rural and provincial swimming centres. The inclusion of a component of education on sun protection in children's swim and other programs was common at centres from both areas. Although only five centres had a solarium, all but one was at metropolitan centres.

It appears that there has been limited development of sun protection policy by rural and provincial swimming centres (23%). In contrast almost twice as many metropolitan swimming centres had developed a written policy (42%) and a further 13% (compared with 1.5% of rural and provincial centres) were in the process of developing one.

Perhaps this is reflected in provision for staff's sun protection, with supply of sunscreen and hats more common in metropolitan centres. Nonetheless, requirements for wearing of hats and shirts was similar by area, whereas it appears rural and provincial centres were more likely to require sunscreen be worn (64% cf. 43%) even though they were less likely than metropolitan centres to supply it (79% cf. 93%).

Staff observed working outside at metropolitan and rural swimming centres differed little in the type of clothing worn (see Table 11.14). Only two significant differences were noted. Staff at rural and provincial centres were more likely to be working in full shade, while staff at metropolitan centres were more likely to have worn a shirt with a collar. Overall the mean level of sun protection (as determined by composite sun protection scores) used by staff at metropolitan centres (67.2, SD=10.0) was not significantly different to that of staff at rural and provincial centres (66.2, SD=9.4;  $t=0.7$ ,  $df=197$ ,  $p=.482$ ) at the time of the audit observations.

**Table 11.14 Observed sun protection of staff working outside at metropolitan and rural and provincial centres**

	Metropolitan n= 64 staff	Rural n=137 staff
Broad-brimmed hats	31%	35%
Wrist-length shirts	9%	12%
Collar *	95%	86%
Ankle-length trousers/skirt	6%	3%
Sunglasses	83%	82%
Zinc cream	0%	2%
In full shade ***	6%	25%

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

## Discussion

This study describes the environment at Victorian swimming pools in the summer of 2000/2001 in terms of factors that are recognised to be supportive of individual staff and patron's sun-protective behaviours. The study has the advantage of including actual observations of the pool environment rather than relying on the reports of pool managers. Nonetheless, although a group of observers were trained in assessing shade at the start of the project, there were some staff changes at the Royal Life Saving Society and some observers had not received training, thus inter-rater reliability is not assured. We also acknowledge limitations with defining 'adequate shade' and used a subjective method. The use of UV radiation detectors, extensive measurements of the shaded areas, accounting for solar angles and other objective measures were not feasible for this study.

Swim centres are a focus for a number of recreational activities, particularly over the summer months in Victoria. Due to the nature of water sports and other pool activities, people will generally wear brief clothing at these venues and hence there is the potential for hazardous levels of exposure to UV radiation in this environment. This is particularly true for centres providing only outdoor facilities. Provision of indoor facilities is no doubt the best option for minimising exposure to UV radiation during swimming. Nonetheless, the majority of swimming centres in Victoria have at least some outdoor facilities, and at these centres provision of adequate shade and sunscreen is most important in providing patrons incentives to reduce their exposure to UV radiation. Rural and provincial swimming centres more commonly had only outdoor facilities available compared with more indoor facilities available in Melbourne centres. This suggests initiatives to promote the development of sun-protective environments at centres must not neglect regional centres.

The observations of shade at pool facilities across Victoria suggest that many centres have paid attention to the SunSmart message, at least in implementing strategies to protect the youngest patrons. Extensive purpose-built shade structures were observed to be provided at many outdoor toddler pool facilities (76%) in swimming centres in Victoria. Data from recent surveys of local government suggest that much of this shade at toddler pools was installed in recent years, with a trend for increased reports of high levels of shade at local government-run wade pools between 1998 and 2001 (Dobbinson, Inglis & Hilditch 2004). In recent years SunSmart has noted a groundswell of advocacy for the development of shade structures, particularly from parents concerned that shade be available for their children at early childhood centres and primary schools. This community pressure may well have been a factor in shade development at swim centres as well.

