“The Big Burn” Misrepresentation of a Tanning Facility

Review of the Alberta Health Services’
“The Big Burn” Website
by the
Joint Canadian Tanning Association

September 11, 2012

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Executive Summary

In March of 2012, Alberta Health Services launched a website which it entitled "The Big Burn". Developed by a marketing firm based in Calgary, the website attempts to portray commercial indoor tanning facilities in as negative a light as possible. From start to finish, the website seeks to malign tanning salons and their operators, relying on an ongoing series of mistruths and misrepresentations in making its case that indoor tanning is inherently unhealthy. It sets out to generalize bodies of research and uses selective data to suggest that commercial tanning is inherently dangerous and will literally land you in hospital. While purporting to inform teens and their parents about indoor tanning facilities, the real purpose of the website is to scare them through a series of half truths and outright deceit.

"The Big Burn" website uses and misrepresents selective data from existing research to show a far greater increased risk for commercial tanning facilities than is true. The main research used is from a report by the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO) which showed an increased risk for those under the age of 35 (75% increased risk for all types of equipment and location of that equipment).

What the website fails to acknowledge is that the risk from commercial tanning units is only 6% when you remove home and medical equipment. When Skin Type 1 individuals (those who cannot and should never attempt to tan) are removed from the study, the risk presented by commercial tanning is almost nil. The website also fails to acknowledge that the lifetime risk increase reported by the WHO as a result of using all types of equipment (home, medical & commercial) and Skin Type 1's is only 15%.

The website makes no effort to distinguish between commercial tanning and home tanning units, even though IARC data make clear that the risk posed by home units is almost seven (7) times higher. The same willful omission is apparent when comparing commercial tanning with medical tanning units, with the latter posing sixteen (16) times the risk, again according to IARC data. The commercial tanning industry regards this website as a deliberate attempt on the part of Alberta Health Services (AHS) to undermine the work of the expert panel established by Alberta's Minister of Health in January 2012 which was charged with the task of reviewing indoor tanning in an unbiased fashion.

In essence, the website is a study in dishonesty. There is no indication that the website was reviewed by medical or scientific experts prior to its launch earlier this year. This may be explained by the fact that the website uses selective and misrepresentative quotes and data from scientific studies that seek to support its own position that tanning is inherently bad for you and completely omits other relevant, objective information from those same studies that run counter to its starting premise. It has conveniently left out all of the peer reviewed studies published in publicly available scientific journals that show that tanning in a professional commercial tanning salon poses minimal health risks.

It may be that the AHS has simply been misled by the nature of the work undertaken by the marketing firm that designed its website. A less charitable interpretation would be that the AHS has taken a preconceived position and permitted the marketing firm that developed the website to include only information that supports that the AHS's own position, regardless of the facts. The website bears all the hall marks of a relentlessly negative campaign and goes as far as to quote newspaper articles that equate the use of tanning facilities to tobacco usage. It comes as no surprise that this website was manufactured by a marketing firm whose aim is clearly to cast the indoor tanning as negatively as possible, without regard for the truth or for the men and women who operate their commercial tanning facilities in a conscientious manner and with the highest regard for the well-being of their clients.

The Big Burn is a hatchet job of the highest order, as this review makes clear.

The Website's Creator – ZGM Collaborative Marketing

"The Big Burn" website was created by ZGM Collaborative Marketing of Calgary, Alberta. Listing Alberta Health Services as its client, the firm's own website provides a glimpse of the thinking behind its campaign to tarnish the commercial indoor tanning industry:

"Instead of just exposing our milky thighs at the tanning salon, we helped Alberta Health Services expose the hidden dangers of indoor tanning.

The Challenge

In Alberta, 30% of 17 year-old girls have used a tanning bed. Studies show indoor tanning before the age of 35 increases the risk of melanoma—the deadliest skin cancer—by 75%. The problem is: no one knows that. To prevent skin cancer caused as a result of indoor tanning, Alberta Health Services wanted to create an awareness campaign that would help teens and parents understand the risks associated with baking themselves bronze.

The Solution

Based on the idea that the health myths surrounding indoor tanning are hiding the real facts about its risks, we created an exploratory online experience— TheBigBurn.ca — set in a seemingly ***harmless tanning salon*** *that suddenly and unexpectedly changes to a sinister hospital room. The frightening truth behind indoor tanning is revealed in a unique and memorable way.*

The numerous pages of research and facts around indoor tanning are broken down into small easily digestible pieces by utilizing three distinct layers of content: simple facts accessed by exploring the salon, infographics that go into more detail, and long copy for those looking for more in depth information. In addition to information, the site also armed parents with a toolkit to talk to their teens about the risks of indoor tanning.

TheBigBurn.ca was supported by online, radio and print components and a grad-themed youth event that all served to drive traffic to the website and raise awareness of the issue."

Based on the idea that the health myths surrounding indoor tanning are hiding the real facts about its risks, we created an exploratory online experience— TheBigBurn.ca — set in a seemingly harmless tanning salon that suddenly and unexpectedly changes to a sinister hospital room. The frightening truth behind indoor tanning is revealed in a unique and memorable way.

Excerpt from the website of ZGM Collaborative Marketing (http://www.zgm.ca/our-work/the-big-burn/)

Our Response:

- TheBigBurn.ca website was created by ZGM, a marketing organization, without the apparent aid or review of scientific medical experts.
- The website purports to show a tanning facility and therefore should have research based on tanning equipment in a tanning facility. The majority of the research used was for not just tanning facilities, but for home units and medical units as well, which serves to skew the data presented on the website to the detriment of tanning facilities.

The website purports to show a tanning facility and therefore should have research based on tanning equipment in a tanning facility.

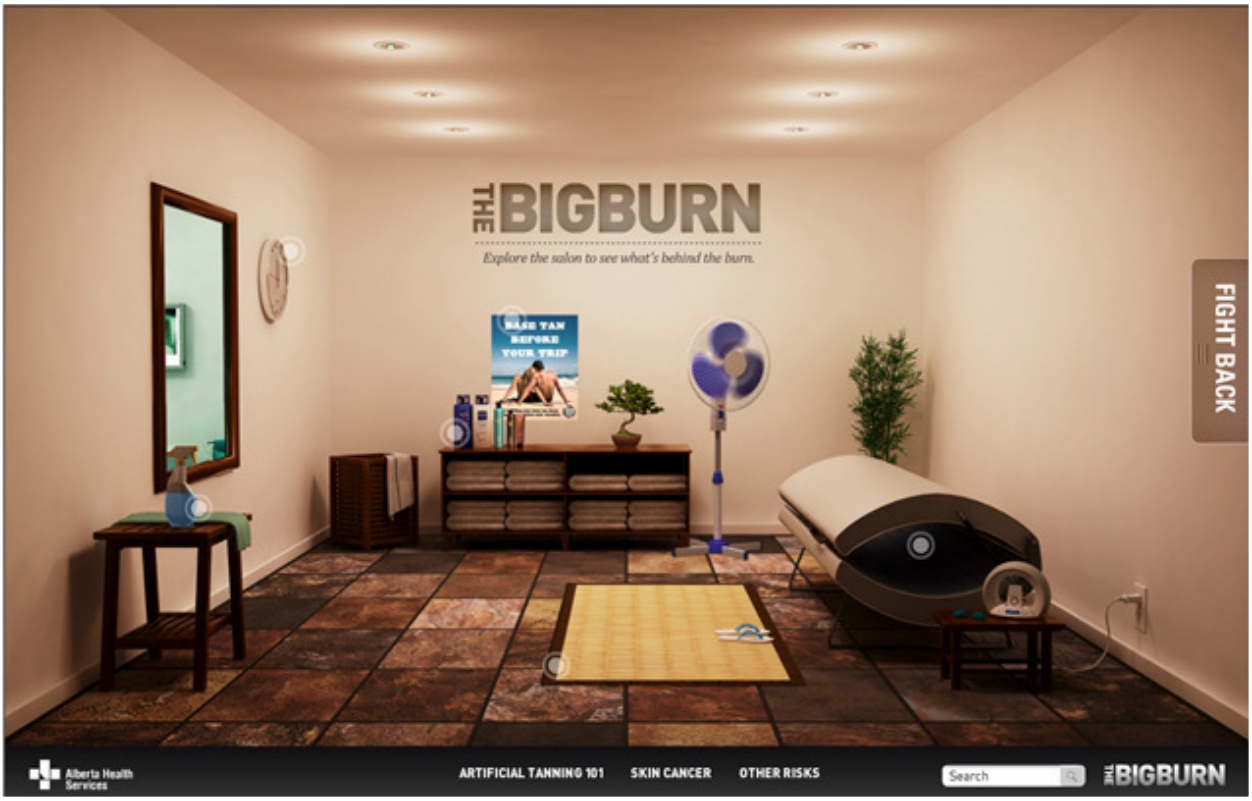
- "*Alberta Health Services wanted to create an awareness campaign that would help teens and parents understand the risks associated with baking themselves bronze"* This campaign then should have been about lifetime risk of radiation exposure and not just targeted to users of commercial facilities. According to the World Health Organization's IARC Report [1], lifetime risk is 15% when you include tanning salons, home units and medical unit along with Skin Type 1 individuals. This campaign was about tanning salons and not tanning equipment so the risk should have been about risk from a tanning salon (6% increased risk when you include a Skin Type 1 person according to the WHO IARC Report data and Skin Type 1 individual are screened from UV tanning in professional Canadian tanning facilities).
- ZGM did not use research papers that showed the risk for indoor tanning salons. The research used showed the melanoma risk not only from commercial tanning salons but also home tanning and medical tanning equipment. The melanoma risks for home and medical tanning are substantially higher than for commercial tanning which in a study by Dr. M Papas shows an increased risk of 6% when you include Skin Type 1 individuals.[2]

