

REGULATORY IMPACT STATEMENT

National Directory for Radiation Protection: Amendment No. 4 - Solaria

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This Regulatory Impact Statement has been prepared for consultation purposes, as required by the Council of Australian Governments' "Best Practice Regulation: A Guide for Ministerial Councils and Standard-Setting Bodies".

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Summary

The proposed Amendment No. 4 (Solaria) to the National Directory for Radiation Protection would set nationally agreed regulatory standards relating to the use of solaria for the first time. The proposed amendment contains the following substantive elements:

- Prohibition on persons under 18 years of age using sun-tanning units;
- All exposures to sun-tanning units to be subject to supervision by an operator;
- All persons supervising the operation of sun-tanning units to be trained;
- Only such trained persons to initiate exposures;
- Skin type to be assessed by operators and persons with skin type 1 to be prohibited from using sun-tanning units; and
- Clients to provide written consent before using a sun-tanning unit; and
- Specified limit on exposure in an individual session and on minimum time between successive sessions.

These requirements will be adopted as law in all States and Territories, with each jurisdiction to determine how the requirements will be legislated.

Three alternatives to the proposed provisions have been assessed. The first differs from the proposed amendment in that it would continue to allow 16 and 17-year-olds to use solaria, subject to written parental permission being obtained. This alternative has the advantage of allowing parents to make choices in relation to their children's health. However, it is expected to be substantially less effective in reducing harms to health due to the use of sun-tanning units, particularly given that people who use these units from a young age are particularly vulnerable to skin cancer.

The second alternative would differ from the proposed amendment in that it would not prohibit the use of solaria by persons with type 1 skin. This alternative has the important intangible benefit that it does not place a regulatory barrier in the way of adults' decisions as to what risks they choose to undertake in relation to their own health. However, since some persons with type 1 skin would inevitably choose to continue to use solaria, this alternative has a lower expected value than the proposed amendment to the NDRP.

The third alternative considered is a non-regulatory one, in which reductions in use of sun-tanning units, particularly by vulnerable groups, would be achieved through the establishment and maintenance of a public education campaign. This would be particularly focused in schools. The assessment of the benefits and costs of the three options considered is subject to substantial uncertainty,

relating in particular to the questions of how effective an education-based approach would be likely to be in practice and, to a lesser extent, how effective a parental permission requirement would be in reducing use by 16 and 17 year olds. However, Table S1 summarises the best available estimates of the benefits and costs of the three options considered.

Table S1: Comparison of expected benefits and costs of alternative proposals (present values over 10 years)

Option	Expected benefits	Expected costs	NPV
Proposed NDRP amendment	\$53.8 - \$122.3m	\$8.9m	\$44.9 - \$113.4m
NDRP amendment without exclusion of <18 yr olds	\$45.8 - \$104.0m	\$8.9m	\$36.9 - \$95.1m
NDRP amendment without exclusion of persons with Type 1 skin	\$43.0 - \$97.8m	\$8.9m	\$34.1m - \$88.9m
Education campaign	\$26.9m-\$61.2m	\$54.4m	-\$27.5m - +\$6.8m

The table shows that the proposed NDRP amendment is expected to have a net present value of between \$44.9 million and \$113.4 million over ten years. The wide range of values cited reflects the use of two effectiveness scenarios and two valuations of a statistical life in carrying out the present value calculations.

The expected NPV is substantially above that of the remaining two options considered. The option of adopting a similar NDRP amendment but without prohibiting under-18 year olds would also have a positive expected NPV, but this is expected to be in the range \$36.9 million - \$95.1 million. The second option, of adopting an NDRP amendment that did not exclude persons with type 1 skin, has a slightly lower expected NPV again, being in the range \$34.1 - \$88.9 million. The third option, that of relying on an education campaign to change behaviour, could potentially have a small positive NPV but is more likely to have a negative expected value. This reflects the high cost of delivering educational initiatives in all Australian schools.

Given these results, it is proposed to adopt the NDRP amendment. It should be noted that the development of the proposed amendment has been cognisant of the parallel process of development of a revised Australian Standard in this area and that the proposed amendment to the NDRP and the current draft of the revised Standards are generally consistent.

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1. Nature and extent of the problem

1.1. Overview

In recent decades in Australia there has been a substantial increase in the level of awareness of the problem of skin cancer and the need to act to reduce the incidence of skin cancers. Australia has among the highest skin cancer rates in the world¹ and substantial public policy action has been taken in recent times with a view to reducing the incidence of skin cancer and its associated health and financial costs.

The single major risk factor in relation to skin cancer is exposure to ultraviolet radiation. The great majority of this exposure necessarily derives from exposure to sunlight. However, there is now also a significant and accumulating body of evidence demonstrating that exposure to ultraviolet radiation in the context of solarium use is an important contributor to skin cancer risk.

Box 1: Defining sun-tanning units

Gordon (2007) defines sun-tanning units (or tanning lamps) as being “*devices that emit artificial ultraviolet radiation. Individuals expose their skin to the radiation for the purpose of inducing a tan while indoors for cosmetic reasons*”.

Gordon et al (2007)² report that:

Results from a meta-analysis of 21 studies investigating the association between solarium use and risk of skin cancer show an increased risk for developing melanoma (by 22%) and squamous cell carcinoma (by 78%), an increased risk of melanoma for first users under 35 years (by 98%) and for women (by 71%). (pp 3-4).

The finding of an increased risk of melanoma due to the use of sun-tanning units was found to be statistically significant: the mean increase in risk for those who had ever used a sun-tanning unit was increased by 22%, while the 95%

¹ Specifically, Australia has the highest rate of Melanoma, the most deadly skin cancer, among males and the second highest rate among females. See: *Australia's Health 2004*. Australian Institute of Health and Welfare.

² Gordon L & Hirst N. (2007). *The health effects of using solarium and potential cost-effectiveness of enforcing solarium regulations in Australia*. Queensland Institute of Medical Research, November 2007.

confidence interval was between a 7% and 39% increased risk. That is, there is a 95% probability that an increase in melanoma risk within this range is incurred due to use of a sun-tanning unit.

Moreover, while

... individuals who have ever used a solarium have a 22% increased risk of developing melanoma. When the analyses were confined to studies which adjusted for other possible explanations for increased numbers of melanomas (skin cancer history, outdoor exposure behaviours, age etc) the associated risk was even greater at 1.36. (pp 32-3).

That is, on the best available measure, persons who use sun-tanning units increase their risk of developing melanoma by more than one third. Gordon *et al* also find that the use of solaria increases the risk of developing Squamous Cell Carcinoma (SCC) by 78%, although it does not appear to increase the risk of developing Basal Cell Carcinoma (BCC).

The above quote from Gordon cites particularly large increases in melanoma risk for those who first use sun-tanning units when under 35 years of age. Other research indicates that exposure to ultraviolet light during adolescence is strongly associated with later development of melanoma. For example, Autier (2008)³ states that

“A considerable body of experimental and epidemiological data supports the hypotheses that childhood and adolescence are the key periods of life for the initiation of the mechanism involved in the genesis of adult melanoma”.

This clearly indicates that adolescents using sun-tanning units can be expected to be at very high risk. Work by Veierod *et al* (2003)⁴ specifically estimates the increased melanoma risk due to childhood and adolescent sun-tanning unit exposure. Veierod studied 106,379 females in Sweden and Norway between 1991-1999 and found exposure to sun-tanning units of greater than or equal to one month between the ages of 10-19 was associated with an increased melanoma risk of 52% (95% CI (0.56-4.12)).

At the same time as evidence about the extent of the hazard posed by use of sun-tanning units has been accumulating, the extent of use of these devices in the Victorian and Australian population has been growing rapidly. According to

³ Autier, P. (2008), “Artificial ultraviolet sources and skin cancers: rationale for restricting access to use of sun-tanning units before 18 years of age”, *National Clinical Practice Oncology*, April 2008, vol. 5, no. 4, p. 178-179.

⁴ Veierod MB, Weiderpass E, Thorn M, *et al*. A prospective study of pigmentation, sun exposure, and risk of cutaneous malignant melanoma in women. *J Natl Cancer Inst* 2003;95:1530–8.

Makin *et al* (2007)⁵ there has been a 300% increase in the number of sun-tanning units operating in Australia's capital cities in the decade to 2006. Moreover, Makin reports that the increase in numbers has occurred throughout Australia, with the exception of the Northern Territory:

From 1996 to 2006, there were increases in the number of listings in all capital cities except for the Northern Territory, where no solariums were listed in 2006. There were continuous increases in the decade from 1996 to 2006 in Adelaide (by more than 200%), Brisbane (more than 200%), Melbourne (more than 500%), and Perth (1000%). In Canberra, Hobart, and Sydney, there were also net increases over the past decade; the number of solariums listed increased by more than 400% in Canberra, more than 100% in Sydney, and more than 70% in Hobart. Melbourne had more solariums in 2006 than any other capital city, with nearly three times more listings than Sydney. Whereas in the 1990s the majority of solariums appeared to be independently operated, in 2001 and 2006 more than one-third of all solariums were affiliated with franchise networks (p 192).

Makin reports that a total of 406 solarium businesses were identified nationally in 2006. However, this is a substantial under-estimate of the actual number of such businesses, since the method used to identify them was based on Yellow Pages listings. In addition, these estimates excluded businesses that operated sun-tanning units as an ancillary to their main activity, such as beauty salons and gyms. A full census of solarium businesses operating in Victoria was conducted by the Victorian Department of Human Services in 2007 and found that tanning units were operating at 436 sites – or more than the total number identified Australia-wide in 2006, based on Yellow Pages listings. This suggests that the true number of businesses operating sun-tanning units in Australia is likely to be well over 1,000⁶.

Risk levels

A standard definition of risk is as follows:

Risk = hazard x exposure

In these terms, the fact that the level of exposure of the Australian population is increasing rapidly implies that the total risk to the population posed by solarium use is also increasing rapidly.

⁵ Makin JK, Dobbinson SJ & Herd NL. (2007) *The Increase in Solariums in Australia 1992 – 2006*. Australian and New Zealand Journal of Public Health Vol 31., No. 2, pp 191-192. Data on solarium numbers based on Yellow Pages listings.

⁶ As Victoria has only around 25% of Australia's population, the DHS census figure could, at first glance, be consistent with a national figure of 1,700. However, Makin reports that Victoria has a substantially larger than average number of solariums, suggesting that the true number may be significantly lower than this.

Moreover, comparative international data suggest that there is a significant probability that the extent of exposure to solarium use may increase much further. Dobbinson *et al* (2006) reported rates of solarium use for female adolescents of up to 70% in Sweden and between 37% and 42% in the United States, whereas Gordon (2007) reports that only 12% of NSW school children were found to have used solariums in a recent survey. Moreover, this figure is substantially higher than the 3% of Victorian adults who reported having used a solarium in the previous 12 months in 2004. These data suggest that solarium use in the general population is highly likely to continue to increase, assuming that a significant proportion of younger users continue to use solariums over time⁷.

The fact that current rates of solarium use in Australia appear to be substantially lower than those experienced in the United States and some European countries also suggests the possibility of further increases in solarium use, particularly when considered in the context of the recent trend toward rapidly increasing numbers of solariums in Australia and some direct evidence of rapid increases in the proportion of the population using solariums⁸. This would necessarily result in increased population exposure to the harms associated with solarium use.

Market failure issues

Gordon (2007) argues that the solarium industry is characterised by market failures, arising notably from information asymmetries. In particular, marketing activities undertaken by the industry have promoted solariums as offering health benefits, while the risks of solarium use have gone largely unacknowledged. While the relevant Australian Standard (*Australian Standard AS/NZS 2653: Solariums for Cosmetic Purposes*) requires information about cancer risks arising from the use of solariums to be provided to intending users, the standard has only voluntary status. The most recent survey based evidence (see below) finds that such information is provided in less than 50% of cases and that the rate of provision of this information has declined over time. This provides a strong indication that the non-regulatory efforts undertaken to date to correct market failure due to information asymmetries have had only limited success.

A second issue arises from the generally youthful age profile of solarium users. The Australian standard currently requires that parental consent be given before those under 16 years of age can use a solarium. However, survey data show that compliance with this requirement currently also stands at below 50%. Moreover, there is no equivalent requirement for 16 and 17 year olds to obtain parental consent, notwithstanding that persons under 18 years of age are acknowledged to be relatively ill-equipped to make rational choices in their own

⁷ That said, climatic differences suggest that rates on solarium use in Australia are not likely to reach the levels seen in northern Europe.

⁸ A 2001 "SunSmart" survey found that only 1.5% of Victorians used sun-tanning units. Hence, Dobbinson's 3% figure suggests a doubling of this rate in only 5 years.

interests in many circumstances. This can also be considered to be an issue of market failure.

Section 1.3., below, provides further information on the development and adoption of the Australian standard as a non-regulatory means of addressing these market failure issues, together with other major risk factors in relation to solarium use and highlights the limited effectiveness of this non-regulatory approach.

1.2. Estimates of the current health costs of solarium use

Recent research has attempted to estimate the extent of the impact of solarium use in increasing overall population exposures to ultraviolet radiation. In particular, Diffey (2003)⁹ developed a model to estimate the impact of artificial UV radiation on melanoma rates. Diffey estimated that solarium use accounts for between 3% and 12% of total exposure to ultraviolet radiation for the British population. Using the midpoint of this range (7.5%) and citing estimates that 80% of melanomas result from exposure to ultraviolet radiation, Diffey estimates that 6% of all melanomas in the British context can be attributed to the use of solarium¹⁰.

