

Solaria compliance in an unregulated environment: The Australian experience [☆]

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Abstract

This study aimed to explore compliance with international recommendations on solarium use in an unregulated setting. Simulated customers visited 176 solariums operating in Australia and two face-to-face visits and one telephone contact were made for each establishment. From the survey, establishments compliant with the recommendations ranged from: 1.1% refusing access to the customer with skin type I; 9.7% recommending to the customer with skin type I against solarium use and up to 87.5% assessing skin type and recommending eye protection. Few (15.9%) were compliant with more than 10 of the 13 recommendations. Establishment type and number of sunbeds were significantly associated with compliance. This study has shown that a much higher level of compliance with recommendations, particularly those excluding higher-risk groups, is required to reduce the harm associated with use of solariums. While new legislation may be useful, other harm minimisation strategies including mandatory staff training and taxation should be considered. © 2005 Elsevier Ltd. All rights reserved.

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1. Introduction

Skin cancer is one of the most common cancers in a number of countries and imposes a significant cost burden on health care systems [1,2]. The relationship between exposure to ultraviolet radiation (UVR) and skin cancers such as melanoma has been well documented [2,3]. Skin cancer prevention efforts have focused on reducing the community's outdoor UVR

exposure [4,5]. More recently there has been a shift to establishing the association between melanoma and exposure to artificial sources of UVR such as sunbeds or tanning devices [3,6,7]. Sunbed use also appears to be associated with the development of non-melanoma skin cancers, and in some instances ocular burns, immune suppression and photosensitivity [8–10].

In a number of countries, concern has been expressed over the increasing availability of indoor tanning facilities [11] and prevalence of sunbed use in the community [12–17]. While there are a number of difficulties in clarifying the relationship between sunbed use and melanoma incidence, at least one case control study [7] has identified that younger people (those aged less than 45 years), and those with fair skin (types I and II according to the Fitzpatrick classification) [18] are more likely to

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be put at risk from sunbed use. Unfortunately, a higher prevalence of sunbed use is evident in younger age groups and those with skin types I, II and III [13,15,16,19–21]. It also appears that those who use sunbeds are also likely to seek unprotected UVR exposure outdoors [22,23].

In response to the risks associated with exposure to artificial UVR, the International Commission on non-ionizing radiation protection (ICNIRP) and the World Health Organisation (WHO) have issued recommendations aimed at minimising these risks [10,24]. It is not known whether compliance with these recommendations will reduce the risk of melanoma for those who use solarium as any amount of sunbed use involves unnecessary exposure to UVR. However, it is likely that some recommendations, such as the complete exclusion of those with certain types of skin, have the potential to reduce the number of people exposed to artificial UVR. Some countries such as the US, Australia, England, Canada, Sweden and France have adopted recommendations based on the ICNIRP or WHO statements [25–30].

Studies on legally enforceable regulations have found varying levels of compliance [31–34]. The more recent US studies [31,34] have explored a limited number of issues in relation to compliance with federal or state legislation. The data suggests that legislation is not sufficient to encourage consistently high levels of compliance with

harm-minimisation strategies in the solarium industry. Relatively little data exists exploring the impact of recommendations in the absence of legislation. One telephone-based US study of 60 solarium operators found only 5% of operators were compliant with the federal recommendation to limit tanning sessions to no more than three per week [31]. An audit of 62 facilities in North Carolina found 95% of patrons were exceeding recommended exposure times [14]. A study of 54 Californian tanning facilities found very few (5.6%) complied with federal recommendations on tanning frequency, while most (97.7%) complied with the recommendations on tanning duration [34]. It is not clear from these reports if legislation is likely to represent an improvement over non-enforceable recommendations. Further studies on the practices of solarium are also needed given that the available data is from relatively small sample sizes (50–60 establishments), none of the studies have explored the impact of consumer skin type on practices and only one [14] has explored the characteristics of compliant *versus* non-compliant establishments.

The present study aimed to establish the proportion of solarium in New South Wales, Australia which complied with each of the common recommendations to both the Australian [26] and International [10,24] standards on solarium use as detailed in Table 1. The study also aimed to identify characteristics associated with greater compliance with the recommendations.