ZGM did not use research papers that showed the risk for indoor tanning salons. The research used showed the melanoma risk not only from commercial tanning salons but also home tanning and medical tanning equipment. The melanoma risks for home and medical tanning are substantially higher than for commercial tanning.

[1] IARC The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers. A systematic review. Int. J. Cancer: 120, 1116-1122 (2006)
World Health Organization (WHO), International Agency for Research on Cancer (IARC), Exposure to Artificial UV Radiation and Skin Cancer. IARC 2006

[2] Papas – Differential risk of malignant melanoma by sunbed exposure type (2011) Abstract and poster presented at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011

Opening Home Page – TheBigBurn.ca – Tanning Facility Room



Interactive Pop-Ups

The Alberta Health Services website TheBigBurn.ca willfully ignored a number of key elements from its portrayal of a typical tanning facility on its home page.

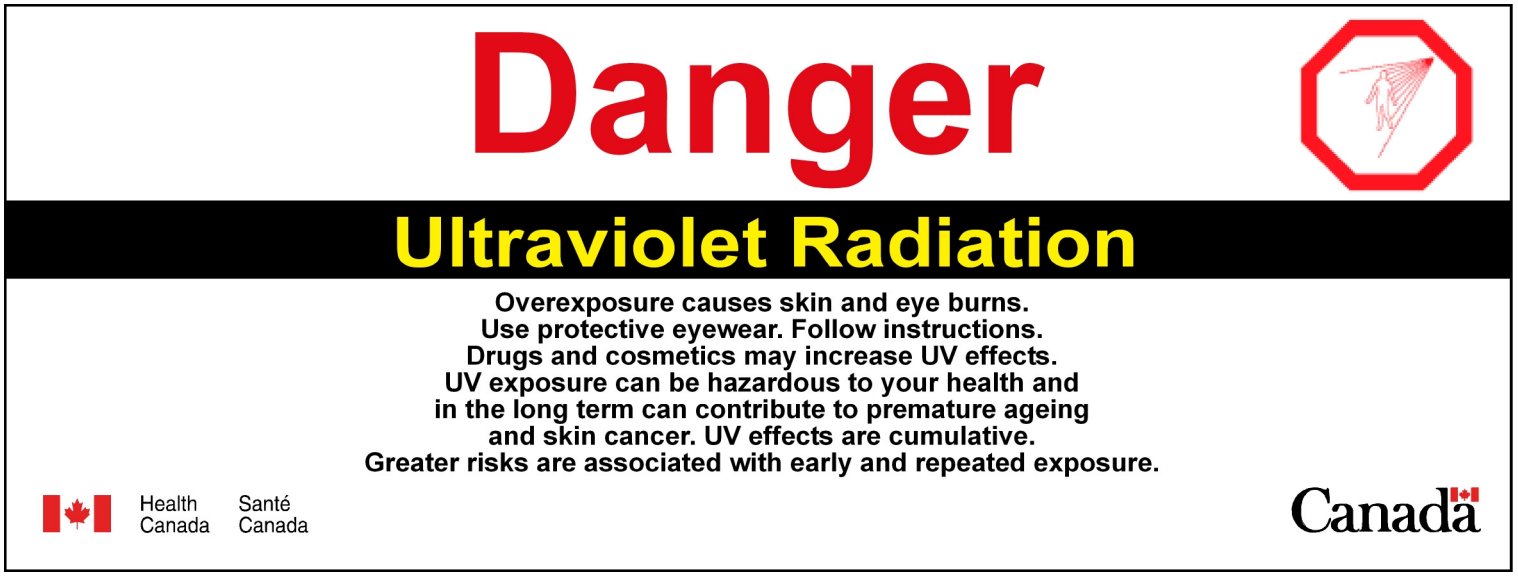
Items missed:

Salon Operator – an operator controls access to equipment and advises each client on every visit they tan. Computer software/Client card displays the last time a client tanned. The operator controls the time each client receives on the equipment to ensure an optimal exposure time with no burning.

Tanning Bed Timer Control – all equipment is controlled by a timer which shuts the equipment off automatically after a session. This can be controlled by the operator at the main desk. The client can also manually switch the equipment off any time they require.

Protective Eyewear – salons either sell or provide protective eyewear to clients and advise them to be worn at all times when using the tanning equipment. There is no eyewear to be seen.

Equipment Safety Stickers - Health Canada requires all tanning equipment to have a "Danger Ultraviolet Radiation" sticker with all consumer warnings prominently displayed. In addition, manufacturers provide a recommended exposure schedule recommending controlled tanning exposure times by skin type and by session number or week.