Diffey's model has been adopted, with variations, by Gordon *et al* (2007) to develop estimates of the contribution of artificial UV radiation to melanoma and Squamous Cell Carcinoma (SCC) rates¹¹ in the Australian context. Gordon concludes that the contribution of sun-tanning units to melanoma is much smaller in Australia than in the UK, for two major reasons:

- **Greater natural UV exposure.** The average intensity of ambient UV radiation in Australia is extremely high by world standards and is, for example, a factor of 2-4 times higher than in the United Kingdom. Thus, notwithstanding the fact that a far smaller portion of the population engages in outdoor suntanning in Australia, the overall population dosage due to "natural" UV exposure is substantially higher in Australia than in the UK.
- **Lower sun-tanning unit usage.** Gordon reports that the proportion of the Australian population using sun-tanning units is substantially lower than that in the UK and that the intensity of solarium usage by this group in

⁹ *A quantitative estimate of melanoma mortality from ultraviolet A sun-tanning unit use in the UK.* British Journal of Dermatology, Vol. 149, pp 578-581 (2003).

¹⁰ This estimate may overstate the role of solarium to some extent, as there is evidence to suggest that sunburn constitutes a specific risk factor for the development of melanoma, while burning does not generally occur as a consequence of sun-tanning unit exposure.

¹¹ Research indicates that exposure to UV radiation does not affect risk levels for Basal Cell Carcinoma, the other major category of skin cancer.

Australia is also significantly lower than in the UK¹². Therefore, total population exposure to UV radiation from artificial sources is substantially lower in Australia than in the UK.

Given the combination of these two effects, Gordon estimates that the contribution of sun-tanning unit usage to total melanoma incidence in Australia is 0.4% (range 0.2% to 0.8%)¹³. Gordon's calculations suggest that the relative contribution of sun-tanning unit exposure to total melanoma incidence in Australia is only approximately 1/15th of that in the UK¹⁴.

Nonetheless, Gordon estimates that four melanoma deaths per year (range 1 – 7 deaths) and 34 new cases of melanoma per year (range 12 – 62 cases) in Australia are caused by sun-tanning unit exposure¹⁵. Using a similarly specified model, Gordon also estimates the impact of sun-tanning unit exposure on SCC cases.

1.3. Specific problems associated with the use of solaria

A number of factors influence the degree of risk associated with solarium use. Recognition of risk and responsibility issues has led, over time, to the development of an Australian Standard to guide industry practice. This is *Australian Standard AS/NZS 2653: Solaria for Cosmetic Purposes*. Key elements of the Standard include the following:

- **Information provision:** information about the cancer risk associated with solarium use should be provided to all clients and potential clients.
- **Protective goggles:** protective goggles should be provided at all times to minimise the risk of eye injury due to solarium use.
- **Skin type:** Potential users' skin type should be assessed by solarium staff.
- **Prevention of access:** Intending users who are assessed as having fair skin that will not tan (i.e. "Type 1 skin" should not be allowed to use the solarium.

¹² Gordon's model is based on an estimated mean number of sun-tanning unit sessions of 10 per year per user.

¹³ This estimate and, by implication, the following estimates of numbers of deaths, was derived through modelling using the Monte Carlo statistical method.

¹⁴ Diffey's UK estimated range of 3-12% of melanomas caused by sun-tanning unit exposure compares with Gordon's range of 0.2 – 0.8%.

¹⁵ Based on data from the Australian Institute for Health and Welfare (AIHW)(2003), there are 1,146 deaths annually due to melanoma in Australia and 9,524 newly diagnosed cases of Melanoma. More recent data, released after the preparation of Gordon's paper (ABS 3303.0) show that the number of melanoma deaths increased to 1,238 in 2006. Clearly, applying the same methodology to this figure would yield a slightly higher estimate than that reached by Gordon.

- **Parental consent:** Intending users under 16 years of age should be prohibited from using the solarium unless they have parental consent.

These five key elements of the Australian standard address two distinct types of issues. Firstly, the provisions in relation to protective goggles and skin type/prevention of access aim to reduce health risks to solarium users. The provision of protective goggles serves to protect the eyes, which are particularly vulnerable to damage from ultraviolet radiation exposure. The denial of access to the solarium to persons judged to have fair skin that will not tan ensures that those at greatest risk of developing skin cancer from exposure to ultraviolet radiation are prevented from using solaria¹⁶.

Secondly, the provisions in relation to information provision and obtaining parental consent aim to ensure that all users of solaria have effectively provided informed consent before exposing themselves to the risks in question. In the case of users under 16 years of age, the provisions ensure that parents/guardians are aware of, and consent to, their child's exposure.

High rates of compliance with the Australian Standard would be expected to reduce substantially the health costs associated with solarium use. However, the standard currently has only the status of a voluntary code. That is, providers of solarium services are under no legal obligation to comply with the requirements of the standard.

Actual compliance levels have been monitored over a period of time. This monitoring indicates that the level of compliance with the different major requirements of the standard varies substantially, with very low compliance with some of the most important elements being observed. Moreover, there has been little improvement in compliance rates in recent years, as the following data indicates.

Table 1, below, summarises compliance rates with various elements of the Standard, as reported in a 2004 study. Table 1 shows that compliance with the requirement to provide protective goggles is high, with these devices being provided in almost 9 out of 10 cases. The provision of information about the cancer risks of solarium use occurs in about seven out of 10 cases.

However, compliance with the remaining requirements is substantially lower. Potential users' skin type is assessed only slightly more than half of the time, while fair-skinned persons (i.e. those with type 1 skin) are denied access to the solarium in only about one out of 10 cases. Clearly this latter provision is of

¹⁶ Factors making individuals particularly susceptible to developing skin cancers include having type 1 skin, having red hair, having blue eyes and having large numbers of moles on the skin. Age at first use of a solarium is also associated with increased skin cancer risk, although this is likely to be strongly correlated with the extent of overall UV exposure.

paramount importance to the ability of the standard to reduce the health costs of solarium use.

Finally, the standard's requirement to prevent access to the solarium to children under 16 without parental consent is enforced less than half of the time.

Table 1: Compliance of solaria with key elements of the Australian Standard - 2004

Requirement of standard	Compliance (%)
Information about cancer risk given	70%
Protective goggles supplied	87%
Skin type assessed	57%
Prevention of access for the fair-skinned	10%
Access without parental consent (under 16s) prohibited	48%

Source: *Compliance of inner Melbourne solarium centres with a revised industry standard: access by teens and customers with a sensitive skin type.* Dobbinson, S. & Wakefield, M., Department of Human Services, October 2004.

Table 2 reports the results of a 2006 study into compliance with the standard. In general, it shows relatively little change in the level of compliance with aspects of the standard since the 2004 study. However, in respect of all of the five elements of the standard listed, the direction of change is a negative one; that is, compliance rates have actually fallen.

Table 2: Compliance of solaria with key elements of the Australian Standard - 2006

Requirement of standard	Compliance (%)
Information about cancer risk given	47%
Protective goggles supplied	80%
Skin type assessed	50%
Prevention of access for the fair-skinned	7%
Access without parental consent (under 16s) prohibited	45%

Source: *Access to commercial indoor tanning facilities by adults with highly sensitive skin and by under-age youth: compliance tests at solarium centres in Melbourne, Australia* Dobbinson S, Wakefield M, Sambell N. Department of Human Services, 2006.

In sum, while the adoption of the provisions contained in the Australian standard by all solarium operators would constitute a relatively effective means of reducing the harms associated with solarium use, experience over a number of years with the implementation of the standard as a voluntary measure shows that it has, at

best, been partially effective. Moreover, there was no evidence of any improving compliance trend: rather, the contrary appeared to be the case. Given that this situation of limited compliance with major elements of the standard has persisted, in an environment in which virtually all members of the solarium industry are fully aware of the existence of the standard, it was considered that further action to substantially improve compliance with its provisions was required in order to address effectively the problems identified above. For this reason, the proposed amendment to the NDRP has been developed. Once these provisions are adopted in regulations by State and Territory Governments there will be enforceable requirements regulating access to sun-tanning units.

1.4. Potential role of general legislation

The CoAG Best Practice Regulations Guide requires that the potential effectiveness of better using existing regulation should be considered as an option to deal with the identified problem. Consideration of existing legislation of general application in the current context suggests the possibility that the Trade Practices Act 1974 could have application in the context of some of the problems identified above in relation to the solarium industry.

Specifically, concerns exist that a proportion of the harms due to solarium use may result from the fact that consumers are misled or deceived regarding the safety and/or health benefits associated with solarium use. To the extent that this is the case, action could potentially be taken under the Trade Practices Act's provisions in relation to misleading and deceptive conduct.

Key concerns in terms of current practices that may give rise to potential action of this sort would include:

- The making of claims, in the context of advertising and promotional material, that solarium use is or may be associated with health benefits; and
- concerns that solarium staff may, in some instances, deny or downplay the risks associated with the use of a solarium by persons with type I skin or the very young, when questioned by potential customers.

For the TPA to be used effectively in this context enforcement action must rely primarily on the ACCC, since solarium users will presumably not be motivated to take such actions in the majority of cases.

The ACCC has, to date, undertaken one action under the relevant sections of the TPA¹⁷. In August 2008 the Federal Court upheld claims of misleading and deceptive conduct engaged in by the Australian Tanning Association, Body Bronze International Pty Ltd and Tropical Sun Industries Pty Ltd, as well as Mr

¹⁷ These are Sections 52, 53 and 55.

Scott Meneilly, a former CEO of Body Bronze. The Federal Court judgement included declarations that a range of statements made in promotional material were false and misleading, an order to pay the costs of the ACCC, injunctions against the parties to restrain them from similar conduct in future and a requirement on the parties to implement a trade practices compliance program.

The statements found to be false and misleading were as follows:

1. There is no evidence linking solarium use with an increased risk of skin cancer;
2. A solarium provides the same ultraviolet light as sunlight;
3. The tanning process does not involve damage to the skin;
4. Tanning protects the skin against sunburn and from the risks of sunburn;
5. Tanning protects the skin from ultraviolet light and the risks of ultraviolet light exposure;
6. The body repairs any damage to the skin caused by ultraviolet light exposure;
7. The skin is not damaged by ultraviolet light exposure unless it receives a sunburn;
8. Body Bronze's "Tan Smart Registration" form and Tropical Sun's Skin Type Analysis forms could be used to accurately assess a person's Skin Type in order to ascertain a person's tanning and burning ability and predict his or her response to ultraviolet light exposure.

The success of this recent action clearly indicates that the TPA has the potential to be a somewhat effective instrument in preventing the consumer being misled regarding the dangers of solarium use, particularly given that the penalties levied would be quite significant in relation to the commercial operations of the parties involved.

Effective action under the TPA can thus be expected to reduce the incidence of solarium use by some groups and, consequently, the resulting harms to some degree. In particular, the most valuable groups could be significantly less likely to use solariums in a consequence in which operators were more likely to inform them of the relevant risks -- e.g., by acknowledging the risks to users with type I skin, rather than minimising or denying these risks, as some recent surveys have shown to be quite common practice within the industry at present.

However, while it is feasible that the TPA may be moderately effective as a tool to reduce the incidence of misleading and deceptive conduct by solarium operators, this conduct constitutes only one element of the problem identified in the preceding sections. The concerns raised in relation to use by persons under 18 years of age are not likely to be effectively addressed in this way, particularly

given the relative insensitivity of this group to risk. It is also apparent that, while the use of solaria by persons with type I skin that may be significantly reduced in this way, it will certainly not be eliminated, as is expected to be the case if the proposed amendments to the NDRP are adopted.

In sum, action under the TPA could potentially address important aspects of the identified problem, but would leave other aspects unaddressed. Moreover, the practical effectiveness of TPA based measures over the medium-term must remain subject to some uncertainty. No other generally applicable legislation has been identified that would be capable of substantively addressing the identified problem.

2. Statement of regulatory objectives

Given the problem statement contained in the preceding section, the objectives of the proposed policy action in this area are:

- To reduce the incidence of mortality and morbidity from skin cancer arising from exposure to artificial UV radiation;
- To protect particularly vulnerable groups from skin cancer risks due to exposure to artificial UV radiation; and
- To ensure that the public is better informed regarding the risks of exposure to UV radiation.

3. Options considered

Four options have been identified that are substantially capable of achieving the above objectives. The first three options involve adopting changes to the current National Directory on Radiation Protection. Adoption of any of these options would have the effect of requiring State and Territory governments to adopt the substantive requirements of the NDRP amendment in their legislation, due to the terms of the relevant inter-governmental agreement on radiation protection. These three options differ in the degree of stringency they apply in respect of restricting the access of under-18 year olds and persons with Type 1 skin to sun-tanning units.

The fourth option considered is that of adopting a non-regulatory response, based on implementation of a public education campaign focused on secondary schools.

The following provides additional detail on each of these alternatives.

3.1. Option 1: NDRP amendment including prohibition on under-18 year olds

The first option is to amend the NDRP to incorporate the following substantive restrictions on the operations of commercial sun-tanning units:

- Prohibition on persons under 18 years of age using sun-tanning units;
- All exposures to sun-tanning units to be subject to supervision by an operator;
- All persons supervising the operation of sun-tanning units to be trained in a range of matters including the relevant Australian Standards, determination of

skin types and exposure times, screening for exposure limiting conditions and emergency procedures;

- Only such trained persons to initiate exposures;
- Skin type to be assessed by operators and persons with skin type 1 to be prohibited from using sun-tanning units;
- Clients to provide written consent, using a specified form, before using a sun-tanning unit; and
- Limit on exposure per tanning session and on the minimum time between tanning sessions.

3.2. Option 2: NDRP amendment not include prohibition on under 18 year olds

The second option considered is to amend the NDRP in broadly the same terms as in Option 1, above, but without the prohibition on the use of sun-tanning units by under-18 year olds.

In lieu of this total prohibition, written parental permission would be required to be obtained before a person under 18 years of age was permitted access to a sun-tanning unit. This approach is consistent with the current Australian Standard (AS 2635: Solaria for Cosmetic Purposes).

This option would effectively allow parents to decide whether their children should be able to use solaria, rather than applying a blanket prohibition.

3.3. Option 3: NDRP amendment not including a prohibition on persons with type 1 skin

Option three is similar to option one, differing essentially in that it would not include a complete prohibition on the use of solaria by persons with type I skin. Instead, persons with type I skin that would be required to sign a modified consent form which explicitly and knowledge that they had been informed of the substantially higher risks attaching to solarium use by persons with their skin type and that they had voluntarily chosen to accept these risks.