Table 1
Comparison of Australian, ICNIRP and WHO recommendations on solarium for cosmetic use

	Australian/New Zealand Standard ^a	ICNIRP ^b	WHO ^c
Age restrictions	<18 yrs need parental consent Those <15 yrs not permitted	<18 years of age not permitted	<18 years should not use
Health claims	Promotion of non-cosmetic health benefits shall not be made	Claims of beneficial medical effects should not be made	Claims of health benefits should not be made
Repeat exposure	Repeat exposure not allowed within 48 h		Repeat use should not be within 48 h
Skin type restrictions	Skin type I should not use	Skin phototypes I or II should be counselled against use	Skin phototypes I and II should not use
Protective eyewear	Protective goggles must be worn.	UV-protective goggles to be provided and worn	UV radiation protective eyewear must be worn
Supervision procedure	All use subject to supervision by a trained operator		A trained supervisor should be available
Warning sign	Warning notices within immediate view in each unit		Notices within immediate view in each cubicle
Consent form	Consent form signed prior to first session		Consent form signed prior to first session
Medication restrictions	Advised to consult your doctor about medications	People taking certain medications to be counselled against use	People should not use solarium if taking certain medications
Session times		Duration of first session to be about half of a regular session	

^a Standards Australia/Standards New Zealand Committee “Solarium for cosmetic purposes”.

^b International Commission on Non-Ionising Radiation Protection “Health issues of ultraviolet tanning appliances”.

^c World Health Organisation “Artificial tanning sunbeds risks and guidance”.

2. Materials and methods

2.1. Design

Simulated customers (women posing as customers) visited a sample of solariums operating in metropolitan (Sydney – population 4 million) and surrounding regional areas (Newcastle, Wollongong and Central Coast) in New South Wales, Australia. A solarium was defined as a commercial establishment that contained one or more sun-tanning units [26]. No simulated customer used sunbeds as part of the study. The study obtained ethical approval from the Human Research Ethics Committee of The University of Newcastle.

2.2. Simulated customer scenarios

Scenarios One and Two were designed to represent typical adult solarium users and involved face-to-face visits to solariums to explore compliance issues. Scenario One involved a female 18 year old who was judged by a panel to potentially look less than 18 years of age, and had fair skin which did not tan. Scenario Two used a female simulated customer who was 25–35 years old with fair to medium skin. In both scenarios the simulated customers probed for full information using standard questions. In order to complete the visits within a brief time period, both Scenario One and Scenario Two involved more than one person completing the visits for that scenario. Scenario Three involved a telephone-based approach by a 16 year old female with the specific aim of identifying information provided by solarium operators regarding youth access. Each solarium in the study was approached with all three scenarios during October–December 2003. The simulated customers were trained to ensure that the visits were conducted in a naturalistic manner. In order to complete the visits in the early summer months, a number of simulated customers were involved in the study. To ensure consistency and reliability in the collection and recording of data, series of training sessions and supervised practice visits were conducted by the simulated customers.

2.3. Sample

Two sub-samples of solariums were included in the study. The first group comprised all establishments in the study area that advertised as a solarium in the Electronic Yellow Pages ($n = 127$). The second group was a sample of 975 hairdressers, beauticians, and health and fitness centres randomly selected from the Electronic Yellow Pages. Each of these establishments was contacted by telephone anonymously. The 78 (8%) who reported having a sunbed for public use were included in the study.

2.4. Procedure and materials

The face-to-face visits (Scenarios One and Two) involved enquiring about the facilities and attempting to make an appointment to use the solarium. Immediately following the visit, the simulated customer recorded details of the information received on a standard recording sheet. The recording sheet was designed to reflect the international standards on solarium use [10,24] with some additional items specific to Australian standard [26]. Simulated customers recorded whether the information was provided verbally, on printed forms (e.g. consent forms) or on a warning sign.

For Scenario Three, a standard script was used for all telephone contacts, and the following information was recorded: (i) if they were informed that there were restrictions on people aged under 18 years (international standard), (ii) that written consent was required for people aged 15–17 years (Australian standard), and (iii) if the required information was provided with or without prompting (i.e., given after or before the caller indicated she was 16 years of age).

The establishments selected for the study were not aware that the study was being conducted until all data was collected. The conditions of ethical approval for the study required that once data collection was completed, each solarium owner be sent a letter outlining the project and offering the opportunity to withdraw their data from the study.

2.5. Analysis

Data was analysed using SAS software, Version 8 [35], to describe the proportion of establishments complying with each of the items studied. The overall compliance score for the study was calculated by selecting the most appropriate scenario for each item, or combining the data from two scenarios where relevant. The calculation of the compliance score is described in the “overall compliance” section of the results. χ^2 were calculated to explore associations between compliance and establishment characteristics such as number of sunbeds, type of establishment, type of promotion, and metropolitan *versus* non-metropolitan location.

3. Results

3.1. Study population

Of the total of 205 establishments, 23 (11.2%) were not eligible for the following reasons: (i) geographical outliers and not cost-effective to visit ($n = 4$), (ii) not contactable ($n = 5$), (iii) no longer having a sunbed ($n = 8$), (iv) were solarium suppliers rather than commercial tanning facilities ($n = 3$), (v) two establishments

appeared twice on the list, and (vi) one establishment did not complete all three scenarios, so was withdrawn from the study. Of the 182 establishments eligible for the study, 6 (3.3%) withdrew from the study, leaving a total of 176 establishments. The majority of the sample was hair or beauty facilities with a solarium (64.2%, $n = 113$). One-fifth (19.9%, $n = 35$) offered only solarium services and 28 (15.9%) were primarily health and fitness centres. These classifications were based on the data recorded by the simulated customers rather than that from the original sampling from the Electronic Yellow Pages. The number of sunbeds per establishment ranged from 1 to 15, with a median of 1 sunbed and a mean of 2.3 sunbeds per establishment.