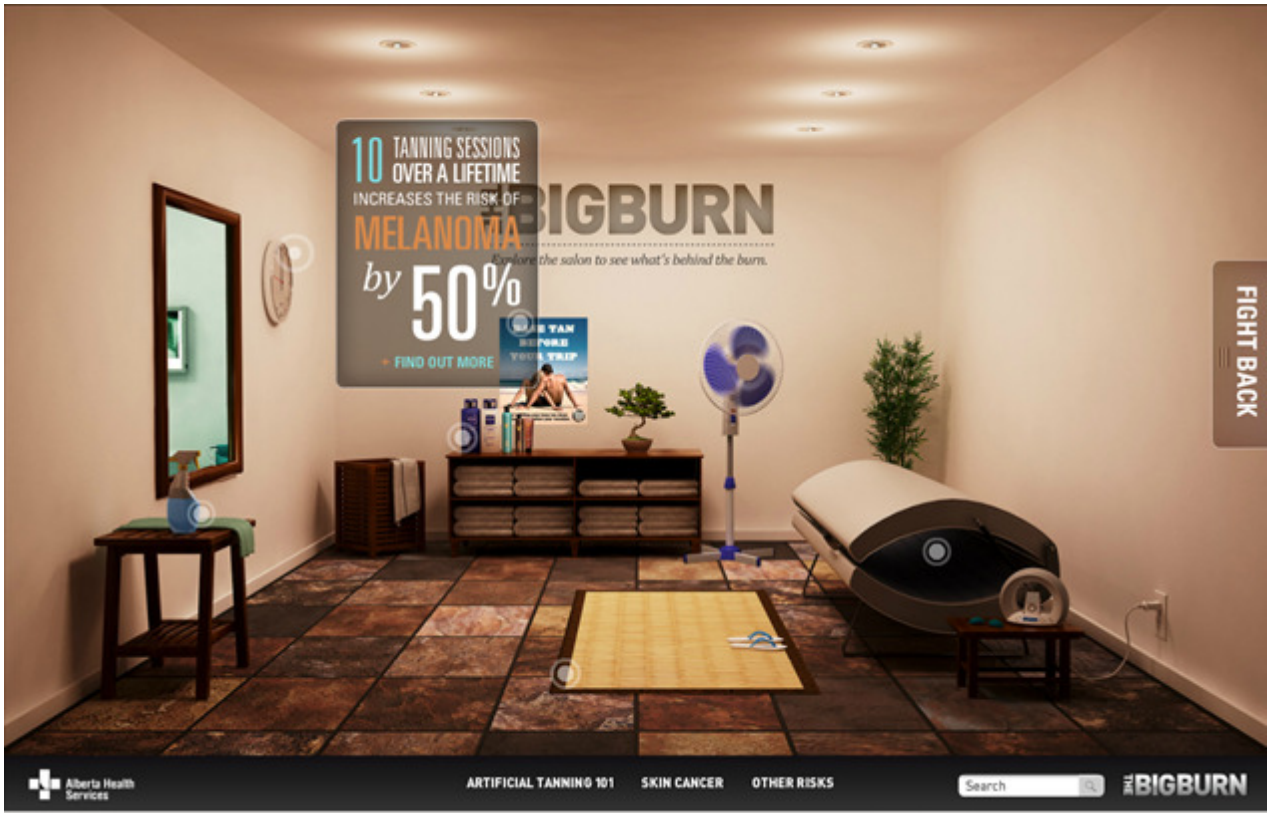

Danger
Ultraviolet Radiation
Overexposure causes skin and eye burns.
Use protective eyewear. Follow instructions.
Drugs and cosmetics may increase UV effects.
UV exposure can be hazardous to your health and
in the long term can contribute to premature ageing
and skin cancer. UV effects are cumulative.
Greater risks are associated with early and repeated exposure.
Health Canada
Santé Canada
Canada


Danger
Rayonnements ultraviolets
La surexposition provoque des brûlures aux yeux et à la peau.
Porter le dispositif de protection des yeux. Suivre les instructions.
Médicaments et cosmétiques peuvent augmenter les effets des UV.
L'exposition aux UV peut avoir des effets nocifs sur la santé
et contribuer, à long terme, au vieillissement prématuré
et au cancer de la peau. Ces effets sont cumulatifs.
Plus l'exposition réguliére commence tôt,
plus les risques qui y sont associés sont élevés.
Santé Canada
Health Canada
Canada

ACTUAL SIZE

Instead the AHS home page focuses on the following negative messages through the use of clever but deceitful interactive devices:

Clock



Statement:
10 Tanning sessions over a lifetime increases the risk of melanoma by 50%

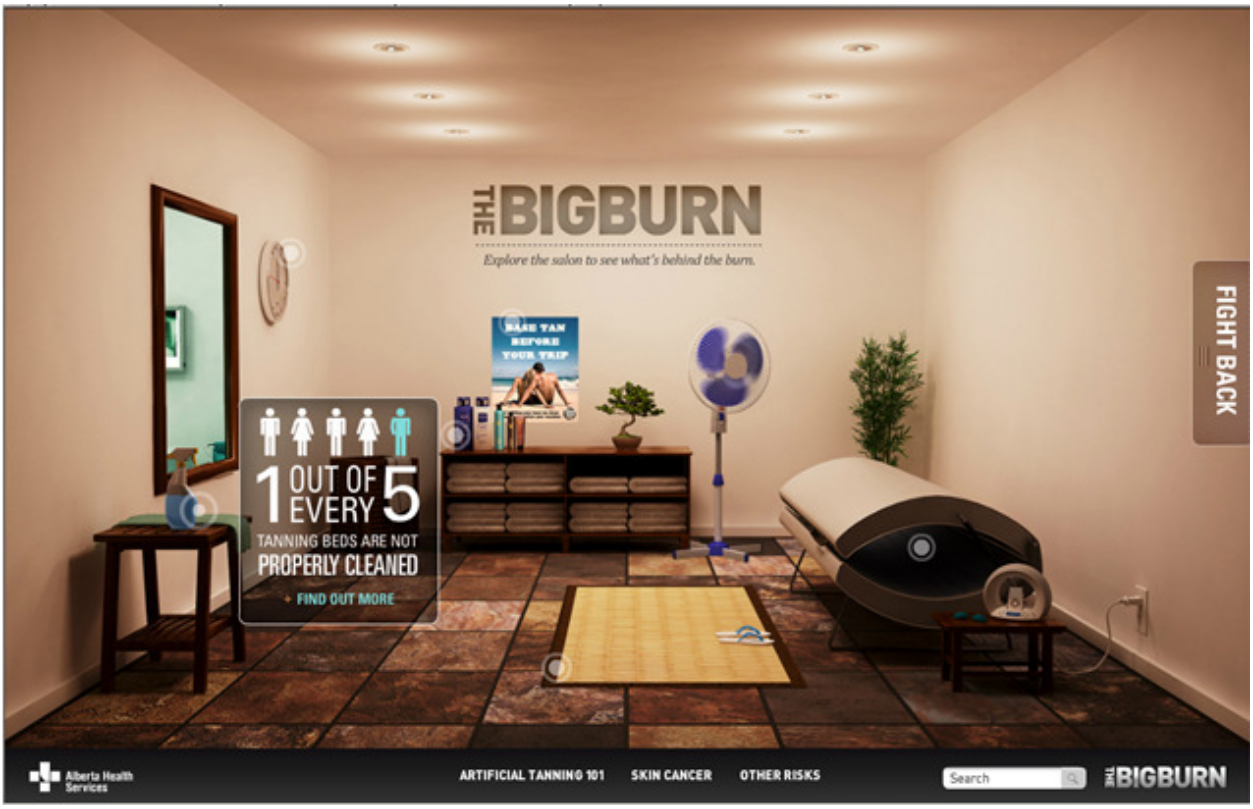
This was referenced to an Australian research study by Cust. Tellingly, this finding was not supported in a similar study done later in the United Kingdom by Elliott, (the UK has a climate and latitude much more like that in Canada). In addition, the Australian research found that one of the most common locations where sunbeds were used was in private homes, representing 60% of over-all usage. Research based on the WHO IARC data has shown that the use of home sunbeds is at a far greater risk than using a sunbed at a commercial location. (Papas 2011)

Papas – Differential risk of malignant melanoma by sunbed exposure type (2011) Abstract and poster presented at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011

Cust, A. E., Armstrong, B. K., Goumas, C., Jenkins, M. A., Schmid, H., Hopper,J. L., Kefford, R. F., Giles, G. G., Aitken, J. F. and Mann, G. J. (2011), Sunbed useduring adolescence and early adulthood is associated with increased risk ofearly-onset melanoma. International Journal of Cancer, 128: 2425–2435

Faye Elliott, Mariano Suppa, May Chan, Susan Leake, Birute Karpavicius, Sue Haynes, Jennifer H. Barrett,
D. Timothy Bishop and Julia A. Newton-Bishop (2011) Relationship between sunbed use and melanoma risk in a large case-control study in the United Kingdom. Int. J. Cancer: 000, 000–000 (2011) Vc 2011 UICC