The rationale for this option is that, unlike persons under 18 years of age, over 18-year-olds with type I skin should be regarded as autonomous adults and accorded the right to make decisions as to the risks that they choose to bear, free of legislated intervention. That is, this option would be favoured if it were seen to be unduly paternalistic to ban solarium use by a particular subgroup of adults.

3.4. Option 4: Education campaign

The fourth option is a non-regulatory response. It is based on implementing a public education campaign to better inform people of the health risks associated with the use of sun-tanning units generally and of the main specific risk factors, including first use at an early age, use by persons with type 1 skin and use by persons with large numbers of moles or with a family history of skin cancer.

This option would be based on providing the proposed public education largely within the secondary school context. This reflects the fact that young people are easily the largest single users of sun-tanning units and the fact that they are particularly vulnerable to skin cancer as a result of this exposure. It also reflects the fact that they are less likely to be well-informed of the health risks involved.

4. Expected benefits and costs of Option 1

4.1. Expected benefits of Option 1

4.1.1. Expected benefits of individual elements of the proposed amendment

The following discusses the rationale for each of the elements of the proposed NDRP amendment contained in option1 , in terms of its contribution to the overall expected benefit of reduced sun-tanning unit-related skin cancer incidence.

Prohibition on use by under-18 year olds

This group are intensive users of solaria, while research evidence indicates that the negative health impacts of the use of sun-tanning units by adolescents are substantially larger than those resulting from use by older persons. This group is also regarded as having limited capability to give informed consent, due to their immaturity and the delayed incidence of the harms to health from use of sun-tanning units.

The adoption of this provision will thus substantially reduce the use of sun-tanning units by one of the largest and most vulnerable user groups and will thus significantly contribute to the overall reduction in harms expected to result from the adoption of the amendment as a whole.

It should also be noted that prohibition on use by under-18 year olds is consistent with the United Nations recommendations on the use of sun-tanning units¹⁸.

Prohibition on use by persons with type 1 skin

Type 1 skin burns but does not tan. Moreover, research shows persons with this skin type to be at substantially higher risk of developing skin cancer due to exposure to UVR than persons with other skin types. Despite this, significant numbers of persons with this skin type seek access to solaria.

The adoption of this provision will prevent a large and vulnerable user group from using solaria. It is therefore also a substantial contributor to the overall reduction in harms expected to result from the adoption of the amendment.

¹⁸ See Section 7, below..

Written consent requirement

The consent form required to be signed by all clients prior to commencing use of sun-tanning units contains basic information on the health and aesthetic risks associated with the use of these units and on safety precautions associated with their use.

The requirement for written consent will therefore ensure that users are making a reasonably informed choice to submit themselves to the risks involved and help ensure that they use sun-tanning units in a risk minimising manner. This requirement is likely to make a small contribution to reductions in overall use rates and a small reduction in the incidence of risky use. The latter effect is expected to occur because consumers will be more likely to raise safety issues (e.g. use of goggles) in the event of poor practice by operators.

Requirements relating to trained operators

The amendment includes three related requirements: that all operators must be training in a range of safety-related issues, that all exposures must be initiated and supervised by these trained operators and that these operators must assess a client's skin type before permitting access to the sun-tanning unit.

These requirements are expected to reduce harms in two ways. First, the training and skin assessment requirements are essential to ensure a high level of compliance with the prohibition on access for persons with type 1 skin. Second, the training, initiation and supervision requirements are expected to reduce the incidence of poor practice in the use of sun-tanning devices.

Exposure limits

The limit on total exposure in any one session to 90% of the amount of radiation required to produce sunburn will, by avoiding burning of users of sun-tanning units, reduce the harms associated with their use. This reflects the fact that sunburn is an additional risk factor for skin cancer. That is, for a given total UV exposure level, a person who has suffered sunburn will have a higher probability of developing skin cancer.

The minimum 48 hour gap before repeat exposure is intended to provide an additional measure of protection against burning of the skin.

4.1.2. General overview of expected benefits

Box 2: The base case

The base case against which the benefits and costs of the three options considered in this RIS are measured is the situation currently obtaining in most Australian States and Territories. This involves the continued promotion of the Australian Standard to the solarium industry and users as a purely voluntary code.

Given the evidence discussed above to the effect that compliance with the Standard had reached a plateau prior to the adoption of the interim regulations, it is assumed that the pre-existing compliance rates would remain broadly unchanged in the base case.

While both Victoria and South Australia already have regulations in place that are broadly consistent with Option 1, these regulations have been very recently introduced, so that the benefits attached to them are not yet visible. Moreover, in both cases, knowledge of the impending NDRP amendment has been a significant driver of the regulations adopted.

The adoption of Option 1 would be expected to reduce substantially the incidence of melanoma and SCC as a result of solarium exposure in Australia. It would achieve this effect by reducing the rate of use of sun-tanning units and, in particular, by preventing their use by vulnerable elements of the population. The European Union's Scientific Committee on Consumer Products has identified those groups particularly at risk of melanoma as follows:

The important biological risk factors for malignant melanoma are age, sex (in some populations), skin phenotype, moles, freckles and family history.¹⁹

Option 1 would address, in particular, the use of solaria by persons in two of these categories: those with the most vulnerable skin type (Type 1) and those under 18 years of age.

Gordon (2007) argues that regulation of the kind proposed would be expected to reduce solarium use in three distinct ways:

- Reduction in solarium use due to prohibition on use by persons under 18 years of age;

¹⁹ EU Scientific Committee on Consumer Products (2005) *Preliminary Opinion on Biological Effects of Ultraviolet Radiation Relevant to Health with Particular Reference to Sun-tanning units for Cosmetic Purposes*. SCCP/0949/05

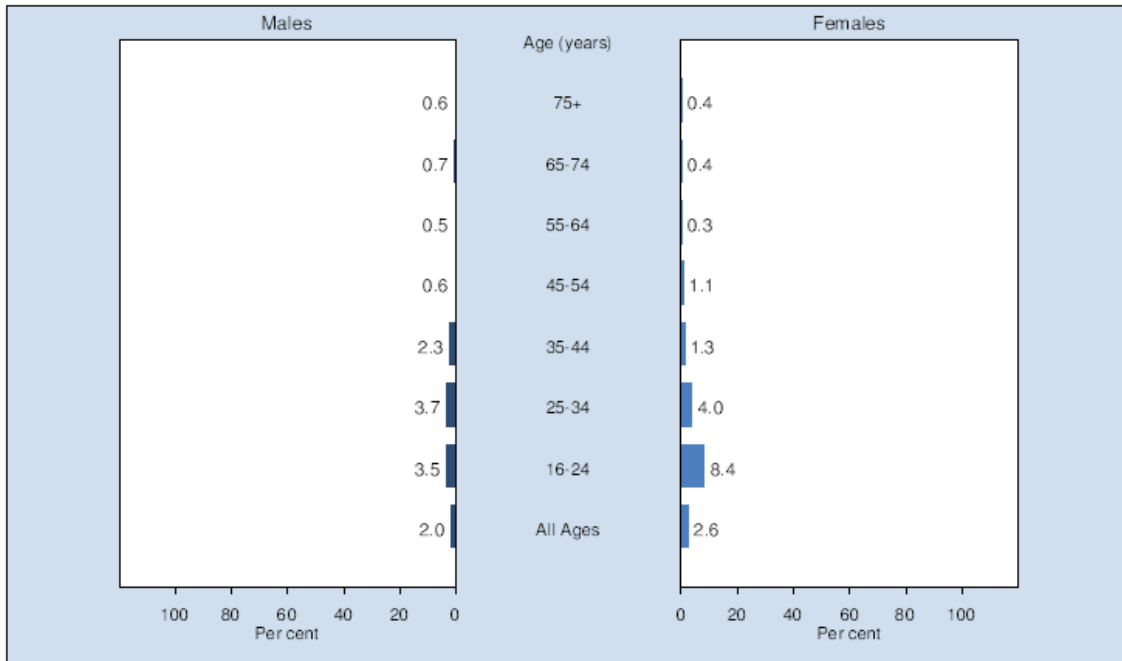
- reduction in solarium use due to prohibition on use by persons with type 1 skin; and
- reduction in solarium use as a result of the increased use of consent forms (which, as noted, contain health warnings and related information).

In addition, the safety of sun-tanning units would be improved in a number of ways. In particular, improved operator control over the length and frequency of exposure would reduce health risks for users.

Reduction in sun-tanning unit use due to prohibition on persons under 18 years of age

The incidence of use of sun-tanning units is strongly concentrated within younger age groups. This is demonstrated in the following graph, based on data from New South Wales. The graph presents the results of survey questioning as to whether respondents had used a solarium at any time during the past 12 months, with the proportions answering that they had used a solarium being disaggregated according to age group.

Graph 1: Solarium use in preceding 12 months by age group



Source: Gordon (2007), p 10.

The graph shows that the prevalence of solarium use is far higher among younger age groups, particularly for females. Among females, the 16 to 24 age group is more than three times as likely as the general population to have used a sun-tanning unit, more than twice as likely as the 24-34 age group to use sun-tanning units and almost eight times more likely than the 45-45 age group to use sun-tanning units.

Option 1 would clearly significantly reduce solarium use among this age group by completely prohibiting use by 16 and 17-year-olds. Use by under-16 year-olds, who fall outside this age group, would also be prohibited. However, Gordon suggests that there may be some, partially offsetting, increase in the solarium used by 18-year-olds as latent demand, caused by the ban on under 18-year-olds, is satisfied.

The health effects of this impact in prohibiting use by the youngest users are particularly important since, as noted above, there is clear evidence that melanoma risk increases as the age at which a solarium is first used declines. The fact that under-18 year olds are particularly vulnerable to harm from solarium use combines with concerns over their ability to give informed consent to provide the rationale for moving to prohibit this age group from using solarium under the proposed regulations, in contrast to the position under the current Australian Standard, whereby parental consent must be obtained only in respect of users 16 years of age or younger. The World Health Organisation, the Cancer Council and Australian College of Dermatologists support the ban on under 18 year olds.

Reduction in use of sun-tanning units due to prohibition on use by persons with type 1 skin

Gordon notes that there is strong evidence of differential skin cancer risk for persons with different physical characteristics. The known risk factors for melanoma include:

- Fair skin that burns easily (i.e., skin type I)
- Green or blue eye colour
- Red hair colour
- Numerous moles on the skin
- Family history of melanoma

Gordon reports that having skin type 1 has been found to increase melanoma risk by 110 per cent, compared with the general population. Having light-coloured eyes (blue or green) increases risk by 50%. Having red hair increases risk by 260%. Having large numbers of moles on the skin is the largest risk factor, with persons having 101 to 120 moles having a 590% greater melanoma risk than those with fewer than 15 moles. (Gordon (2007), p 23).

Given these factors, and the fact that a number of these risk factors would be cross-correlated with having type 1 skin, the prohibition on use by persons with type 1 skin is expected to reduce substantially the melanoma risk faced by users of sun-tanning units.

Reduced use as a result of the combination of the use of consent forms incorporating health warnings

Melanoma risk will also be reduced somewhat due to the combined effect of these factors in reducing the overall incidence of solarium use. Gordon argues that the size of this effect can be expected to be relatively small. However, it is important to note that the purpose of these measures is to provide greater confidence that solarium use is based upon informed consent.

4.1.3.. Estimating total benefits

Gordon's model

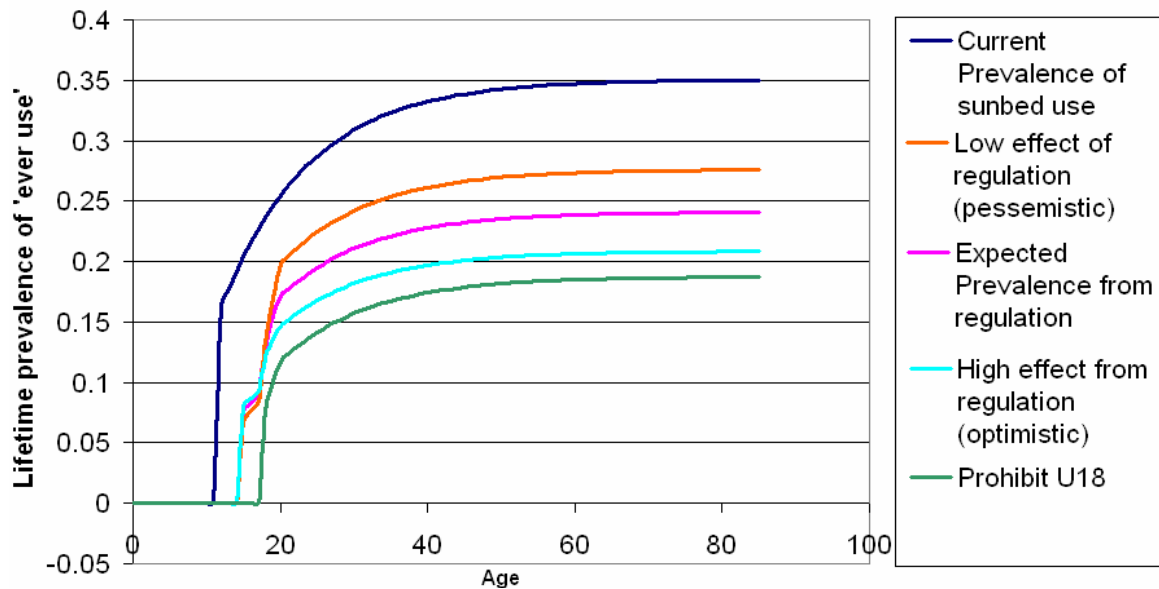
Gordon has modelled the expected total impact of restrictions similar to those contained in Option 1. Graph 2, below, summarises these expected impacts. The graph indicates the expected impacts of these restrictions on the proportion of the population that will ever use sun-tanning units, measured against age.