The findings for Scenarios One and Two are provided in Table 2. The findings for scenario Three (age restrictions only) showed that in 62.9% ($n = 110$) of establishments, information was provided to the 16 year old customer that age restrictions applied to the use of sunbeds. This included any verbal or written information that age restrictions applied to people aged under 18 years, or that written parental consent was required for people aged under 18 years before using the sunbed. In almost all cases (93.6%, $n = 103$), this information was provided after the 16 year old prompted the operator that she was 16 years of age.

3.2. Overall compliance

A 13-item overall compliance score for each establishment was calculated by assigning one point for com-

pliance with each item shown in Table 3. Table 3 indicates in brackets beside each item whether Scenario One, Two or Three was used in the compliance score. Where more than one scenario was used, an establishment was considered compliant if the information was provided to either one of the two customers. For example, in the case of the item relating to consent forms, an establishment was classified as compliant if they told either the Scenario One or Two customer about needing to sign a consent form. Twenty eight (15.9%) of the establishments were compliant with more than 10 of the items. Fig. 1 shows the distribution of compliance score totals.

3.3. Characteristics associated with compliance

χ^2 were calculated to explore associations between compliance score and establishment characteristics such as number of sunbeds, type of promotion (advertised in Yellow Pages as solarium *versus* did not advertise as solarium), type of establishment (solarium only, hair/beauty salon, or health/fitness centre), and metropolitan *versus* non-metropolitan location. Number of sunbeds was associated with total compliance score, such that those with more than two sunbeds were more likely to have a higher than average compliance score (average = a score of 7, 8 or 9) than those with two or fewer sunbeds in their establishment ($\chi^2 = 11.9414$, $df = 2$, $P < 0.005$). Establishment type was also associated with total compliance score, with solarium-only establishments being more likely to have a higher than average

Table 2
Compliance with international recommendations for simulated customer Scenarios One and Two

Recommendation	Proportion of establishments compliant			
	Scenario One		Scenario Two	
	<i>n</i>	%	<i>n</i>	%
Asked about age or informed that age restrictions apply	45	25.6	49	27.8
Asked about skin type or informed that people with fair skin who do not tan should not use sunbeds	154	87.5	115	65.3
Refused access to solarium	2	1.1	NA	NA
Recommended against using solarium ^a	17	9.7	4	2.3
Asked if using medication or advised that people taking certain medications should avoid using a solarium	31	17.6	66	37.5
Advised about need for prior written consent or consent form sighted	46	26.1	55	31.3
Warning sign present with information about any one of: sunburn risk, skin cancer risk, skin type restrictions, age restrictions, goggles, frequency of use, medication restrictions	19	10.8	47	26.7
Prompted to read signage	40	22.7	23	13.1
Advised of risk of sunburn	120	68.0	108	61.4
Advised of risk of skin cancer	83	47.2	83	47.2
Advised not to revisit within 48 h	120	68.0	134	76.1
Informed of supervision procedure	28	15.9	14	8.0
Advised to use safety goggles	119	67.6	122	69.3
Avoided making claim that solarium are 'safe' or 'safer than the sun'	82	46.6	96	54.6
Maximum first session time of 30 min or less	159	90.0	161	91.5

Note: Advice, questions and recommendations provided in either verbal or written form constituted compliance.

^a Recommendations were primarily on the basis of inappropriate skin type.

Table 3
Proportion of establishments complying with each item of the compliance score

Item	Proportion compliant	
	<i>n</i>	%
Advised of first session duration (Scenario One or Two)	172	97.7
Assessed skin type (Scenario One)	154	87.5
Advised of eye protection (Scenario One or Two)	154	87.5
Advised of risks of sunburn (Scenario One or Two)	150	85.2
Advised of repeat exposure guidelines (Scenario Two)	134	76.1
No inaccurate health claims made (Scenario One or Two)	126	71.6
Advised of risks of skin cancer (Scenario One or Two)	123	69.9
Advised of age restrictions (Scenario Three)	110	62.5
Advised of consent forms (Scenario One or Two)	79	44.9
Advised of medication restrictions (Scenario Two)	66	37.5
Presence of warning sign (Scenario One or Two)	58	33.0
Advised of age restrictions (Scenario One)	45	25.6
Advised of safety procedure (Scenario One or Two)	41	23.3