Cleaning Bottle

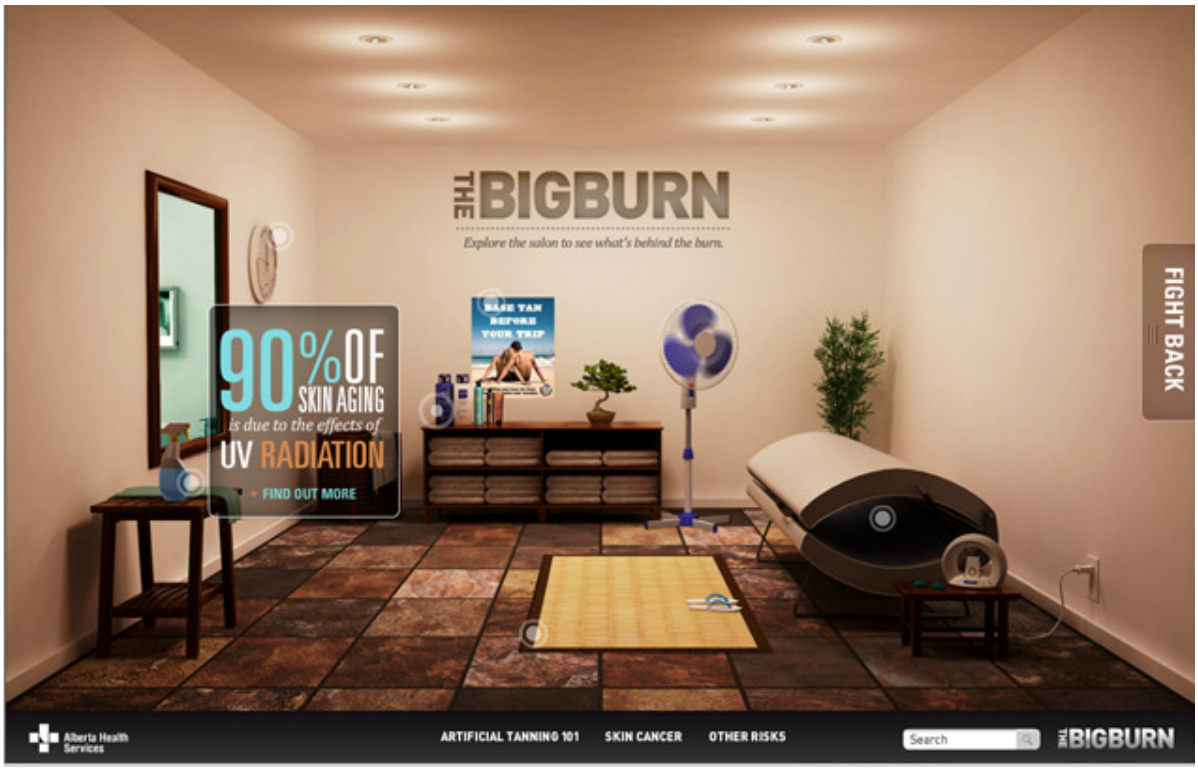


Statement:
1 out of every 5 tanning beds are not properly cleaned

This is a deliberate misrepresentation. The actual study by Gavin states that 98.8% of the sunbeds were cleaned. The research report states: *"Of the premises 98.8% reported that sunbeds were cleaned after use; however, this cleaning was performed by the staff in only 79.3% of premises with customers expected to provide cleaning in others."* In Canada over 90% of all commercial tanning salons have staff cleaning the equipment. It's only the self-serve equipment that would have a risk. This is just one of the reasons the JCTA advocates a ban on uncontrolled, self-serve equipment.

Gavin et al,. Public at risk: a survey of sunbed parlour operating practices in Northern Ireland. British Journal of Dermatology 2010 162, pp627-632

Tanning Lotion Bottles

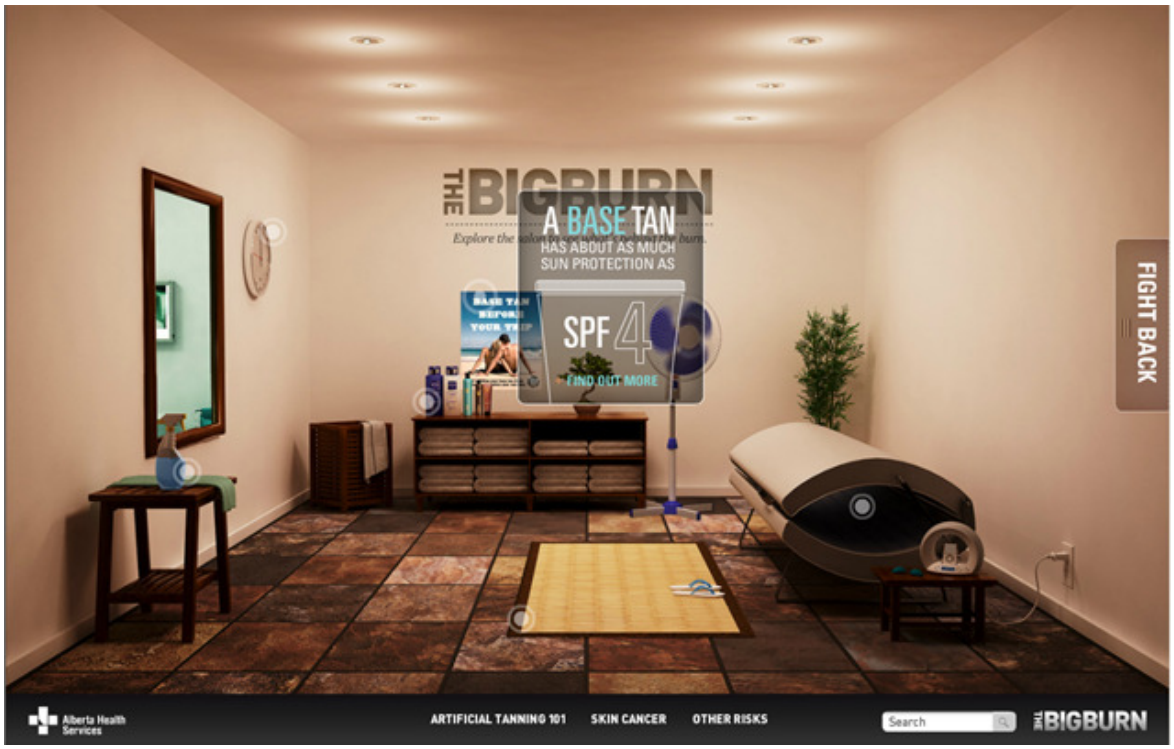


Statement:
90% of skin aging is due to the effects of UV radiation

This quote is **not** backed up by a proper scientific reference. There is no research paper, published or peer reviewed, that has studied skin aging and come to this conclusion. This appears to be a number pulled out of the air by the Canadian Dermatology Association. It does not take into consideration intrinsic aging or genetic factors. If there is research, the research reference should have been used.

There is no research paper, published or peer reviewed that has studied skin aging and come to this conclusion.

Poster



Statement:
A base tan has about as much sun protection as SPF 4

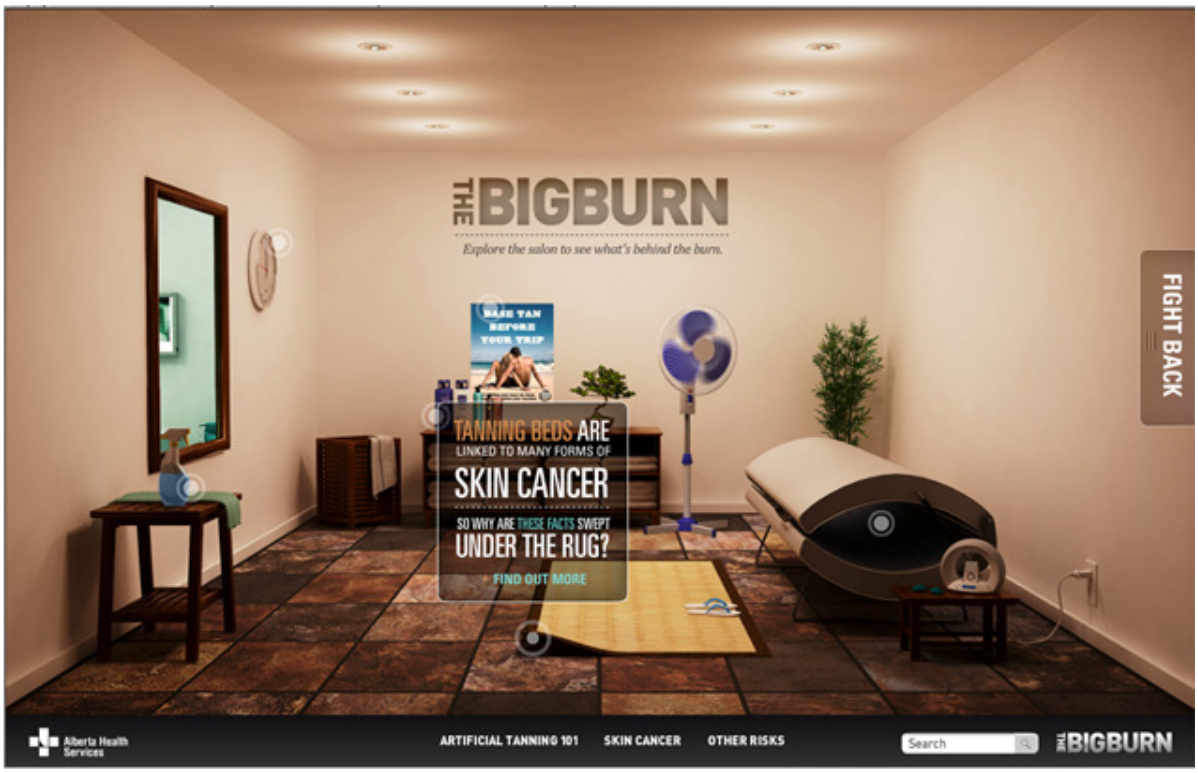
Actually a base tan has a value up to an SPF 6 which is higher than the actual value for an SPF 30 which is applied by the average person at a rate that is thinner than how it's tested and provides a protection of an SPF 2.3. A Base Tan give a person 6 times the protection that someone without a tan would have. Consider the following:

1. A Base Tan does not wash off.
2. A Base Tan does not need to be reapplied every 2 hours.
3. A Base Tan is the natural way of protecting yourself called photoprotection.
4. A Base Tan is a multiplier for chemical sunscreen.
5. A Base Tan does not come with chemicals, like Oxybenzone, that can harm you.