Given that Option 1 includes a total ban on the use of sun-tanning units by persons under 18 years of age, the lowest (green) line represents the expected post-regulation incidence of use of sun-tanning units. The graph demonstrates that the proportion of the population to have used sun-tanning units at some point in their life is expected to approximately halve, from 35% to 18% as a result of the impact of the proposed regulations. Specific impacts modelled are:

1. Reduction in use of sun-tanning units of 19% due to exclusion of persons with type 1 skin.
2. Reduction of 100% in use of sun-tanning units by 15-17 year olds due to exclusion of this group.
3. Reduction in use of 10% due to increased use of consent forms and other informed consent based factors.
4. Increase in incidence of use of sun-tanning units by 18, 19 and 20 year olds of 3%, 2% and 1% respectively²⁰.

²⁰ This effect is assumed to exist and is seen as a response to the prohibition on under-18 year olds using solarium.

Graph 2: Impact of Option 1 on lifetime prevalence of use of sun-tanning units



Thus, the expected impact of option 1 includes the exclusion from solariums of a substantial proportion of the population which is at highest risk (i.e. those with type 1 skin), the exclusion of a significant part of the largest user age cohort (i.e. 15-17 year olds) – which is also a group at substantially elevated risk– and a reduction in the proportion of the population using solariums due to the various “informed consent” measures.

As the above graph indicates, the combined impact of these measures is expected to be an approximate halving of the proportion of the population using solariums. Moreover, since the reductions in solarium use will be concentrated amongst those at highest risk, it can be expected that the effectiveness of the regulations in reducing skin cancers due to solarium use will be significantly greater than 50%.

Gordon models the expected reductions in skin cancer using the lifetime impact on a specific age cohort. However, this approach is not consistent with that generally adopted in the RIS context, for at least two major reasons.

First, the time horizon involved substantially exceeds the 5 – 10 year lifespan of regulations in most Australian States²¹. This time horizon is problematic since it necessarily assumes the maintenance of the currently proposed regulations into

²¹ “Sunsetting” provisions ensure the automatic repeal of subordinate legislation in most Australian States.

the distant future, a factor which cannot be guaranteed. It is also problematic since the modelling of the costs of the regulations is rendered virtually impossible over such a time horizon.

Second, this approach to analysis does not account directly for the health impact of the regulations on current adults. These impacts are clearly significant, both as a result of the exclusion of persons with type 1 skin and as a result of reduced use due to “informed consent” effects. Put in other terms, the Gordon analysis focuses on a particular age cohort, rather than considering the expected impact of regulation on the population as a whole.

Preferred approach

Given the above problems, Gordon’s model has not been used as the basis for benefit estimation in this RIS. Rather, the reduction in harm due to solarium use has been estimated by applying a global estimate of the proportionate reduction in existing harm likely to result from solarium use.

Base case

As noted above, Gordon estimates that, Australia wide, four deaths from melanoma annually are attributable to use of sun-tanning units, while 34 new cases of melanoma annually are also estimated to result from use of sun-tanning units. This estimate has been developed in a context in which the Australian Standard has been in place for several years as a voluntary measure. These figures are therefore used to generate the “base case” from which expected benefits are calculated.

Given the rapid recent rate of growth in the use of sun-tanning units in Australia it is arguable that the base case estimate of sun-tanning unit related harms should include continuing increases in the currently estimated harms over the next several years. However, recent evidence indicates that following the extensive publicity relating to the connection between solarium use and skin cancer over the past year (commencing with attention to the case of Claire Oliver) the growth in the number of sun-tanning units in operation may have halted, or even been reversed.

In particular, data from Victoria, which adopted a licensing requirement for all businesses using sun-tanning units in late 2007, indicates a 30% reduction in the number of units in use over the past 12 months²². This decline is likely to be larger than that occurring nationally, given that Claire Oliver was a Victorian and the case was, consequently, likely to have received much greater publicity in that state than elsewhere. Moreover, the observed decline may well be transient in

²² The existence of a licensing requirement means that a definitive count of existing sun-tanning units can be made in Victoria, unlike other jurisdictions.

nature, as awareness of the case and its effect in modifying consumer behaviour fade over time.

However, while there is inevitably uncertainty over the long-term impact of this increase in awareness of health risks associated with the solarium use, it seems possible that the rate of use of sun-tanning units would stabilise over the medium term, even in the absence of regulatory intervention. Given this, the base case is specified in terms of maintenance of existing rates of solarium use. The impact of adopting this assumption, rather than that of an upward trend in the rate of solarium use, is to introduce a significant measure of conservative bias into the estimation of the expected benefits of the proposed regulations. That is, if a base case of increasing use of sun-tanning units were substituted into the analysis, the expected benefits of the proposed regulation would be substantially larger than that modelled below.

Reductions in use due to Option 1

The global estimate of reduction in use of sun-tanning units developed by Gordon can be applied to her estimates of current harms to obtain estimates of the expected benefits of the adoption of Option 1. Specific indicators of the likely impact of this option are as follows:

1. Lawler et al (2006)²³ found that approximately 19 per cent of solarium users in Queensland had type 1 skin. Assuming the intensity of their solarium use to be average, an effective prohibition on the use of solaria by those with type 1 skin could reduce solarium use by 19 per cent²⁴.
2. Graph 1 shows that solarium use is most prevalent among the 16-24 age group. Prohibiting use by 16 and 17 year olds can be expected to reduce overall solarium use substantially.
3. As Graph 2 demonstrates, Gordon's behavioural model assumes that there will also be a long-term impact of preventing solarium use by those under 18 years of age. That is, if prevented from using a sun-tanning unit while adolescents, it is assumed that it is less likely that the habit of using sun-tanning units will be initiated later in life.
4. Gordon also assumes a 10% reduction in use of sun-tanning units due to behavioural effects prompted by the combination of greater use of health warnings and bans on positive health messages being disseminated.
5. Graph 2 suggests that the current under-15 age cohort will be almost 50% less likely ever to take up use of sun-tanning units if the

²³ Lawler, SP., Kvaskoff, M., DiSipio, T., Whiteman, D., Eakin, E., Aitkin, J. & Fritschi, L. (2006). *Solaria Use in Queensland, Australia*. Australian and New Zealand Journal of Public Health, Vol 30, No. 5, pp 479-482.

²⁴ Gordon adopts this estimate in her model.

combination of bans on under-18s and bans on those with type 1 skin are implemented.

The total impact of the above factors cannot be estimated with precision. However, the combination of the 19% reduction in use due to prohibition of use by those with Type 1 skin and a 10% reduction due to behavioural factors yields a 29% estimated reduction in use.

The exclusion of under-18 year olds is also likely to reduce usage substantially. As noted above, a NSW survey found that 12% of schoolchildren had used sun-tanning units in the preceding 12 months. This compares with figures cited in Gordon (2007) and reproduced in Graph 1 indicating that the usage rate for the 16-24 age group as a whole was only 6%, while usage rates for the remaining age groups were: 25-34 (3.8%), 35-44 (1.8%), 45-54 (0.9%) and older age groups (approximately 0.5%). On this basis, it seems likely that the 16 – 24 age group may account for as many as half of users and that the 16 – 17 year old cohort may account for almost half of the users within this group²⁵.

This should not be taken as suggesting that 20-25% of users are likely to be in the 16-17 age group, however, since the intensity of their use may well be lower than the average. Nonetheless, it is plausible that, say, 10% of visits to sun-tanning units are undertaken by 16 and 17 year olds.

If under-18 year old users are estimated to comprise 10% of current users, their exclusion would bring the total estimated reduction in use to around 40% in the short term, while the total reduction would be around 45 – 50% in the medium term, due to the behavioural effect Gordon proposes. Another factor which could potentially be relevant would be a possible reduction in the intensity of solarium use by those who continue to use them, due to increasing health concerns prompted by the health warnings contained in the consent forms.

Thus, it seems reasonable to suggest that the aggregate impact of the various provisions of option 1²⁶ would be to reduce solarium use by half. This estimate implicitly assumes a high level of compliance – i.e. 90+%. In assessing the probability of such high compliance rates being reached, it can also be noted that the level of compliance with the Australian Standard in recent years was relatively high, at least in respect of certain provisions, given its voluntary status. This can be taken as suggesting that the industry would be likely to exhibit significantly higher rates of compliance with compulsory regulatory requirements.

Reduction in skin cancers

²⁵ i.e. they form around 22% of the age group (2 year cohorts of 9 in total) and have twice the propensity to use solaria of the age group as a whole.

²⁶ Or, strictly speaking, the licence and licence exemption conditions to be imposed through them.

The actual impact on sun-tanning unit related skin cancer would necessarily be significantly greater than the actual reduction in the number of visits. This is because the largest part of the reduction in overall use derives from the exclusion of two particularly vulnerable groups: those with Type 1 skin and the very young. As noted in Section 1, above, those with Type 1 skin have been found to have a 110% increase in melanoma risk due to solarium use. Similarly, those first using solaria in adolescence experience a 52% increase in melanoma risk. By comparison the increase in melanoma risk due to solarium use for the general population was found to be 22% (or 36% when adjusted for other exposure factors).

The importance of this factor is difficult to model accurately. Consequently, two scenarios are modelled. In the low impact scenario, the rate of reduction in tanning unit caused skin cancer is estimated at 60% and in the high impact scenario it is estimated at 80%. The former scenario effectively assumes that those who are excluded from using sun-tanning units (or otherwise choose not to use them as an outcome of aspects of the regulations) have on average a 20% higher risk of melanoma than the general population, while the latter scenario assumes that this group has a 60% higher average risk. Given the above data on specific comparative risk for the two main excluded groups, these scenarios are considered to both be well within the reasonable range of expected outcomes.

As noted above, the base case against which these potential reductions is measured is the current situation of around 4 deaths per annum due to melanoma and 34 new cases of melanoma per annum due to sun-tanning unit exposures in Australia.

Based on these two scenarios, the following table estimates the expected reductions in skin cancers due to the regulations over a 10 year period.

Table 3: Estimated skin cancer reductions due to adoption of Option 1

	Low scenario		High scenario	
	Annual reduction	10 year impact	Annual reduction	10 year impact
Melanoma mortalities	2.4	24	3.2	32
Melanoma cases	20.4	204	27.2	272
SCC cases ²⁷	212	2,123	283	2,831

²⁷ Gordon's model estimates that enforcement of the regulations would prevent approximately 10.4 times as many SCCs as new cases of melanoma (see Gordon (2007), Table 11).

Table 3 shows that between 24 and 32 deaths from melanoma would be expected to be averted, assuming a 10 year life of the regulations implementing the proposed amendment. Between 204 and 272 cases of melanoma would also be averted, while between 2,123 and 2,831 cases of SCC would be averted.

Data summarised by Gordon indicated that the average latency period for melanoma is, most likely, only about two years. On the other hand, the average latency period for SCC is approximately 10 years. Thus, if the regulations are assumed to have a 10-year lifespan, the benefits in terms of reductions in melanoma cases and mortalities can be modelled as occurring between year three and year 13 after the introduction of the regulations, while the reduction in cases of SCC are appropriately modelled as occurring between years 11 and years 20.

Valuation of the benefits

Two basic approaches to benefit valuation had been adopted. First, in respect of melanoma mortalities averted, a Value of a Statistical Life (VSL) figure based on revealed willingness to pay has been adopted. In fact, two scenarios have been modelled, based on two different VSL figures. The first is a figure of \$3.5 million, while the second is a figure of \$6.0 million. Both of these figures have been derived on the basis of meta-analyses of the academic research on this issue conducted in Australia recently²⁸.

Second, the approach taken to valuing reductions in non-fatal cases of melanoma and cases of SCC replicates that of Gordon. Gordon's model estimated only the benefits of cost savings to Medicare due to reductions in requirements for medical treatment of these conditions. The average cost of treating a non-fatal case of melanoma was estimated at \$1,272, while the average cost of treating a case of SCC was estimated at \$995.

This approach has the effect of adding a second significant source of conservative bias to benefit estimation. Conceptually, benefit estimation should include benefits attributable to reductions in productivity losses as well as benefits attributable to reductions in pain and suffering. However, quantification of both of these benefits in monetary terms is problematic and, indeed controversial.

Table 4 summarises the expected dollar values of the benefits attributable to the proposed regulations, based on the above data and methodology. All figures are expressed in present value terms²⁹.

²⁸ See Access Economics (2008) *The Health of Nations: The Value of a Statistical Life*. Report prepared for the Office of the Australian Safety and Compensation Council. Abelson, P. (2007). *Establishing a Monetary Value for Lives Saved: Issues and Controversies*. Paper prepared for the Office of Best Practice Regulation.

²⁹ All present values in this document are calculated using a real discount rate of 3.5 per cent.

Table 4: Estimated benefits of Option 1

	High impact scenario		Low impact scenario	
	High VSL	Low VSL	High VSL	Low VSL
Value of lives saved	\$149,061,889	\$86,952,769	\$111,796,417	\$65,214,576
Medical cost savings (melanoma)	\$268,610	\$268,610	\$201,457	\$201,457
Medical cost savings (SCC)	\$859,210	\$859,210	\$644,408	\$644,408
Total benefits	\$150,189,709	\$88,080,589	\$112,642,282	\$66,060,441

Note: High VSL figure is \$6.0 million, low VSL figure is \$3.5 million. High impact scenario assumes 3.2 deaths per annum due to melanoma are averted. Low impact scenario assumes 2.4 deaths per annum averted.

Table 4 shows that the present value of the estimated benefits of Option 1 varies from a minimum of approximately \$62.2 million dollars over 10 years to a maximum of \$149.1 million. The overwhelming majority of these benefits derive from the fact that 9 – 12 lives are expected to be saved. By contrast, the reduction in medical expenses is estimated to be in the range \$846,000 - \$1.13 million approximately.