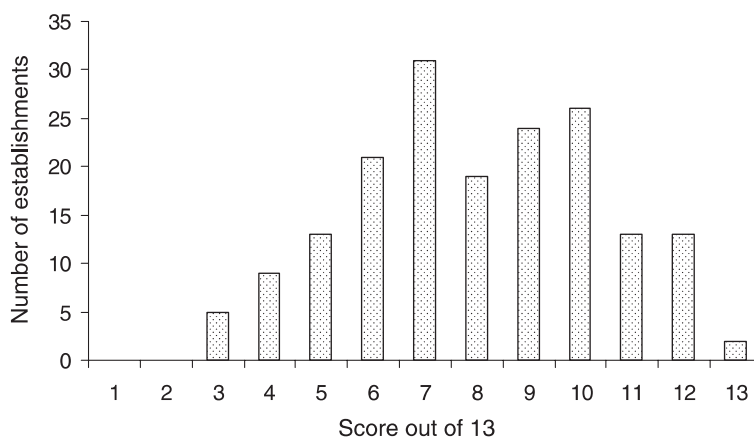


Fig. 1. The distribution of total scores on the 13-item compliance scale.

compliance score than hair/beauty facilities or health/fitness centres ($\chi^2 = 11.2510$, $df = 4$, $P < 0.05$).

4. Discussion

4.1. Compliance levels

Compliance with recommendations was found to be particularly poor for the recommendations with the greatest potential for minimising harm, *i.e.*, those that discourage or exclude persons at greater risk from UVR exposure. Given that the Scenario One customer reported her skin only burned and never tanned, the fact that very few establishments (9.7%) recommended against use of the sunbed, and only 1.1% refused access, represents poor compliance with the recommendations. Low levels of compliance were also found for recommendations relating to age restrictions, using a sunbed while taking medications, provision of consent forms and discussing safety procedures.

The compliance score data indicates that there were very few establishments complying with less than four of the recommendations. However, there were similarly few complying with most or all of the recommendations addressed in this study. This indicates that there may be many customers who use solarium without being fully aware of the associated risks. While there was majority compliance with some recommendations such as the provision of eye protection, part-compliance may not provide a significant public health benefit. Very high levels of compliance are likely to be required in order to reduce the potential harm from sunbed use and in particular compliance with those recommendations relating to the exclusion of groups at increased risk of skin cancer.

4.2. International comparisons

The compliance levels found in this study compared with the US studies where enforceable regulations were in place [31–34], did not present a clear case for

legislation as motivation for change. Both this study and the US studies found that compliance with recommendations on the provision of eye protection and maximum session duration was relatively high. Both this study and the US studies found that a minority of establishments complied with the use of consent forms, warning signs and age-related restrictions. It must be acknowledged that this interpretation is based on a very small number of studies which are not directly comparable. Also, there are some differences in the findings for this study compared to US studies of compliance with non-legislated recommendations [14,31,34] particularly with respect to frequency of exposure. However, overall the studies provide support for the view that something other than legislation, or in addition to legislation is required if the harm associated with sunbed use is to be minimised via recommendations or regulations.

The associations found between establishment characteristics and some aspects of compliance suggest that improved compliance can be achieved. High levels of compliance should be a mandatory requirement for all solarium operators and it may be that mandatory staff training, as suggested by others [34] is a potential avenue for increasing compliance. Other potential harm-minimisation strategies such as increased taxation on sunbed use may be useful in decreasing the number of exposures to artificial UVR.

4.3. Study limitations

The potential for variability in the data should be considered when interpreting the results. Although the data collection was as standardised as possible, variability may have resulted depending on which staff member the simulated customer contacted. The ability of the study to look at geographical variation (other than for metropolitan *versus* non-metropolitan areas) in compliance was an additional limitation. This was a result of the need to have the simulated customers operate in defined geographic areas to contain data collection costs and time frames. However, given the nature and rigour of the study, these limitations are considered to be relatively minor.

It should be noted that the approach taken in this study to assessing compliance is quite conservative, giving the establishment two opportunities to comply with certain recommendations. It should also be noted that as the simulated customers were not able to identify the type of sunbed, the number of establishments providing the recommended advice on session times is likely to be an over-estimate.

In conclusion, minimising the harm associated with solarium use may require much higher levels of compliance with the international recommendations than was found in this study. While adherence to these recommendations could not remove fully the risk associ-

ated with UVR exposure; refusing access to those at greater risk and fully informing all users should be a minimal standard required for solarium operation. There is a need to explore avenues for greatly improving compliance, particularly those relating to age restrictions, skin type, health claims, warning signs and consent forms. While putting the recommendations into legislation may be useful, effective strategies for educating staff should also be explored, together with other strategies such as increased taxation that are likely to reduce patronage.

Conflict of interest statement

None declared.

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