Miller et al,. Reduction of the UV burden it indoor tanners through new exposure schedules: a pilot study. Photodermatol Photoimmunol Photomed 2006; 22:59-66
Caswell et al,. The kinetics of the tanning response to tanning bed exposures. Photodermatol Photoimmunol Photomed 2000; 16:10-14

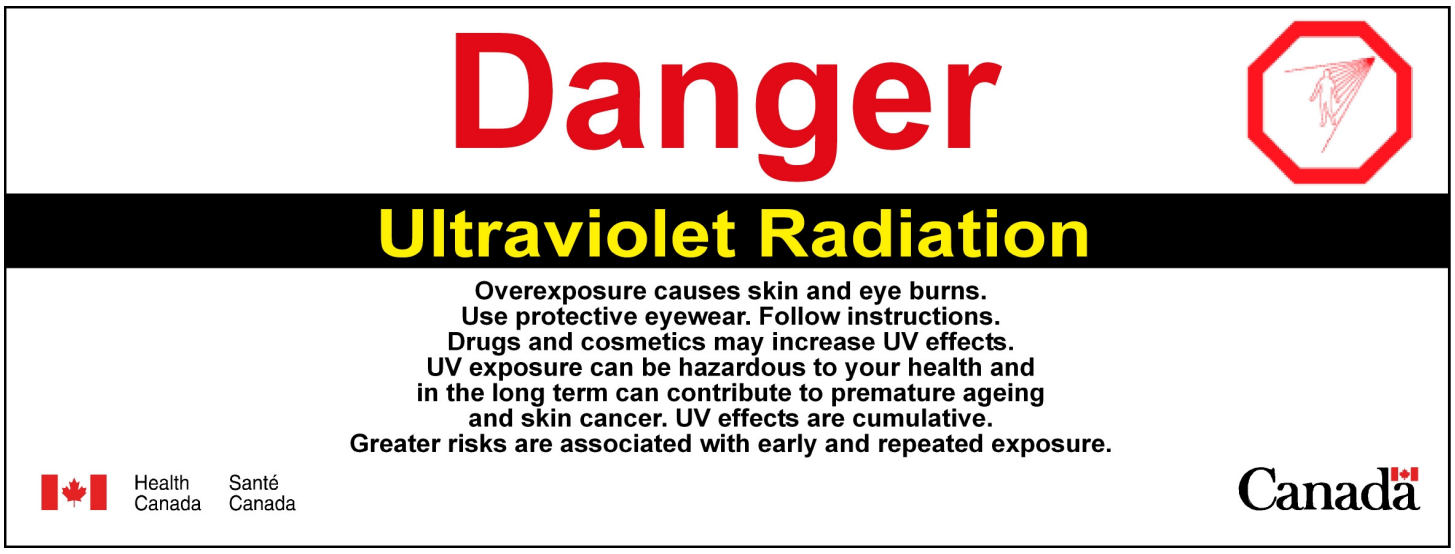
Letter from Don Smith, Non-Ionizing Radiation Research Institute, 2/24/2011 – PHOTOPROTECTION COMPARISON SUNSCREEN vs NATURAL TAN

Rug



Statement:
Tanning beds are linked to many forms of skin cancer. So why are these facts swept under the rug?

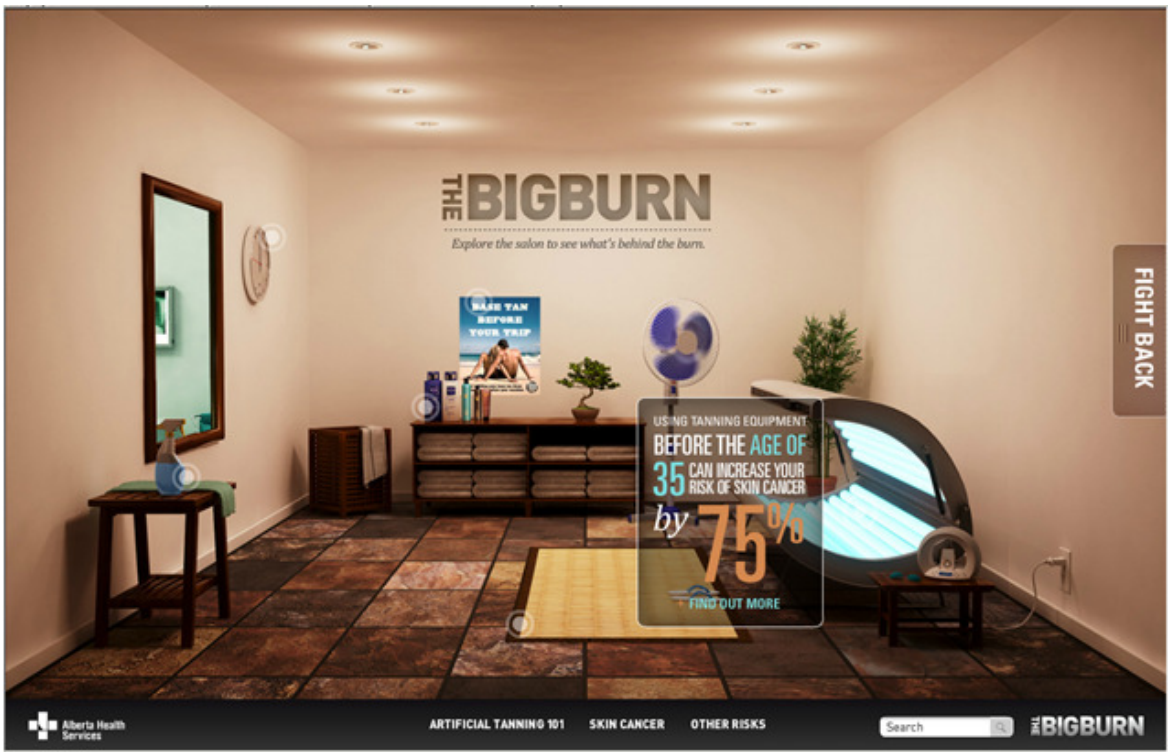
Tanning equipment is only as safe as the operation of the equipment. The key is not to allow someone to over-expose or burn. Home beds /self-serve/medical units pose the risk. No research references were used to show that commercial tanning facilities increase the risk of skin cancer, if tanning equipment is used properly. Health Canada's Warning Label is also on the equipment to warn the public about overexposure. These labels are in both French and English.



ACTUAL SIZE

No research references were used to show that commercial tanning facilities increase the risk of skin cancer, if tanning equipment is used properly

Tanning Bed in a Tanning Salon



Statement:
Using tanning equipment before the age of 35 can increase your risk of skin cancer by 75%

This statement is a complete misrepresentation of the facts. The 75% risk only relates to 5% of skin cancers. The World Health Organization (WHO) IARC Report Data [1] does not, as is widely misreported, show a blanket 75% increase of risk for melanoma from commercial tanning units for people under age 35. When home units (40% increased risk) and medical units (96% increased risk) are removed from the IARC data, **the weighted increase of risk is only 6% for commercial sunbeds which includes Skin Type I individuals** (who are screened from UV tanning in professional Canadian tanning facilities). Removing Skin Type I cases from the studies eliminates the increase in risk [2] and may actually show that UV tanners have a lower risk in this data set. (The IARC data was most recently reviewed by Dr. M. Papas [3] at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011.)