An additional sensitivity analysis has also been undertaken based on the assumption of a longer, 10 year latency period between radiation exposure and melanoma diagnosis and a similar 10 year latency period between radiation exposure and death from melanoma. This reflects the fact that there is some uncertainty regarding the existence and length of a latency period for melanoma and that, while a number of papers have suggested a two year latency period, at least one paper has suggested that a 10 year latency period may be more realistic.

Under this sensitivity analysis, the benefits due to reduced incidence of, and mortality from, melanoma now occur between years 11 and 20 of the analysis, rather than years 3 – 12. Thus, the value of the benefits is more heavily discounted. Table 5, below, summarises the results of this sensitivity analysis.

Table 5: Estimated benefits of Option 1 – long latency

	High impact scenario		Low impact scenario	
	High VSL	Low VSL	High VSL	Low VSL

Value of lives saved	\$121,261,943	\$70,736,133	\$90,946,457	\$53,052,100
Medical cost savings (melanoma)	\$218,514	\$218,514	\$163,886	\$163,886
Medical cost savings (SCC)	\$859,210	\$859,210	\$644,408	\$644,408
Total benefits	\$122,339,667	\$71,813,857	\$91,754,751	\$53,860,394

Table 5 shows that, under the long latency scenario, expected benefits lie in the range \$53.9 million to \$122.3 million, compared with \$62.2 million to \$149.1 million in the short latency scenario. This represents a reduction of between 13.3% and 18.0% and indicates that the results are relatively insensitive to the assumptions made as to the latency periods for melanoma, within the plausible range.

4.2. Expected costs

4.2.1. Estimating the costs of Option 1

As noted above, a total of 406 businesses nationally were found to be advertising the availability of sun-tanning units in the Yellow Pages in 2006. It was noted that this necessarily represents substantially fewer than the total number of businesses actually offering these services. Thus, an adjustment to this estimate must be undertaken in order to obtain a reasonably reliable estimate of the number of businesses likely to be affected in Australia.

Makin et al (2006)³⁰ found 169 solarium businesses in Victoria in 2006, while the currently licensed number of solarium businesses in Victoria is 272, or 61% more than the Makin estimate. If it is assumed that the current number of solarium businesses across Australia is equal to 1.61 times the Makin estimates from 2006, the total number of affected businesses will be:

$$406 \times 1.61 = 654.$$

Each of these 654 businesses will be subject to the regulatory requirements made to implement the provisions of the NDRP amendment. However, while each State and Territory will be required to implement the substance of the amendment, the specific mechanisms by which they choose to do so are subject to their discretion. Thus, the actual costs imposed can be expected to vary somewhat in different States, reflecting the different choices made as to how to implement the requirements.

Given this, cost estimation has been carried out on the basis of the methodology developed in Victoria, which is currently the only jurisdiction to have adopted regulations that are generally in conformity with the NDRP amendment and to have completed an RIS in respect of those regulations. The following applies this methodology to national data and estimates. However, the actual costs incurred in implementing the amendment will potentially vary significantly from these estimates if substantially different implementation choices are made by other states and territories.

4.2.2. Licensing costs

Under the Victorian regulations, solarium businesses are required to be licensed, while operators working in these businesses are exempt from licensing, subject to compliance with a range of conditions. It is assumed that all States and Territories will adopt a licensing requirement for solarium businesses, as this

³⁰ Makin, J., Herd, N. & Dobbinson, S. (2006). *An Audit of the Increase in Sun-Tanning Centres (Solariums) in Urban Australia, 1992 – 2006*. Cancer Council of Victoria, December 2006.

appears to be the minimum necessary requirement in order to ensure a high level of compliance with the proposed NDRP amendment. Hence, licensing costs have been estimated in line with the Victorian RIS methodology.

The Victorian licence fees have been established on a “full cost recovery” basis. That is, the fees set are expected to recover the regulatory costs incurred by the Department of Human Services. These costs include both the administrative costs of the licensing process and the substantive regulatory costs of inspections, responses to public complaints and the like.

Licence fees

Licence fees have been set on the basis of a “one-off” application processing fee (\$99.20) plus a fee based on how many units are to be possessed (\$110.20 per unit for a one year licence).

As noted above, it is estimated that there are 654 businesses operating sun-tanning units nationally. The Victorian average is $(828/272) = 3.04$ tanning units per business. Thus, the total number of tanning units operating nationally can be estimated at:

$$654 \times 3.04 = 1,989.$$

The initial licence application costs are therefore estimated at:

$$654 \times \$99.20 = \$64,877$$

While the annual licence fees (and hence the annual regulatory cost) is estimated at:

$$\$110.20 \times 1,989 = \$219,188$$

Other, licensing related costs to business

For solarium businesses, the direct licensing costs incurred include both the payment of these licensing fees and the time costs involved in preparing licensing applications and lodging these with the regulatory authority.

Applications for Victorian licences must contain:

- Details about the proposed radiation practice.
- Details about any radiation sources to be possessed
- Details about the sites where the radiation practice is proposed to be conducted.

- Details of any radiation safety systems proposed to be used e.g. shielding of radiation sources.

The amount of detail required to be provided in relation to the above issues is quite low. Thus, the costs of preparing and lodging licence applications are also expected to be low. Applications can be transmitted either in paper or electronic form under the Victorian regulations.

Given the limited nature of the information required and the ability to lodge licence applications electronically, it is estimated that the time cost to business to undertake these tasks be approximately equal to be time taken by DHS to assess licence applications. Given that the latter has been estimated above to cost approximately \$64,877 per annum, this implies that the value of the time taken by business to compile and submit licence applications will also be of the order of \$64,877 per annum.

Thus the initial licensing costs to be borne by business are estimated at approximately \$129,754 per annum, comprising \$64,877 in time costs and \$64,877 in fees payable to regulatory authorities.

In addition, businesses using sun-tanning units will incur costs associated with the enforcement of the regulations. These will notably include making their premises and records available to regulators when inspections are conducted, answering questions from regulators in this context and the like. Again, these costs are estimated to be approximately equal to the regulatory enforcement costs incurred by government. These costs are estimated above at approximately \$219,188 per annum.

The total annual costs borne by solarium businesses as a result of licensing requirements will comprise year 1 costs of $(64,877 \times 2) = \$129,754$ plus annual costs³¹ of $(\$219,188 \times 2) = \$438,376$. The present value of these costs is therefore \$3.8 million over ten years.

It should be noted that these costs represent only the administrative costs of compliance with the regulatory requirements. The substantive compliance costs are discussed separately in the following section.

4.2.3. Other costs to solarium businesses

In addition to the cash costs of licensing, discussed above, business owners will incur costs associated with the need to train operators, undertake skin type assessments, obtain written consent from clients and verify that younger users are 18 years of age or over.

³¹ Annual cost amount is also borne in year 1, in addition to the initial application fee.

Training costs

It is proposed that the required operator training will be delivered via a self-administered, on-line training package. Such a package is currently under development.

The use of self-administered on-line training is intended to ensure that the necessary skills are acquired by operators in the most cost-effective way. The costs of training of this type are essentially confined to the cost of the time the operator must devote to completing the training package and demonstrating competence. Given that the training module will be relatively small in size, it is anticipated that business owners will expect both currently employed operators and new job applicants to complete the training in their own time, rather than providing paid leave for completion. Thus, it is not expected that any cost will be borne by business owners in respect of the training requirement other than that of verifying that the operator has undertaken the training module. This is likely to be achieved by viewing a print-out of the operator's certificate of satisfactory completion.

These costs are likely to be quite small in size.

The costs of training will, according to the above assumptions, be "non-cash" costs. That is, they essentially comprise the value that operators place on the loss of leisure time consequent on the need to complete the training. According to standard economic theory, people make choices between work and leisure, adjusting their working hours until they reach the point at which the value of an hour of additional leisure is equal to the net income from an additional hour of work. Given this assumption, wage rates can be used as the basis for a calculation of the implicit value of leisure time foregone due to the need to complete the training requirement.

No specific information is available on the average wages earned by operators in solarium businesses. Hence, the award wage rate for a Retail Worker Grade 1 is used to estimate this average wage. The award wage is \$526.40 for a 38 hour week³². This is equivalent to \$13.85 per hour. However, this is the gross wage. A marginal tax rate of 30c would be applicable to a full-time worker on this wage, implying an after-tax wage rate of ($\$13.85 \times .7 = \9.70).

It is assumed that the training will take approximately four hours to complete. This reflects the need for operators to be familiar with the relevant provisions of the Australian Standard, as well as the specific items noted in the proposed amendment (see above). Thus, the time cost of completing the training requirement is estimated at:

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[http://www.wagenet.gov.au/WageNet/Search/view.asp?docid=253544&query=\(\(%20AW798407\)\)&page=15&quickview=Y](http://www.wagenet.gov.au/WageNet/Search/view.asp?docid=253544&query=((%20AW798407))&page=15&quickview=Y)

$\$9.70 \times 4 \text{ hours} = \$38.80 \text{ per operator.}$

A total of 654 businesses, operating 1,989 solarium units will be affected. It is assumed that each business employs an average of four operators. This implies that 2,616 operators would need to complete the training requirement at the commencement of the regulations. In addition, newly employed operators will need to complete the training requirement. If turnover in the industry is estimated at 10%, this suggests approximately 262 operators per year will need to undertake training in subsequent years.

Thus, the year 1 cost of training is estimated at:

$2,616 \times \$38.80 = \$101,501.$

The cost in each subsequent year is equal to 10% of this, or \$10,150 approximately. This cost is equal to \$172,675 in present value terms over ten years.

Skin type assessments

The cost of conducting skin type assessments will be a cash cost borne by business owners, since their employees will be required to undertake these assessments as part of the normal operations of the business. Thus, the wage costs of the time required to complete the assessments are attributable to Option 1.

No specific method for conducting skin type tests is required to be used. However, a widely adopted approach is to adopt the Fitzpatrick Skin Typing Test³³. This test is used in the relevant Australian Standard. This test contains 10 questions, measuring genetic predisposition, reaction to sun exposure and tanning habits. It is likely that about 10 minutes would be required to complete this test, with the solarium operator being required to calculate the results and, presumably, to check their plausibility against visible evidence. However, each client would need to complete the test only once at each solarium. Thus, this is a “one-off” cost for the solarium proprietor in respect of each client.

The costs of obtaining written consent and of verifying ages are also “one-off” costs in respect of each client, rather than being ongoing costs borne at each visit. The time taken to complete these requirements is expected to be minimal.

It must also be noted that these requirements are contained within the current Australian Standard. Thus, additional costs will be incurred only by those solarium operators who do not currently comply with the standard.

³³ For an example of this test, see: http://www.spa-medical.com/fitzpatrick_skin_typing_test.htm

As an indicative calculation, it is assumed that the time taken to administer the skin type test and obtain written consent will average 10 minutes per client. In the first year of operation of the regulations, the test will need to be administered to all clients who have not had it administered as a result of voluntary adherence to the Australian Standard by their solarium. As noted above, compliance with this provision was 50% in 2006. Thus, the number of tests to be carried out in year 1 will be equal to 50% of the total number of solarium clients. In subsequent years, new solarium clients and those who change solariums will need to complete the test and sign a consent form. This group is assumed to account for 10% of solarium users.

The proportion of the Australian population using solariums has been estimated by Gordon³⁴ at 6.7%. Thus, the number of clients that will complete the tests in year 1 is estimated as being equal to 6.7% of the population, less the 50% of this group that has already completed the test due to solariums voluntarily complying with the Australian Standard. Thus, around 3.4% of the population will be affected, equal to around 714,000 clients. In subsequent years, 0.67% of the population will be affected, or 140,700 clients per year.

Based on the above gross hourly wage of \$13.85 and a 75% labour on-cost figure, the cost per test/consent form is $1/6 \text{ hour} \times \$13.85 \times 1.75 = \$4.04$ per test. Thus, the cost of testing and consent forms in year 1 will be $\$4.04 \times 714,000 = \$2,884,560$. The cost in each subsequent year would be equal to $\$4.04 \times 140,700$, or \$568,428, based on current usage patterns. However, it is assumed that usage will be reduced by approximately 50%. Thus, the adjusted annual cost is estimated at half of this figure, or \$284,214 per annum³⁵. The present value of these costs over 10 years is equal to \$4.9 million.

4.2.4. Reduced revenues for solarium industry

The adoption of the regulations is expected to reduce substantially the current extent of solarium tanning. As noted above, the incidence of tanning in the general population is expected to fall by around 50% following implementation.

No data on the current turnover in the industry are available. It should be noted that many sun-tanning units are operated as a part of another business (e.g. hairdresser or beautician), rather than being a part of a dedicated solarium business. This adds to the difficulty of estimating revenue effects.

³⁴ Gordon's estimate was derived by averaging the results of a range of published surveys on usage.

³⁵ By contrast, the year 1 cost has not been discounted by 50% because it is not considered likely that any substantial reduction in solarium use will occur immediately. Given that some reduction will occur from the outset (e.g. due to the banning of under-18 year olds), this assumption incorporates a degree of conservative bias into the cost estimates (i.e. the costs will be slightly over-estimated).

One recent business for sale advertisement claims revenue of \$67,600 for a four bed solarium business. This is equal to approximately \$16,900 per sun-tanning unit. Such a figure can obviously be taken as indicative only.

Moreover, the total number of sun-tanning units in operation is also unknown. It is known that there are currently 828 licensed sun-tanning units operating in Victoria, given that regulation is already in place requiring licensing. Using the estimate of Makin et al (2006) that Victoria accounts for 41.6% of solarium businesses nationally (i.e. 169 of 406 businesses identified), the number of sun-tanning units in operation nationally can be estimated at:

$$828 \times 1/.416 = 1,989 \text{ sun-tanning units.}$$

Thus, the current annual revenue of the industry can be estimated at:

$$1,989 \times \$16,900 = \$33,614,100.$$

This would imply that, if solarium use were to be reduced by 50%, as predicted in the previous section, the regulations could lead to a reduction in revenue of around \$16.8 million per annum. This is equivalent to a reduction in revenue of \$139.8 million in present value terms over the expected 10 year life of the regulations.