In contrast, the shade provided over the main outdoor pool at swim centres in Victoria was commonly inadequate (52%) or limited to certain times of the day (40%). This difference may reflect a conscious effort to protect the young children in our community but also it is likely to reflect other issues, such as cost or other practicalities relating to providing suitable shade covering over large pool areas compared to small toddler pools. Also solar heating of the deeper water in large pools may allow comfortable swimming outdoors for most of the spring and summer months, whereas a shaded pool might be too cold for swimming. It might be argued that the data suggest these barriers to further shade developments over the main pool at swimming centres do exist, as centres generally provided more extensive shade at other pool facilities, such as spectator areas and food eating, than for the main pool. Nonetheless, some centres had specified they had future shade development plans at the main pool, although plans for shade at the concourse and other recreational areas were somewhat more common.

Other provisions for patrons' sun protection were less commonly adopted by swimming centres. The few strategies that were widely adopted were the provision of sun protection education in programs for children (58% of those centres with programs) and allowing the wearing of protective T-shirts, rash vests and wetsuits in the pool (92% of centres).

It was particularly disappointing that maximum protection sunscreen was not commonly available at pool kiosks (available at one-third of centres with a kiosk). This is surprising given in 1989–90, 60% of pool

managers reported maximum protection sunscreen was available for sale at the pool kiosk (Broadstock et al. 1992). It may be that sunscreen is not commonly on display at kiosks although possibly available and our observations reflect a limited promotion of sunscreen for sale.

Likewise there seems to have been a decrease in signage and poster prompts for sun protection. Only one-fifth of centres actually displayed these posters and signs in 2001, while manager reports indicated 63% of pools displayed such posters in 1989–90 (Broadstock et al. 1992). It is of concern that some of these simple prompts for patrons' sun protection may have become less common in swim centres over recent years. A review of skin cancer prevention interventions for children suggests that parents respond favourably to such appeals to protect their children from the sun (Buller & Borland 1999). SunSmart needs to explore ways to provide support for centres in promoting reminders of the need for sun protection to patrons to ensure a return to better practice.

In contrast, although strategies to minimise time outside during peak UV radiation periods at swim centres have the potential to reduce exposure to UV radiation, these strategies are not particularly practical where indoor facilities are not available. There was limited scheduling of swim programs outside these times in 2001. Cost recovery is also likely an issue with the provision of pass-outs in the middle of the day and these were rarely promoted both in 2001 and 1989–90 (Broadstock et al. 1992). This highlights the importance of the use of shade and sunscreen to minimise patron's sun exposure at swimming centres.

It also appears that the use of sun protection policies to support initiatives has been limited. Less than one-third of centres had a sun protection policy in 2001 and only a further 4% were developing one. Moreover those policies tended to be of limited scope, with a focus mainly on provision for staff's sun protection rather than shade development or other measures for patrons. There is some indication that there has been a small improvement, especially in provisions for employees' sun protection since 1989–90. Although the measures were not directly comparable, 56% of centres in 1989–90 indicated they either had a policy (18%) or encouraged (38%) employees' sun protection (Broadstock et al. 1992), while by 2001, 82% of centres provided sunscreen and 56% provide broad-brimmed or legionnaire-style hats for staff.

This study has identified a number of areas for improvement of environmental supports for sun protection at swimming centres in Victoria. Interventions focusing on skin cancer education to promote behaviour change through improving individuals' knowledge and awareness of skin cancer are more common in the literature than those promoting environmental interventions. The high level of awareness of skin cancer prevention messages in Victoria suggests this approach would currently be of value to a small proportion of the general public or specifically to children and that reminders and enabling factors to support individuals' sun-protective behaviour are warranted. Nonetheless, as outlined below, some interventions in the United States have reported success in changing patrons and staff behaviour in swimming centres. With the Royal Life Saving Society contracted to conduct regular visits to swimming centres in Victoria to perform safety audits, there is an opportunity to explore some form of educational intervention in this setting.

Research in 1995–96 of a large provider of swimming programs in the United States showed widespread gaps in swim instructors' and children's knowledge of skin cancer prevention, with little education on skin cancer prevention incorporated into YMCA learn-to-swim programs (Rosenberg, Mayer & Eckhardt 1997). A mainly education-based program, SunWise, with take-home activities, was implemented by aquatic instructors during swimming lessons to address these gaps in knowledge, but the brief presentations had little influence on children's sun protection (Mayer et al. 1997).