When home units (40% increased risk) and medical units (96% increased risk) are removed from the IARC data, **the weighted increase of risk is only 6% for commercial sunbeds which includes Skin Type I individuals** (who are screened from UV tanning in professional Canadian tanning facilities)

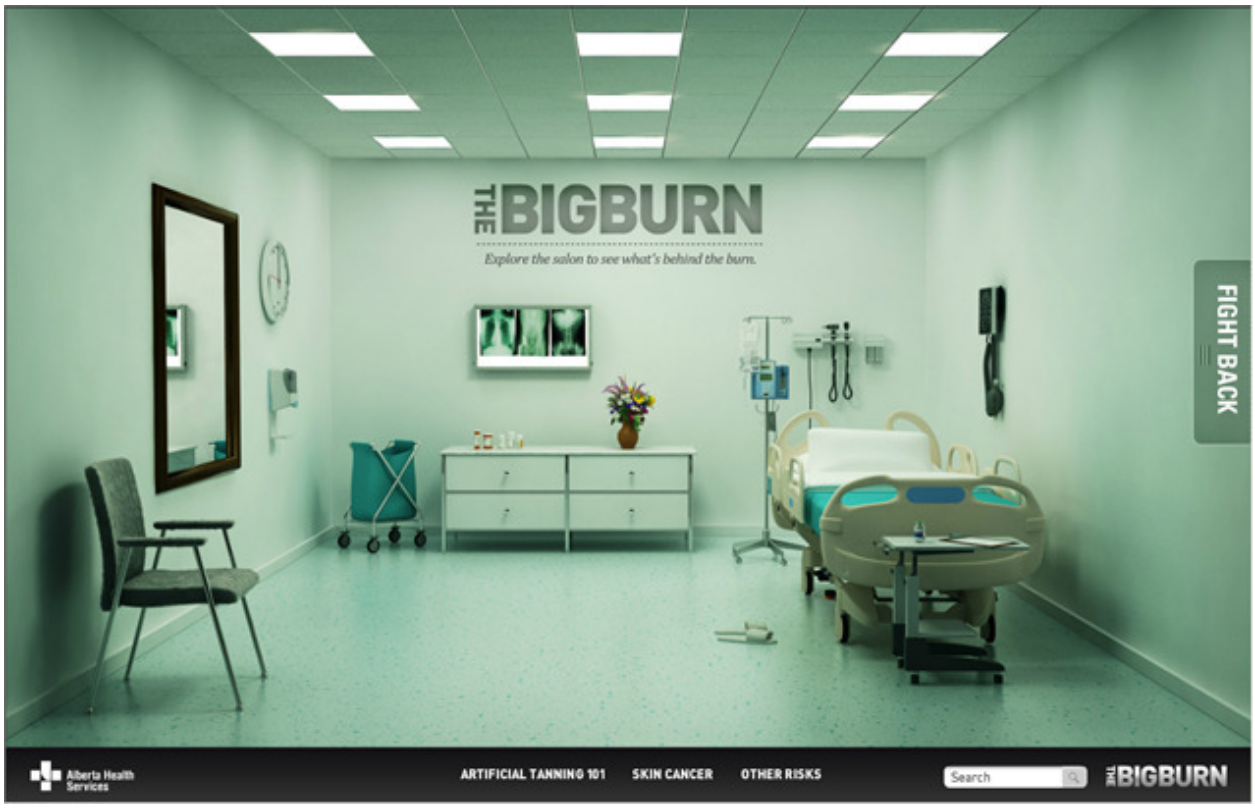
[1] IARC The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers. A systematic review. Int. J. Cancer: 120, 1116-1122 (2006)
World Health Organization (WHO), International Agency for Research on Cancer (IARC), Exposure to Artificial UV Radiation and Skin Cancer. IARC 2006

[1] IARC The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers. A systematic review. Int. J. Cancer: 120, 1116-1122 (2006)
World Health Organization (WHO), International Agency for Research on Cancer (IARC), Exposure to Artificial UV Radiation and Skin Cancer. IARC 2006

[2] Grant, Critique of the International Agency for Research on Cancers meta-analyses of the association of sunbed use with risk of cutaneous malignant melanoma. Dermato-Endocrinology 1:6, 1-7; November/December 2009

[3] Papas – Differential risk of malignant melanoma by sunbed exposure type (2011) Abstract and poster presented at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011

Mirror

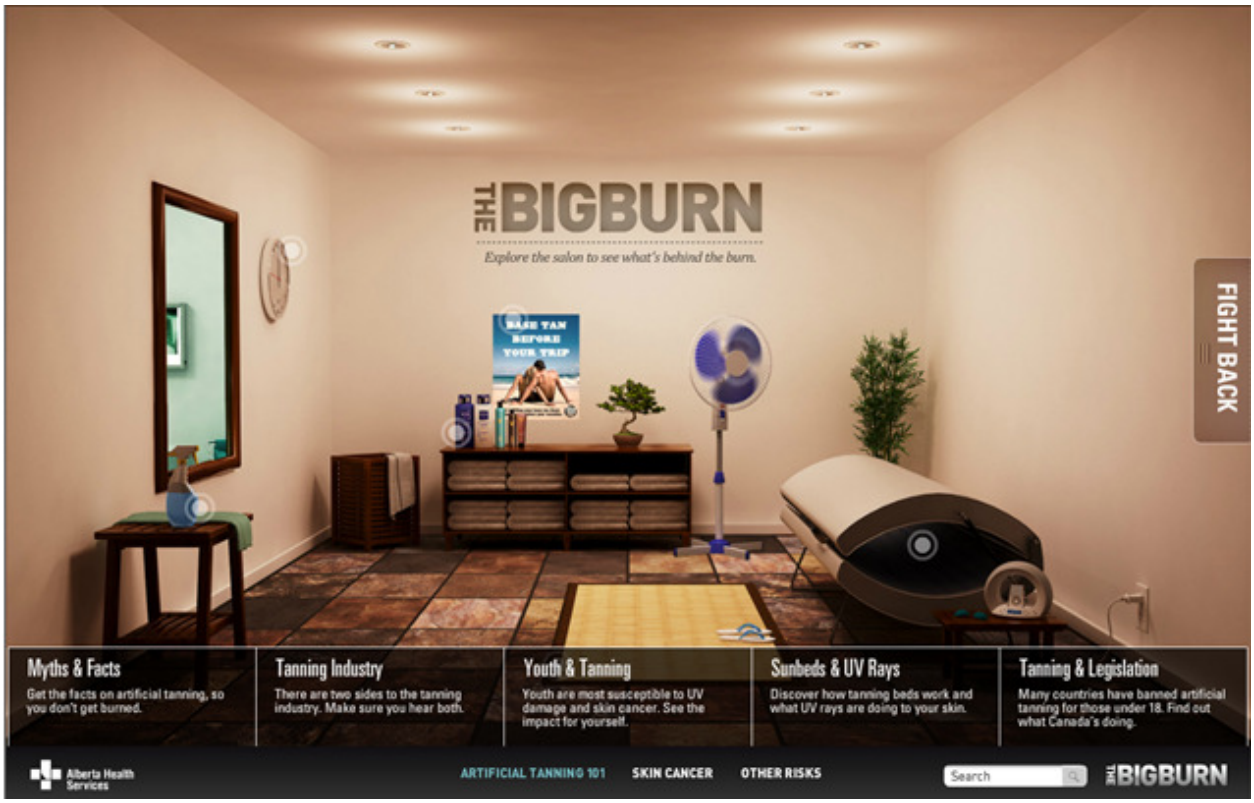


By placing the mouse over the mirror the room changes to a hospital bed and room.