This is not an economic cost. In economic terms, the majority of this amount can be considered to be a transfer from the solarium industry to producers of a range of other goods and services. That is, to the extent that demand for solarium services declines, this can be expected to result in consumers switching expenditure to other services.

Some of these services would be expected to be provided by the same service providers: for example, many former solarium users (including those who may continue to use a solarium but do so less frequently due to increased risk awareness) may choose to use spray tanning as an alternative. This service is offered by many solarium businesses. To the extent that this shift in demand occurs, it would not represent a loss of revenue to solarium businesses but, rather, a simple shift from sales of one product to another.

4.2.5. Loss of utility due to reduced individual choice

While the loss of revenue for solarium operators has been identified above as constituting a transfer, rather than a real economic cost, economic theory does indicate that a relatively smaller economic cost will often be associated with changes in expenditure patterns that are induced by regulation.

If a consumer is assumed to be fully informed then, in the absence of externalities or other market failures, their expenditure choices are assumed to be utility maximising. Thus, if a regulation causes changes in those choices, it is regarded as having a distorting effect on consumer preference and, as a consequence, leading to a reduction in total consumer utility. The size of this reduction in total consumer utility is normally equal to only a small proportion of the total quantum of expenditure that is transferred to other consumption possibilities. Thus, in the current case, the potential loss of consumer utility would be equal to some small proportion of the estimated total reduction in expenditure on solarium services of \$139.8 million over 10 years.

In the case of Option 1, it is most likely that the loss of consumer utility involved will be very small. The net impact on consumer utility can be regarded as being the sum of three separate effects:

- First, some consumers who are fully informed of the risks involved, who currently choose to use solarium services regardless of those risks and who would be excluded from using solarium by the regulations will suffer a loss of utility. The only identifiable group in this category is those with type 1 skin;
- second, some currently ill informed consumers who currently use solarium services will, as a result of aspect of the regulations aimed at improving consumer information and reducing the prevalence of potentially misleading information, choose to no longer use solarium services, or to use fewer solarium services. The reduction in consumption by this group will be associated with an increase in consumer utility, since choices will increasingly be made on the basis of full information; and
- third, some consumers who are deemed to be unable to give informed consent will be excluded from using solarium services. This group comprises those under 18 years of age. The impact on consumer utility of excluding this group from solarium cannot be objectively determined³⁶.

There is necessarily a considerable degree of uncertainty as to the relative size of these three impacts. However, the fact that they operate in different directions and that they therefore offset each other, at least to some extent, and suggests that any net loss in consumer welfare as a result of the introduction of Option 1 will be very small.

³⁶ Gordon's model assumes that some proportion of this group will commence using solarium services as soon as possible after reaching 18 years of age. For this group, the prohibition on the use of solarium when under 18 is, presumably, associated with a loss of utility. However, for those who, at 18 years of age, decide not to engage in solarium use the prohibition on them using solarium when under 18 would, at least arguably, increase utility.

4.2.6. Summary of costs

Given the above it is clear that, from the viewpoint of society as a whole, the economic costs (as distinct from economic transfers) associated with Option 1 are as follows:

Table 6: Estimated costs of proposed regulations (PV over 10 years)

Cost	Amount
Licensing related costs	\$3.8 million
Training	\$0.2 million
Skin type assessments	\$4.9 million
Total	\$8.9 million

The costs of Option 1 are therefore estimated at \$8.9 million in present value terms over 10 years. In addition, reductions in revenue from sun-tanning units of \$139.8 million are expected to result from the adoption of the regulations.

5. Expected costs and benefits of option 2

5.1. *Expected benefits of option 2*

The benefits of this option will necessarily be similar in large part to those of option 1, since this option differs only in that it does not completely exclude under-18 year olds from using sun-tanning units. However, given that under-18 year olds form a substantial user group, total benefits are expected to be substantially smaller than those associated with the proposed amendment.

It was estimated above that approximately 10% of solarium visits may currently be undertaken by under-18 year olds. The exclusion of this group under the proposed amendment thus accounts for around one fifth of the expected 50% total reduction in patronage of solarium businesses. Under this alternative, there would be some reduction in use by this age group, due to the requirement that parental consent be obtained in writing and the expectation that a proportion of parents would refuse to give consent.

The size of this reduction in patronage is difficult to estimate, given the lack of available information on parent attitudes in this regard. However, given that the results of visiting a sun-tanning unit are obvious, it can be speculated that relatively few of the current under-18 year old users have parents that would be likely to withhold consent. If it is speculated that only 25% of parents would withhold consent, this suggests that the reduction in use by under-18 year olds under this alternative would be equal to only 2.5% of current patronage, rather than 10% under the proposed amendment.

Thus, if all other elements of this alternative were to be identical to the proposed amendment, the expected reduction in solarium use would fall from around 50% to around 42.5%. This implies a reduction of 15% (i.e 7.5%/50%) in the benefits attributable to this alternative, vis-à-vis the proposed amendment.

The expected benefits of the proposed amendment have been estimated in Section 4 as lying within the range \$53.9 million - \$122.3 million. Thus, the expected benefits of this alternative would be within the range \$45.8 million – \$104.0 million.

However, a second benefit of this alternative is that it preserves a greater degree of individual choice as to use a solarium than do the proposed regulations. Under this alternative, parents who felt that their 16 or 17 year old children were capable of making an informed choice, and who did not wish to prevent them from using solarium, would be able to give them permission to do so. These adolescents would then not be prevented from using solarium.

It can be noted that this alternative is consistent with the approach taken under the current Australian Standard on solarium use, and under the current interim regulations, whereas the proposed regulations go further in this area. More broadly, it is common for regulation to recognise parental responsibility for their children in a wide range of relatively low-risk circumstances by allowing them to make a decision as to whether their child may participate in a risky activity. This alternative would be consistent with that general regulatory approach.

5.2. *Expected costs of option 2*

The costs of this alternative would be essentially identical to those of the proposed regulations. These were estimated above at \$8.9 million over 10 years in present value terms.

There would be a small additional cost associated with the need to obtain and file parental consent forms from under-18 year old users, rather than simply denying them access. This cost has not been quantified.

The reduction in revenue for solarium businesses would also be somewhat smaller under this alternative. Given the expected 15% reduction in the size of the move away from the use of sun-tanning units under this alternative, the fall in revenue would be expected to be around \$118.8 million over ten years (in present value terms), rather than \$139.8 million under the proposed amendment.

6. Expected benefits and costs of option 3

6.1. Expected benefits of option 3

Option three would also achieve many of the identified benefits associated with option one. An additional, intangible benefit associated with option three is that it would avoid imposing what would be seen by many as a paternalistic legislative prohibition on the use of solarium by a particular subgroup of adults (i.e. those with type I skin).

The benefits associated with option three would be lower than those associated with option 1 to the extent that it was less effective in reducing the current usage rate of solarium by persons with type I skin. It is assumed that, under this option, persons with type I skin that would be required to sign a modified consent form that specifically knowledge that they had been informed of the substantially higher risks faced by persons with their skin type when using solarium and that they had voluntarily chosen to expose themselves to this risk.

This requirement would combine with the proposed ban on the making of positive claims regarding the health impacts of solarium and the requirement for more general warnings to be provided, in common with both options one and option two. Taken together, these provisions would be expected to reduce the current incidence of use of solarium by persons with type I skin. However, many persons with type I skin would undoubtedly continue to use solarium. Data presented in section 4 (citing Lawler (2006)) show that almost one fifth of solarium users have type I skin. It is considered highly unlikely that all of this group are unaware of the significantly higher risks which they face when using solarium. Rather, a substantial proportion of this group can be assumed to have made a conscious choice to continue solarium use despite understanding these risks, at least in general terms.

It must be assumed that this subset of solarium users with type I skin would continue to use solarium under option two. Moreover, a proportion of the group of solarium users with type I skin and are currently unaware of the relevant risks would also be expected to continue solarium use even after being provided with information regarding these risks, as would be required under this option.

In the absence of any specific information on the risk awareness of this group, the benefits of this option have been modelled on the basis of assumption that 50% of the current group of users with type I skin would continue solarium use, while the other 50% would cease to use a solarium. Since 19% of solarium users have type I skin, this implies that 9.5% of solarium users would continue their solarium use under this option, whereas they would be banned from solarium use

under option one. Overall, this implies that the total reduction in the quantum of solarium use would be around 40% under this option, by comparison with 50% under option one. That is, the expected benefits of option three would be approximately 80% as large as those estimated above in respect of option one.

Table 7 Estimated benefits of Option 3

	High impact scenario		Low impact scenario	
	High VSL	Low VSL	High VSL	Low VSL
Value of lives saved	\$119,249,510	\$69,562,215	\$89,437,136	\$52,171,660
Medical cost savings (melanoma)	\$214,888	\$214,888	\$161,166	\$161,166
Medical cost savings (SCC)	\$687,368	\$687,368	\$515,526	\$515,526
Total benefits	\$120,151,766	\$70,464,471	\$90,113,828	\$52,848,352

Table 7 shows that the expected benefits of option three remain substantial, with the expected value of these benefits lying in the range \$52.8 million to \$120.2 million.

6.2. Expected costs of option 3

the real economic costs of option three are effectively indistinguishable from those of option one, since all of the cost drivers identified in section 4.2, above, are equally applicable to option three. At the margin, it could be argued that very slightly larger costs would accrue under option three, due to be assumed requirement for persons with type I skin to be presented with a specific consent form and, by implication, with specific information as to the health risks faced by persons with their skin type when using solarium. However, any such cost increase is considered to be modest and no attempt has been made to quantify this additional cost.

Quantitatively speaking, the major costs identified in respect of all the regulatory options under discussion is that of reduced revenues for the solarium industry as a result of declining consumer patronage. These costs, which have been identified above as constituting transfers (in the economic sense), rather than economic costs, are necessarily reduced under option three, vis-à-vis option one.

The cost analysis presented in respect of option one was based on a 50% reduction in consumer patronage and predicted revenue reductions averaging \$16.8 million per annum, or \$139.8 million in present value terms over 10 years. However, as noted in section 6.1, option three is anticipated to cause only a 40%

reduction in consumer patronage in comparison with the base case. Consequently, expected revenue reductions under option three would be approximately 20% lower than under option one. This implies that expected annual reductions in revenue would be of the order of \$13.4 million, equivalent to \$111.8 million in present value terms over 10 years.

7. Expected benefits and costs of option 4

The fourth alternative to the proposed NDRP amendment is to address concerns regarding solarium use via education programs aimed primarily at young people. The current context is one in which some public education campaigns (e.g. the Cancer Council's "Fashion to Die For" campaign) are already in place. However, in the absence of a regulatory response, it is assumed that a more substantial public education campaign would be required, involving addressing the issue in secondary schools and providing additional funding for a general media campaign aimed specifically at young people.

7.1. Expected benefits of option 4

Short-term responses to the substantial media coverage of the Claire Oliver story and the subsequent "Fashion to Die For" campaign appear to have been substantial, given the observed decline in solarium numbers in Victoria of around 30% over the past year³⁷.

An ongoing campaign aimed particularly at young people would potentially maintain this short-run behavioural effect, at least to a substantial degree, in the medium term. Moreover, it would also be possible to supplement the existing campaign with more detailed messages highlighting, in particular, the higher risks facing particularly vulnerable groups, including those with type 1 skin, very young users, those with a family history of skin cancer and those with substantial numbers of moles, naevi and/or freckles.

In general terms, it is clear that educational campaigns have led to substantial behavioural modification in the area of exposure to UV radiation over the past several decades, with various "SunSmart" type campaigns having had a large impact on patterns of exposure to sunlight around Australia. This also suggests the potential effectiveness of an educationally based alternative.

However, while past experience suggests that this alternative would be relatively effective, it would also be expected *a priori* to have significantly smaller benefits than the proposed regulations, for several reasons. First, this alternative relies entirely on behavioural change. It has been noted in a range of public policy contexts (e.g. smoking) that adolescents demonstrate relatively low susceptibility to health messages pointing out the dangers of particular behaviours. Thus, the impact of this alternative on the very young, who represent both a large and a particularly vulnerable user group, can be expected to be much smaller than that of the proposed amendment. Regardless of the posited extent of behavioural change among the under-18 age group, the size of the impact on their solarium

³⁷ Equivalent data for other States and Territories are not currently available. Victorian data availability is a by-product of the existing regulation in that jurisdiction.

use can only be smaller – and probably significantly smaller – than would be the case under the proposed total prohibition.

Moreover, a campaign aimed primarily at young people would be likely to have only a relatively small impact on other high-risk user groups. In particular, it can be expected to have a substantially smaller impact on solarium use by people with Type 1 skin than would the proposed total prohibition. Available data indicates that this group represents around 19% of all solarium users, suggesting that lower effectiveness in this regard would also mean that the benefits of this alternative are substantially reduced relative to the proposed regulations. While it would be possible for an educational campaign to contain more than one message – i.e. to be directed specifically at both young people and those with type 1 skin – its effectiveness would, again, necessarily be lower than under the proposed complete prohibition on access by this group.

Finally, this option does not include provisions that would regulate the behaviour of the solarium industry in areas such as exercising control over exposure times and ensuring that maintenance of sun-tanning units is not carried out in a way that would increase their emissions. This, too, could be expected to contribute to lower overall effectiveness.

Given the size of the observed short-term change in solarium demand in Victoria, this alternative is considered able to achieve significant benefits. However, for the reasons highlighted above, the degree of effectiveness of this option will necessarily be significantly lower than under the proposed amendment. It is considered that a 25% reduction in the use of sun-tanning units would constitute the maximum potential benefit of this alternative. Using the methodology adopted in Section 4, above, this suggests that the benefits of this alternative would be likely to lie within the range \$26.9 million - \$61.2 million over ten years in present value terms.