A few more intensive programs in recreational pool settings have shown more promise.

A recent randomised control trial of the Pool Cool program implemented in aquatic centres in Hawaii and Massachusetts found improved sun-protective behaviours of staff was associated with frequency of implementing lessons and activities on sun protection (Geller et al. 2001). Pool Cool also sought

environmental changes at the centres through provision of a guide to develop policy, supply of sunscreen, provision of portable shade structures, metal sun protection signs, advice and consultations to staff. Parents and children attending the centres reduced their incidence of sunburn and increased their use of sunscreen and shade following the program, while use of hats, clothing and sunglasses was not changed (Glanz et al. 2002).

Improvements in patrons' and employees' sunscreen use was also noted after implementation of the SafeSun intervention at pools in Virginia (Lombard et al. 1991). The intervention incorporated training of lifeguards to model sun-protective behaviours at the swimming pools, fliers distributed to adults and children, posters displayed and a pool sun protection target set (with daily feedback and rewards for attainment). The effects on behaviour were short-lived following the end of this intervention, highlighting the difficulties of sustaining change for such initiatives without ongoing community support through awareness of the issues or by addressing more permanent environmental supports for sun protection through policy development. Still, it suggests that these promotional activities can provide benefits and may be suitable for pool managers in Victoria to consider adopting where feasible or for special events.

For SunSmart, facilitating environmental change fits well with its current strategic directions (SunSmart 2003). In Victoria, pool employees already provide generally good role models for sun protection; 64% of staff wore a hat and 89% wore a shirt with a collar at the time of the audit. In addition, public awareness of sun exposure and skin cancer issues in Victoria is already high (Dobbinson & Borland 1999). The Ottawa Charter for Health Promotion provides a strong theoretical base for strategies promoting environmental change (WHO 1986). Appropriate shade provides a good alternative protection from the sun to covering clothing when this is not practical due to activity needs. Over the last decade people have been seeking the shade in greater numbers than ever before (Dobbinson & Borland 1999).

## Conclusions

The data presented here suggest that there is room for further improvement of the shade provided at swimming centres in Victoria. An increase in the provision of appropriate shade, with greater consistency at centres and facilities, is needed. Where shade was available at swimming centres, it was most commonly 'natural shade' (provided by trees or walls) and centres may be most amenable to advice as to 'how to' improve and supplement 'natural shade'. Encouragingly, a large proportion of managers reported that there were plans to increase the shade available at their centre over the next three years.

Moreover, SunSmart is currently developing a comprehensive step-by-step guide with expert advice on what needs to be considered when developing shade to maximise use. It would appear the majority of swimming centres would benefit from receiving such a resource. In terms of cost and practicality, increasing shade planting or adding to existing structures to extend or improve shade may prove the most viable. In addition, an increase in the provision and quality of shade provided in small areas, such as eating areas, may be possible in relatively simple and inexpensive ways.

The other main areas that could be improved, as mentioned earlier, having sunscreen more readily available for sale at pool kiosks, and signage and posters are used to prompt patrons' sun-protective behaviour. It may be that SunSmart can best facilitate this process by ensuring that policy development occurs and that these areas are specifically addressed in the policies. Currently it is clear that sun protection policies in pools, where they exist, have been developed mainly in response to occupational health and safety concerns for staff. The development of policy specifically to improve the overall environment of swimming pools in terms of support for both patrons' and employees' sun protection is needed. SunSmart might also consider developing resources, such as posters and signage, specifically for use in pools. In addition, there is an opportunity for SunSmart to further their partnerships with both the Royal Life Saving Society and local government health

promotion officers in implementing strategies to support the development of policy and other initiatives in this setting.

Compared to other outdoor activities, people are more likely to experience sunburn during aquatic activities (Hill et al. 1992). Although this study explored the sun-protective behaviours of employees at these swimming centres, it would also be useful to learn more about patrons' sun-protective behaviours and sunburn incidence in this setting, with a view to exploring the influence of available shade and other environmental factors.

In conclusion, although progress has been made particularly with provision of shade at toddler pool facilities, there is still much work to be done in order to decrease the UV radiation exposure of children, adolescents, adults and staff at public swimming centres in Victoria.

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