At the bottom of the home page there are 3 links:

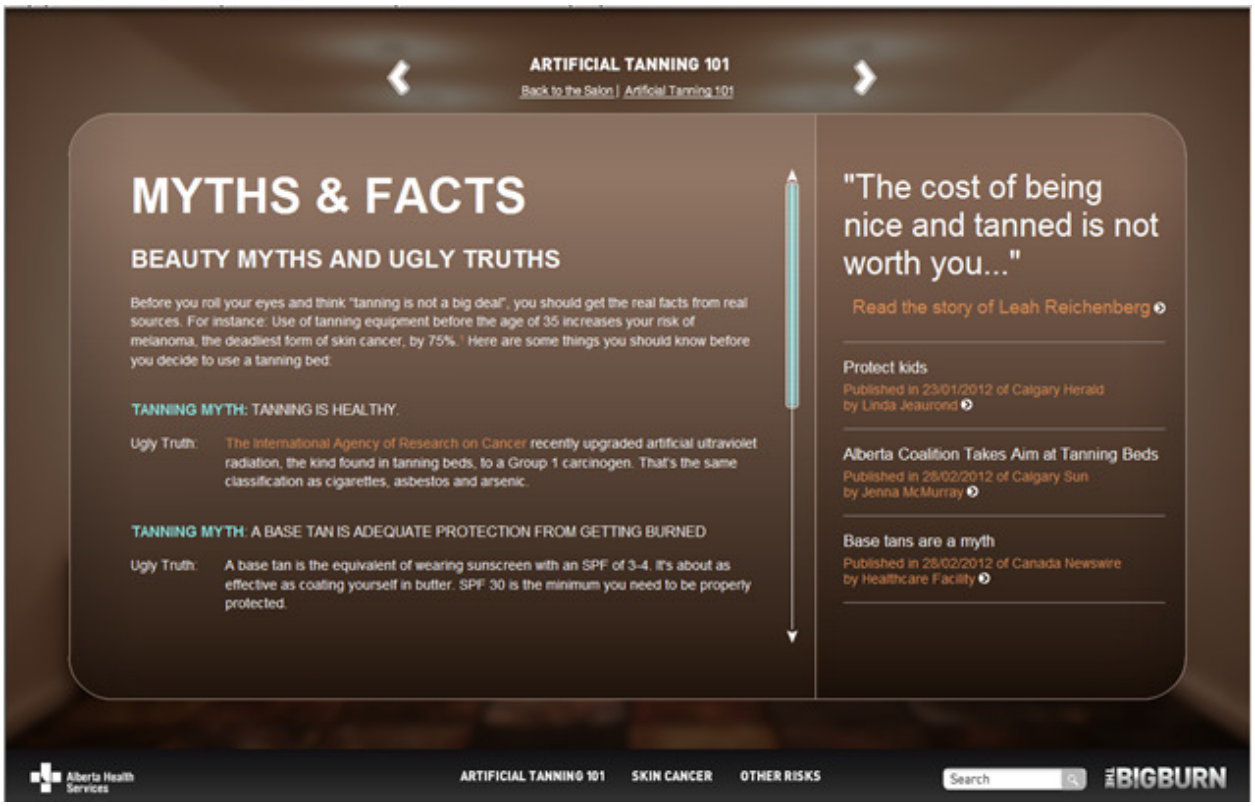
- Artificial Tanning 101
- Skin Cancer
- Other Risks

Artificial Tanning 101



This link goes to 5 areas;
Myths & Facts,
Tanning Industry,
Youth & Tanning,
Sunbeds & UV Rays,
Tanning & Legislation

Myths & Facts



Quote - *Use of tanning equipment before the age of 35 increases your risk of melanoma, the deadliest form of skin cancer, by 75%.*

This is a gross misrepresentation of commercial tanning risk especially for people over the age of 35, namely the majority of parents who are looking at this website. No information is provided by TheBigBurn.ca website for the risk of sunbed use for all ages. In the same 2006 WHO IARC report, the overall risk of melanoma from using a sunbed for all ages of people, based on 19 studies was just 15%. This number included home & medical units and Skin Type 1 individuals. This was not stated, and visitors to the site are left to assume incorrectly that their increased risk is still 75% which would be inaccurate.

In addition, quoting a risk of 75% for people under 35 is a misleading quote when referring to the melanoma risk for commercial tanning salons. The website does not differentiate the risk for the actual location where the tanning equipment is located. At a commercial tanning facility, trained operators control the exposure time per session, the time between sessions, and the correct exposure time for the person based on their skin type, current tan, medical considerations and previous exposure schedule. People tanning at home can use the tanning equipment for as long as they want, whenever they want regardless of their skin type. This leads to over exposure and risk of burning which results in higher melanoma risk [1, 2].

[1] Walter et al,. The association of cutaneous malignant melanoma with the use of sunbeds and sunlamps. American Journal of Epidemiology Vol. 131. No 2 (1990)

[2] Chen et al., Sunlamp use and the risk of cutaneous malignant melanoma: a population-based case-control study in Connecticut, USA. International Journal of Epidemiology 1998;27:758-765

At a commercial tanning facility, trained operators control the exposure time per session, the time between sessions , and the correct exposure time for the person based on their skin type, current tan, medical considerations and previous exposure schedule.

The 75% increase in risk for people under age 35 reference is derived from the WHO IARC report from 2006. It reported that people who tanned indoors under the age of 35 had a 75% greater risk of having melanoma. What was not reported by media or cancer organizations was where subjects in this study were getting their sunbed exposure from – namely commercial locations, home and/or in medical units. When you extrapolate the data from each of the studies used by IARC and recalculate the risk by location of where the sunbed was actually used, you find that the risk was higher for indoor tanning in homes and medical facilities.

The cited increased risk for people under 35 from professional, commercial sunbathing equipment is only 6% (Papas). The corresponding risk of using sunbed equipment at home is 40% and the risk from medical units is 96%. Medical units have 16 times the risk of professional tanning facilities. Further research into the IARC Report by Dr. W. Grant stated "*Removing skin type 1, those who are genetically predisposed to cutaneous malignant melanoma (CMM), showed no statistically significant link between ever use of indoor tanning facilities and melanoma exists"* (Grant)

The cited increased risk for people under 35 from professional, commercial sunbathing equipment is only 6% when you include a Skin Type 1 person

Papas – Differential risk of malignant melanoma by sunbed exposure type (2011) Abstract and poster presented at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011

"Removing skin type 1, those who are genetically predisposed to cutaneous malignant melanoma (CMM), showed no statistically significant link between ever use of indoor tanning facilities and melanoma exists"

Grant, Critique of the International Agency for Research on Cancers meta-analyses of the association of sunbed use with risk of cutaneous malignant melanoma. Dermato-Endocrinology 1:6, 1-7; November/December 2009ndoor tanning facilities and melanoma exists"

Papas – Differential risk of malignant melanoma by sunbed exposure type (2011) Abstract and poster presented at the 3rd North American Congress of Epidemiology in Montreal June 21-24, 2011

Grant, Critique of the International Agency for Research on Cancers meta-analyses of the association of sunbed use with risk of cutaneous malignant melanoma. Dermato-Endocrinology 1:6, 1-7; November/December 2009

Does using a sunbed actually increase the melanoma risk of younger users? A recent study in the US reports that it actually lowers the melanoma risk. A large case-control study completed in 2011 in the US looked at sunbeds and sunlamps and their risk of causing melanoma. They found for females, *use before age 20 yr, current use and years of use were not significant* after adjustments. *The estimated relative odds of melanoma was 0.8 for occasional users (<10 sessions) and 1.1 for more frequent users (10+ sessions)*. For males, the melanoma risk from sunbeds was 0.90 with no significant difference between occasional and frequent users.