7.2. *Expected costs of option 4*

This alternative could be expected to have costs that are somewhat lower than those of the proposed NDRP amendment, since it would not involve either licensing or enforcement-related activities. On the other hand, the cost of providing an effective education program which incorporated both general messages and elements specifically targeted to vulnerable user groups would be not insubstantial. Indicative costings would include the following:

- There were 1,486 secondary schools and 1,199 combined primary/secondary schools in Australia in 2007 (ABS 4221.0). Thus, programs would need to be delivered in 2,685 schools approximately³⁸.
- If a single, two hour session were offered at each year level, with years 9,10,11 and 12 covered, this would imply a total of 10,740 education sessions being conducted over 21,480 hours.
- If each session is presented by two presenters (given the implicit large session sizes, this may be necessary for practical reasons), each earning average weekly earnings, the total wage cost would be [42,960 x \$29.25 = \$1,256,580³⁹]
- Addition of 75% on-costs would raise the total labour cost to \$2,199,015.
- It is assumed that written materials are made available to all students. There were 984,071 full-time secondary students in years 9-12 in Australia in 2007. At a notional cost of \$10 per student for printing and distribution, this is equal to \$9,840,710 in costs for distribution of supporting literature.

The above suggests a total cost of \$2,199,015 + \$9,840,710 = \$12,039,725. If it is assumed that the education programs are repeated at two-yearly intervals for all students in order to ensure maximum effectiveness by periodically reinforcing the message and progressively increasing the detail and sophistication provided as students progress through older year levels, this cost would become a biennial one.

The present value of these costs over ten years would be \$54.4 million. It should be noted that these costs relate only to the provision of an education program in the schools context. Were a media based program to be adopted in conjunction with the schools program, in order to target the wider population and/or other vulnerable user groups, significant additional costs would also be incurred.

³⁸ This will be an over-estimate, to the extent that some of the combined schools do not include students in years 9-12. However, this group is believed to be a small number.

³⁹ Full-time Adult ordinary time earnings in February 2008 = \$1123.30/week, divided by average hours of 38.4 = \$29.25/hour. (ABS 6302.0, ABS 6306.0).

8. Conclusion

8.1. Comparison of alternatives

Four alternative means of reducing the incidence of skin cancer and the associated mortalities due to exposure to sun-tanning units have been identified. Two of these options involve amending the National Directory on Radiation Protection to adopt a range of restrictions on the use of these devices in a commercial solarium setting. The two options differ according to the question of whether under-18 year olds would be prohibited from using sun-tanning units. The third identified option is to rely on an education campaign to change consumer behaviours, in preference to adopting a regulatory response. Table 8, below, summarises estimates of the likely benefits and costs of the three options.

Table 8: Comparison of expected benefits and costs of alternative proposals (present values over 10 years)

Option	Expected benefits	Expected costs	NPV
Proposed NDRP amendment	\$53.8 - \$122.3m	\$8.9m	\$44.9 - \$113.4m
NDRP amendment without exclusion of <18 yr olds	\$45.8 - \$104.0m	\$8.9m	\$36.9 - \$95.1m
NDRP amendment without exclusion of persons with Type 1 skin	\$43.0 - \$97.8m	\$8.9m	\$34.1m - \$88.9m
Education campaign	\$26.9m-\$61.2m	\$54.4m	-\$27.5m - +\$6.8m

Table 8 shows that the proposed NDRP amendment, including prohibition on the use of sun-tanning units by under 18 year olds has the highest expected benefits, with these benefits expected to have a present value in the range \$53.8 million to \$122.3 million over 10 years. The alternative of adopting an NDRP amendment that does not exclude under 18 year olds has benefits estimated at around 15% smaller, since a proportion of under-18 year olds will continue to use sun-tanning units by providing written parental permission. The alternative of adopting an NDRP amendment that bans under-18 year olds but does not ban over-18 year olds with Type 1 skin has benefits about 20% lower, as the number of users with type 1 skin is expected to be reduced by only around half under this option, versus 100% under Option 1.

The alternative of an educational campaign is expected to have benefits approximately half as large as those of the proposed NDRP amendment, since this purely voluntary approach is expected to be only partially successful in changing the behaviours of the most vulnerable groups. In particular, significant numbers of both under-18 year olds and persons with skin type 1 would be expected to continue to use sun-tanning units under this option.

The costs of the education campaign are also substantially higher than those of the two other options. This reflects the need to communicate quite complex messages to a very large, and difficult to segment, user group. Indicative costs of around \$54.4 million over 10 years have been identified as being incurred under this option. By contrast the cost of the two variants of the proposed NDRP amendment are considered to be approximately equal, at \$8.9 million over ten years.

Given the above, it is most likely that the option of an education campaign would yield a negative net present value, although a small positive NPV would be conceivable under some scenarios. The two other options would both have significant positive NPVs, although the proposed NDRP amendment including the prohibition on under-18 year olds is likely to have the highest NPV. Given this and the particular importance of protecting young people, as a vulnerable group with limited ability to make sound decisions in their own long-term interests, this option is preferred.

All of the options considered would be expected to reduce substantially the use of sun-tanning units in Australia, particularly by those groups most at risk of contracting skin cancer due to exposure to ultraviolet radiation. Consequently, all would have substantial benefits in terms of reduced mortality and morbidity. The proposed NDRP amendment is expected to have the largest benefits, as a result of its prohibition on access to solarium by two vulnerable groups, under 18 year olds and persons with type 1 skin. The second regulatory option prohibits use only by the former of these groups, while the third option prohibits use only by the latter group. The education-based alternative would allow both groups to continue to use sun-tanning units. All four alternatives have the effect of improving understanding of the risks associated with solarium use and by preventing certain types of potentially misleading advertising.

It is estimated that the implementation of the proposed NDRP amendment will reduce the number of deaths due to melanomas caused by sun-tanning unit exposure by between 24 and 32 over ten years and the number of non-fatal melanoma cases by between 204 and 272 over the same period. The number of cases of SCC is also expected to be reduced by between 2,122 and 2,823 over ten years. Each of the two alternatives considered would be less effective in reducing mortality and morbidity due to skin cancers caused by exposure to artificial UV radiation.

Moreover, the benefits estimated in respect of both non-fatal melanoma and SCC relate only to reductions in the costs of medical treatment. That is, no valuation of the reduction in pain and suffering consequent on the lowering of the incidence of these kinds of skin cancers has been factored into these benefit calculations. Clearly, however, this constitutes an extremely important intangible benefit which should also be taken into account. Reduced productivity losses should also, ideally be taken into account.

Potential confounding behaviours

The above estimates are based on the achievement of a high level of compliance with the proposed requirements of the NDRP amendment and also implicitly assume that there will be no behavioural changes among users of sun-tanning units that would offset the potential benefits highlighted above.

It is foreseeable that one offsetting behaviour, in particular, may reduce the size of the benefits actually achieved due to implementation of the NDRP amendment. This is that current users of sun-tanning units who are denied access due to being under 18 years of age and/or having type 1 skin may respond by increasing their use of sun-tanning. No data are available as to the likely extent of this offsetting behaviour. However, factors can be identified which suggest that it may be limited.

In particular, persons with type 1 skin who seek access to a solarium will be provided with information on the specific health risks to them of using tanning-units and, more generally, of exposure to UV radiation. At the same time, they are likely to be offered alternatives such as a “spray tan” that do not entail the same risks. In this context, it is likely that they will, in many cases, choose to adopt the alternatives and that, more generally, a high proportion will avoid adding to their UV exposure;

It is clear that, to the extent that this offsetting behaviour does occur, the benefits of the proposed amendment will be lower than the above estimates suggest. However, the size of these behaviours is expected to be relatively modest. Moreover, given the substantially positive benefit/cost ratios attached to the proposed amendment, even were these offsetting behaviours to be of substantial magnitude, the outcome would still clearly be a positive NPV.

While the above summarises the economic benefits and costs of the proposal, it has also been noted that a further impact will be a sizeable transfer of consumer spending away from the solarium industry. It has been estimated that this reduction in revenue may be as great as \$16.8 million per annum, or \$139.8 million in present value terms over 10 years. This is equal to 50% of the current turnover of the industry. In practice, however, the observed decline in revenue is likely to be lower than this, reflecting the fact that many consumers may choose to substitute spray tans or other products supplied by the solarium industry.

It is emphasised that this reduction in revenue constitutes a transfer, rather than an economic cost, since consumer expenditure will inevitably be diverted to other ends.

Finally, it should be noted that the revised version of the Australian standard in respect of solarium use, which has recently been released in draft form for public consultation purposes, include a prohibition on the use of solaria by those under 18 years of age. It is expected that this revised standard will be published in approximately December 2008. There are clear benefits in terms of the consistency of the messages being received by industry and the public if state and territory regulation is consistent with the standard in this important respect.

Consequently, it is proposed to proceed with the proposed NDRP amendment.

8.2. Sensitivity analysis

The benefit and cost assessments of the various alternatives that have been conducted in the preceding sections include sensitivity analysis based on both the likely effectiveness of each option and on the value of a statistical life (VSL). However, all the above calculation and have been conducted on the basis of an assumed real discount rate of 3.5%. This is currently the only specific discount rate to be recommended by a government body responsible for the supervision of regulatory impact analysis anywhere in Australia⁴⁰.

However, this figure sits toward the lower end of the range of recommended discount rates found internationally. Consequently, a sensitivity analysis has been conducted in relation to the preferred option using an alternative real discount rate of 7%. This figure of 7% represents an approximate midpoint among the discount rates recommended for use internationally.

Table 9, below, sets out the expected benefits associated with each of the scenarios modelled under option one, using a 7% real discount rate.

Table 9: Estimated benefits of Option 1 – 7% discount rate

	High impact scenario		Low impact scenario	
	High VSL	Low VSL	High VSL	Low VSL
Value of lives saved	\$117,785,628	\$68,708,283	\$88,339,221	\$51,531,212
Medical cost savings (melanoma)	\$212,250	\$212,250	\$159,187	\$159,187

⁴⁰ The 3.5% real discount rates is recommended for use in Victorian RIS and BIA by the Victorian Competition and Efficiency Commission.

Medical cost savings (SCC)	\$538,543	\$538,543	\$403,907	\$403,907
Total benefits	\$118,536,421	\$69,459,076	\$88,902,315	\$52,094,306

Table 9 shows that, using a 7% real discount rate, the present value of the expected benefits of option one, calculated over 10 years, would lie within the range \$52.1 million to \$118.5 million. This represents a reduction of 21.1% when compared with the results of the same calculation conducted using a 3.5% real discount rate. However, as table 10 demonstrates, the expected value of the costs associated with option one is also reduced when calculated using a 7% real discount rate. Table 9 shows that the expected value of all costs associated with option one would be \$7.8 million, using a 7% discount rate, compared with \$8.9 million using a 3.5% discount rate. Therefore, while benefits are reduced by 21.1% when a 7% real discount rate is used, costs are also reduced by 12.4%.

Table 10: Estimated costs of Option 1 – 7% discount rate (PV over 10 years)

Cost	Amount
Licensing related costs	\$4.4 million
Training	\$0.2 million
Skin type assessments	\$3.2 million
Total	\$7.8 million

In the present value of a net benefits associated with option one, using a 7% real discount rate, therefore lies within the range \$44.3 million to \$110.7 million. This can be compared with the range calculated above using a 3.5% real discount rate of \$44.9 million to \$113.4 million.

The very small differences in the expected net present value figures under these two, quite different real discount rate scenarios provide a further measure of the robustness of the conclusions advanced.

9. Interstate and international comparisons

9.1. Current regulatory context within Australia

For the past several years, the approach taken in Australia to minimising the risks associated with the use of sun-tanning units has been to promote voluntary compliance with the Australian Standard in relation to solarium use (*Australian Standard AS/NZS 2653: Solaria for Cosmetic Purposes*) by the solarium industry. Thus, until recently, no State or Territory has formally regulated the use of solaria.

However, this situation has changed within the past two years. Despite the fact that the proposed NDRP amendment has yet to be formally endorsed by Health Ministers⁴¹, Victoria⁴² and South Australia have already adopted regulations that are generally consistent with it, while Western Australia is understood to be in the process of developing similar regulations at present. This early action reflects a view that urgent action is required in this area.

9.2. International comparisons

The World Health Organisation recommended in 2003 that governments should consider introducing regulation governing the use of sun-tanning units and set out a number of specific recommendations as to the restrictions on the use of sun-tanning units that ought to be contained in such regulation. These recommendations are closely reflected in the proposed NDRP amendment and state that people should not use artificial tanning devices if they:

- Are less than 18 years of age.
- Have large numbers of nevi (moles).
- Tend to freckle.
- Have a history of frequent childhood sunburn.
- Have pre-malignant or malignant skin lesions.
- Have skin type 1 or 2.

⁴¹ The draft amendment will be approved for forwarding to Ministers by the Australian Health Ministers' Advisory Council (AHMAC) and subsequently approved by the Health, Community and Disability Services Ministerial Council.

⁴² Victoria adopted interim regulations that came into effect in early 2008 for a period of 12 months and do not include the prohibition on under-18 year olds. It has recently released an RIS in respect of similar regulations that do, however, include this prohibition and are intended to replace the interim regulations

- Have sun damaged skin.

In addition, the recommendation includes requirements that:

- Protective eyewear be worn;
- Repeat exposures should not occur within 48 hours;
- Exposure times should be limited so that no burning of the skin occurs;
- Trained operators should supervise exposures;
- Written client consent should be obtained; and
- Promotion of health benefits of solarium use should be prohibited.⁴³

Regulation of the solarium industry is, in fact, now widespread internationally and is apparently expanding. According to Makin *et al* (2007)⁴⁴:

Legislation is already in place in 28 States of the United States and several European countries, including France, Belgium and Sweden. Several more States and countries are considering introducing similar legislation.

A number of different regulatory frameworks currently govern solarium use in Europe. However, France, Norway, Sweden, Austria, Finland, Spain, Belgium and Portugal all have some form of solarium regulation in place. In addition, the United Kingdom⁴⁵ and Germany currently have voluntary regulation. The following summarises the take-up of key features of solarium regulation in Europe⁴⁶:

Irradiance.

All European Union countries which regulate solariums have recently implemented a uniform limit of 0.3 W/m² for the total irradiance of solarium units.

Registration

Solariums require registration with the statutory authority in France, Norway and Sweden.

⁴³ Sinclair C. *WHO Guidance Brochure: Artificial Tanning Sun-tanning units*. Geneva (CHE): World Health Organization; 2003. .

⁴⁴ Makin, J., K. Dobbinson, S., J. and Herd, N., L. (2007), "The increase in solariums in Australia, 1992-2006", *Australian and New Zealand Journal of Public Health*, vol. 31, no. 2, p. 191-192.

⁴⁵ Scotland has recently passed a Bill to implement solarium controls via legislation that will see under 18s banned and solarium supervision made a requirement.

⁴⁶ Source: Data supplied by the Department of Human Services.

Access by minors

All countries except Belgium ban under 18 year olds from using solarium. Belgium bans only under 15 year olds.

Skin type 1

The exclusion of skin type I persons is required in France, Sweden, Austria, Finland and Spain. Austria also bans persons with skin type II. Norway, Belgium and Portugal do not restrict skin types.

Interval between exposures

The 48hr minimum interval between exposures control is required in France, Norway Sweden, Finland, Spain and Belgium. Portugal and Austria do not have this requirement.

Harmonisation agenda

Work is continuing in Europe towards harmonisation of solarium regulations. The European Society for Skin Cancer Prevention has recently submitted a "Code of Practice for Artificial Tanning" to the European Commission for consideration to be given to its implementation as a uniform requirement for all jurisdictions with solarium regulation. The Code covers training, the provision of information and advice to consumers, consent forms, recording of customer exposures, supervision of customer use, testing and certification of tanning equipment, inspections of solarium and provision of eye protection. As is apparent, the content of this European Code is broadly consistent with that of the proposed regulations and the draft National Directory.

10. Consultation

There has historically been general support from solarium industry associations for the Australian Standard. Consequently, early policy responses to concerns as to the observed low rate of compliance included regulators writing to solarium operators, in both 2002 and 2005, reminding them of the requirements of the Australian Standard and inviting industry members to work with them to increase compliance with the Standard. These initiatives met with a limited response.

In 2007, the Radiation Health Committee (RHC) and ARPANSA were requested by several State jurisdictions to co-ordinate a national approach to the regulation of solaria. Senior radiation protection officers from all jurisdictions are members of RHC. The RHC reviewed a range of information, and ARPANSA sponsored a National Conference on the Impacts of Regulating Solaria in November 2007. This Forum was attended by radiation protection regulators and public health officials from each jurisdiction, an industry representative, Cancer Council representative, and ARPANSA UV scientists. It was clear that a number of jurisdictions had already been requested by Ministers to either develop or investigate the regulation of solaria, and that all supported a nationally consistent approach.

The Forum was followed by a meeting of the government officers who had attended the forum. From this meeting, a draft set of outcomes was prepared and discussed at the RHC meeting in November 2007. A RHC working group prepared a draft statement in a form suitable for regulatory adoption. This was circulated to RHC members on 18 December 2007 requesting comment by 25 January 2008. The working group revised the draft after consideration of the RHC member comment and the revised draft was circulated to RHC members on 18 February 2008. This draft formed the basis of the proposed amendment to the National Directory for Radiation Protection, which has been agreed by RHC.

The Cancer Council view is that regulation of the solarium industry is necessary to ensure compliance with provisions such as those in the Australian Standard, including prohibiting skin type 1 and under 18 year olds from using solaria, ensuring that operators are trained and supervise solarium sessions, and that informed consent is obtained from clients.

The industry representative highlighted both potential positive and negative impacts of regulation on the solarium industry. The main positive aspects identified were that being subject to regulation would help to give salons professional credibility and help to improve operator behaviour and/or eradicate poor performers from the industry. The industry representative also argued that regulation would serve to increase public awareness of the obligations of solarium operators in relation to their customers.

Possible negative aspects identified included the cost of licensing, staffing difficulties, compliance concerns for regional operators, monitoring policies, online training, annual testing costs, the potential for regulations to require costly sunbed retrofits, and that the number of second tier operators would decrease.

Given the specific nature of the proposed NDRP amendment, most of these industry concerns are considered unlikely to be borne out in practice. In particular:

- licensing costs have been estimated to be low, averaging less than \$0.6 million per annum, or less than \$3.8 million in present value terms over 10 years.
- Online training for operators is to be made available, while the nature and extent of the training required is sufficiently limited to allow online completion to be a feasible option. This should, in particular, address potential concerns as to the feasibility of compliance for regional operators.
- Similarly, staffing difficulties are considered unlikely to arise given the relative ease with which it will be possible to train existing staff to meet the requirements of the proposed regulation.
- Nothing in the proposed regulations is expected to require costly sunbed retrofits.

11. Implementation and review

The proposed amendment to the National Directory on Radiation Protection will be adopted into law by each individual state and territory. The nature of the intergovernmental agreement operating in this area provides wide discretion to each jurisdiction as to the means that will be used to translate the substantive requirements of the Directory into law. The agreement specifies only that each jurisdiction should implement the substantive requirements.

As an example of the different approaches that can be taken, Victoria's current legislation adopts requirements similar to those contained in the proposed Directory amendment under its Radiation Act 2005 and associated regulations. By contrast, a number of jurisdictions are expected to implement these provisions through amendments to their public health legislation.

It is anticipated that most or all jurisdictions will adopt licensing requirements as the basis for implementation of the required provisions. For example, in Victoria at present owners of solarium businesses and suppliers of solarium equipment are required to be licensed, although individual staff members working within solarium businesses are not. Sanctions, including withdrawal of licensing, are available in respect of substantive non-compliance with the requirements.

Given this, and the fact that the substantive requirements to be implemented are largely reflective of the Australian Standard which has been implemented by a large section of the industry on a voluntary basis in recent years, a high level of compliance with the proposed requirements can be anticipated.

In addition, it can be noted that there continues to be a significant research effort in Australia in relation to the incidence of skin cancer, the causal factors involved and the specific contribution of the solarium industry. This is expected to continue following the implementation of these proposals and will provide the basis for effective ongoing evaluation and review of the proposed amendments to the NDRP.

The proposed regulation will be reviewed by ARPANSA's Radiation Health Committee within 10 years of its commencement to ensure it is still relevant to radiation protection needs. Earlier review would be undertaken if there are problems in the implementation, if international or national radiation protection objectives change or if there is new information from international research.

12. Statement of compliance with National Competition Policy

The National Competition Policy Agreements (“NCPA”) set out specific requirements with regard to all new legislation adopted by jurisdictions that are party to the agreements. Clause 5(1) of the Competition Principles Agreement sets out the basic principle that must be applied to both existing legislation, under the legislative review process, and to proposed legislation:

The guiding principle is that legislation (including Acts, enactments, Ordinances or Regulations) should not restrict competition unless it can be demonstrated that:

- (a) The benefits of the restriction to the community as a whole outweigh the costs; and*
- (b) The objectives of the regulation can only be achieved by restricting competition.*

Clause 5(5) provides a specific obligation on parties to the agreement with regard to newly proposed legislation:

Each party will require proposals for new legislation that restricts competition to be accompanied by evidence that the restriction is consistent with the principle set out in sub-clause (1).⁴⁷

Accordingly, every regulatory impact statement must include a section providing evidence that the proposed regulatory instrument is consistent with these NCP obligations. The recently released OECD Competition Assessment Toolkit⁴⁸ provides a checklist for identifying potentially significant negative impact on competition in the RIA context. This is based on the following three questions:

- Does the proposed regulation limit the number or range of suppliers?
- Does the proposed regulation limit the ability of suppliers to complete?
- Does the proposed regulation limit to the incentives for suppliers to compete vigorously?

According to the OECD, if all three of these questions can be answered in the negative, it is unlikely that the proposed regulations will have any significant negative impact on competition.

⁴⁷ Clause 5, Competition Principles Agreement, 11 April 1995 accessed at www.ncc.gov.au/pdf/PIAg-001.pdf

⁴⁸ See *Integrating Competition Assessment into Regulatory Impact Analysis*. OECD, Paris, 2007. (DAF/COMP(2007)8).

In the case of the proposed regulations, all three of the above questions must be answered in the negative. The regulations impose only minimal cost increases on solarium businesses. Moreover, while the reductions in demand for solarium use that they are likely to entail may lead to a diminution in the number of solarium businesses, this is not considered to be anti-competitive in the above terms for two reasons. First, there is no “limit” on the number of suppliers being imposed as a result of the regulations. Given this, and the current large numbers of solarium businesses, it is not considered likely that the regulations will lead to any discernible reduction in competitive pressures in this industry.

Consequently, it has been concluded that the proposed regulations are fully compliant with the National Competition Policy Agreements.

Appendix 1: National Directory on Radiation Protection – Amendment No. 4 (2008) (Solaria)

NATIONAL DIRECTORY FOR RADIATION PROTECTION

Amendment No. 4, 2008

Solaria

Approved by Radiation Health Committee, ?? ?? 2008

5.4 Adoption of national regulatory elements for control of specified practices

In a case where no Code of Practice or Standard applies to a practice specified in this Section, the provisions applying to that practice must be adopted by Authorities within their regulatory frameworks.

5.4.1 Solaria

The Responsible Person in relation to the operation of a solarium used for cosmetic purposes must ensure that:

- (a) No individual under the age of 18 is permitted to be exposed in a **sun-tanning unit** that is under the control of the Responsible Person.
- (b) Any person supervising the operation of a **sun-tanning unit** is trained in the following:
 - (i) The requirements of relevant Australian Standards and their practical implementation;
 - (ii) Determination of skin types and exposure times;
 - (iii) Screening for potentially exposure limiting conditions;
 - (iv) Emergency procedures in case of over-exposure to UV light;
 - (v) Types and wavelength of UV light;
 - (vi) Procedures for sanitizing protective eye wear and tanning equipment.
- (c) An assessment of skin type is conducted by a trained operator for every client before exposure in a **sun-tanning unit**, and that individuals with **skin type 1** are not permitted to be exposed in a **sun-tanning unit**.
- (d) Only a trained operator initiates an **exposure session**.
- (e) All exposure of any client in a **solarium** is subject to **supervision** by a trained operator at all times.

- (f) Prior to the commencement of a course of tanning of one or more **exposure sessions** in a **sun-tanning unit**, a consent form as set out in Table A is handed to the client, and that:
- (i) The client signs and dates the form;
 - (ii) The client returns the signed and dated form prior to commencement of the first **exposure session** in the establishment;
 - (iii) The original signed and dated form is filed in the records of the establishment for a period of not less than 2 years;
 - (iv) A copy of the signed and dated form is handed to the client.
- (g) Any **exposure session** does not exceed 0.9 **MED**, and that any repeat **exposure session** takes place no sooner than 48 hours after the previous **exposure session**.
- (h) Protective goggles are worn by every user of a **sun-tanning unit** during any period for which the **sun-tanning unit** is operative.

TABLE A
CONSENT FORM FOR CLIENTS OF SOLARIA

CLIENT CONSENT FORM

Please read carefully the following information:

1. Exposure to ultraviolet radiation such as from a sun-tanning unit contributes to the skin ageing process and may cause skin cancer.
2. People with fair skin who are unable to tan must not use a sun-tanning unit.
3. Intentional sun-tanning unit exposure should be avoided for 48 hours before and after sunlight or sun-tanning unit exposure.
4. Protective goggles must be worn at all times while undergoing sun-tanning unit exposure. You must not read while the sun-tanning unit is in operation.
5. There is additional risk, and sun-tanning unit exposure is not recommended if-
 - (a) you have ever been treated for solar keratoses or skin cancer; or
 - (b) you have ever suffered from an abnormal reaction, or allergy, to light.
6. There may be further risk if you are pregnant, taking certain medications by mouth or applying medications or certain cosmetics to the skin.

If there is any doubt in your mind in relation to any of the particulars described in Items 2, 5 and 6 above, consult your doctor before undergoing any ultraviolet exposure.

I,, am aged 18 years or over, and have carefully read and fully understand the above information and choose to undergo ultraviolet exposure in this establishment.

Signed:.....Date:

Name of establishment:

.....

Schedule 2 – Categories of Non-ionizing Radiation

(Refer sections 2.3(j) and 2.6(g))

Schedule 2, which was blank in Edition 1 of NDRP, is amended to include the following:

The following non-ionizing radiation apparatus that produce harmful non-ionizing radiation when energised are specified as requiring regulatory control.

(1) A solarium used for cosmetic purposes;

Glossary

The Glossary is amended to add the following definitions

CIE means Commission Internationale de l’Eclairage

Erythemally Effective Dose means the dose obtained by weighting the spectral distribution of UVR incident on the subject with the erythemal effectiveness of the CIE across the UVR wavelength range (280 to 400 nm) and then integrating to obtain the total dose in J.m^{-2} .

Exposure Session means a session of exposure to UVR in a solarium, and where the total exposure does not exceed 0.9 MED.

MED – Minimum Erythemal Dose means the minimum dose of UVR required to produce erythema (sunburn) in the skin. It ranges from 2 SED (200 J.m^{-2}) for skin type 1 to 4.5 SED (450 J.m^{-2}) for skin type 4.

Responsible Person is as defined in the National Directory for Radiation Protection

SED – Standard Erythemal Dose means 100 J.m^{-2} of erythemally effective dose. For example, an erythemally effective dose of 200 J.m^{-2} is 2.0 SEDs which is sufficient to cause mild reddening or erythema in people with skin type 1 (fair skin).

Skin type 1 means fair skin, which always burns, never tans and is often accompanied by red hair and freckles.

Solarium means any commercial establishment containing one or more sun-tanning units.

Sun-tanning unit means an electrically powered appliance or installation intended to produce tanning of the human skin by utilizing ultraviolet radiation

Supervision means being on the premises to ensure that all pre-exposure requirements are fulfilled and to ensure that the exposure session is terminated.