Fears et al,. Sunbeds and sunlamps: who used them and their risk for melanoma. Pigment Cell Melanoma RES. doi: 10,1111/j.1755-148X.2011.00842.x

WHO IARC Studies – Review of Melanoma Risk by Sunbed Location

The 2006 WHO IARC study used 7 studies in a meta-analysis for people under age 35 which reported a 75% increased risk for melanoma. The studies were: - Swerdlow 1988, Walter 1990, Westerdahl 1994, Chen 1998, Westerdahl 2000, Veierod 2003, and Bataille 2005. All of these studies had been previously published in peer reviewed publications. Not all 7 studies split out the location where the sun bed was used – Home, Commercial or Medical -- and the associated melanoma related risks. For those that did and which also reported on these results, the findings were that sunbed use in commercial tanning salons did not cause a higher risk of melanoma. Here is what they actually reported in each of the individual studies:

Dr. Stephen Walter (McMaster University, Ontario, Canada) looked at the location where a sunbed was used and its impact on risk: *"Analysis of sunbed / sunlamp use according to location showed that home use is associated with a significant odds ratio for each sex, suggesting about a doubling of risk (table 7). Commercial sunbed/sunlamp use was more common in females, but their odds ratio is very close to 1. The commercial sunbed/sunlamp odds ratio* [OR] *for males is elevated, but does not attain statistical significance either. Although the numbers exposed in medical facilities were small, there was a significant risk elevation for females."*

Dr. Stephen Walter (McMaster University, Ontario, Canada) looked at the location where a sunbed was used and its impact on risk: *"Analysis of sunbed / sunlamp use according to location showed that home use is associated with a significant odds ratio for each sex, suggesting about a doubling of risk (table 7). Commercial sunbed/sunlamp use was more common in females, but their odds ratio is very close to 1. The commercial sunbed/sunlamp odds ratio* [OR] *for males is elevated, but does not attain statistical significance either. Although the numbers exposed in medical facilities were small, there was a significant risk elevation for females."*

Table 7
Females
Commercial Salon – OR 0.92
Home – OR 1.90
Medical Facility – OR 6.42

TABLE 7

Age-adjusted case-control odds ratios, by location of sunbed/sunlamp exposure

Location of exposure	Percent exposed at location		Odds ratio	95% confidence interval	p value
	Cases	Controls			
		Males			
Home	12.0	6.0	2.07	1.09–4.08	0.03
Commercial salon	9.8	6.0	1.75	0.89–3.51	0.11
Medical facility	2.5	2.8	0.88	0.27–2.83	1.00
		Females			
Home	14.4	8.0	1.90	1.11–3.31	0.02
Commercial salon	12.1	13.0	0.92	0.55–1.54	0.84
Medical facility	3.9	0.6	6.42	1.41–59.5	0.01

Walter et al,. The association of cutaneous malignant melanoma with the use of sunbeds and sunlamps. American Journal of Epidemiology Vol. 131. No 2 (1990)

The study by Chen from 1998 also reported a higher risk for home bed users. *"Subgroup analyses showed that sunlamp use was associated with a greater increase in risk for melanoma among those who used sunlamps at home."* The majority of sunbed users in the Chen study - 62% in fact, used sunlamps at home. *"A significant association was observed between sunlamp use at home and melanoma risk. For home users, ever use of sunlamps increased risk of melanoma with a crude OR of 1.63"*. For sunlamps used in commercial settings such as tanning facilities, Chen reported – *"Sunlamp use in commercial settings was not associated with subsequent development of melanoma"*. Chen also analyzed the data by age group. They found that people under age 25 that used sunlamp's at home had double the risk of commercial tanning salons (see Table 3 below).

Chen reported – *"Sunlamp use in commercial settings was not associated with subsequent development of melanoma".*

Table 3 - Age at first use of sunlamp

<25 years – Commercial OR 0.63
<25 years – Home OR 1.79

Table 3 Case-control odds ratio (OR) and their 95% confidence intervals (CI) for sunlamp-related variables among 579 malignant melanoma cases and 468 population-based controls by location of sunlamp use, Connecticut, 1987–1989[a]

	Home				Commercial Settings			
Sunlamp variables	Cases	Controls	ORc (95% CI)[b]	ORa (95% CI)[c]	Cases	Controls	ORc (95% CI)[b]	ORa (95% CI)[c]
Ever used sunlamp								
No	483	417	–	–	483	417	–	–
Yes	96	51	1.63 (1.12–2.37)	1.40 (0.97–2.04)	44	44	0.88 (0.56–1.37)	0.79 (0.49–1.26)
Total number of sunlamp uses								
Never	483	417	–	–	483	417	–	–
<10	57	26	1.90 (1 16–3.09)	1.84 (1.11–3.06)	19	24	0.68 (0.37–1.28)	0.61 (0.47–0.81)
≥10	38	21	1.58 (0.91–2.74)	1.25 (0.71–2.20)	24	19	1.14 (0.61–2.13)	1.00 (0.52–1.91)
Linear trend[d]			$P = 0.68$	$P = 0.45$			$P = 0.78$	$P = 0.83$
Age at first use of sunlamp[e]								
Never	483	417	–	–	483	417	–	–
<25	57	26	2.03 (1.25–3.32)	1.79 (1.07–2.97)	14	16	0.77 (0.37–1.62)	0.63 (0.29–1 36)
25–45	21	15	1.19 (0.60–2.35)	0.92 (0.46–1.87)	18	16	1.01 (0.51–2.01)	1.07 (0.53–2.17)
>45	12	5	1.93 (0.67–5.58)	2.12 (0.69–6.47)	11	10	1.07 (0.45–2.54)	0.71 (0.29–1.75)

[a] Number of cases and controls do not always add up to total due to missing information.

[b] Crude odds ratio adjusted for sex and age.

[c] Odds ratio adjusted for sex, age, skin susceptibility index, and total recreational sun exposure index.

[d] Crude linear trend adjusted for sex, age, and ever used sunlamp (yes/no). Multivariate-adjusted linear trend adjusted for sex, age, cutaneous phenotype index, recreational sun exposure index, and ever used sunlamp (yes/no).

[e] Odds ratio adjusted for total number of sunlamp uses, in addition to variables mentioned above.

Chen et al., Sunlamp use and the risk of cutaneous malignant melanoma: a population-based case-control study in Connecticut, USA. International Journal of Epidemiology 1998;27:758-765

There are other facts to consider when looking at the combined melanoma risk for people under age 35 from these 7 studies:

- Swerdlow 1988

- older study, done in Scotland, greater percentage of Skin Type 1s with a greater risk of melanoma, with cases from 1979-84 when sunbed industry was still in its infancy
- report stated *"Risk analyzed by age at first exposure was somewhat greater for people first exposed before age of 30 compared with those at a later age, but overall relation to age was not significant"*

Swerdlow et al,. Fluorescent lights, ultraviolet lamps, and risk of cutaneous melanoma. BMJ Volume 297 10 September 1988

- Westerdahl 2000

- southern Sweden, greater percentage of skin type 1s vs Canada, plus exposure time was 30 minutes which was higher than in the use of Canadian equipment today
- Westerdahl did two studies from the same group of cases and controls, one on sunbed risk and one for sunscreen risk
- Westerdahl's Sunbed study found OR of 1.2 for "ever" use and 1.8 OR for regular sunbed use. In Westerdahl's Sunscreen study, with the same patients he found 1.3 OR for ever use and 1.8 OR for always use sunscreens. So sunbeds and sunscreens had the same Odds Ratio – 1.8 for regular users. The use of sunbeds (home or commercial) and chemical sunscreens have the same increase risk of melanoma.

Westerdahl et al,. Risk of cutaneous malignant melanoma in relation to use of sunbeds: further evidence for UV-A carcinogenicity. British Journal of Cancer (2000) 82(9), 1593-1599

Westerdahl et al,. Sunscreen use and malignant melanoma. Int. J. Cancer: 87, 145-150 (2000)

- Veierod 2003

- this was a prospective cohort study of 106,379 women from Norway and Sweden
- the IARC study used data from this study for women age 20-29 who tanned >1 time/month – OR 2.58. Not all the data was used to create the WHO IARC Conclusion, the increase risk would have been lower if all the data was used.
- IARC could have selected the data for age 10-39 RR1.55 as this more broadly matched the criteria for under age 35 they were working with. IARC committed selection bias and cherry picked the worst case of RR 2.58 vs RR 1.55 to show an overall high risk for the meta-analysis
- in 2010 this study was updated for the 106,379 women and actual melanoma cases. When they recalculated the updated numbers the results for women age 20-29 who tanned >1 time/month had an OR of 1.53. That's a 40% drop in risk from the same study as what was used in the 2006 IARC report

Veierod et al,. A prospective study of pigmentation, sun exposure and and risk of cutaneous malignant melanoma in women. Journal of the National Cancer Institute, Vol. 95, No. 20, October 15, 2003

Veierod et al,. Sun and solarium exposure and melanoma risk: Effects of age, pigmentary characteristics, and nevi. American Association for Cancer Research doi: 10.1158/1055-9965 EPI-09-0567 Cancer Epidemiol Biomarkers Prev; 19(1); 111-20. 2010

- Bataille 2005

- this study was the largest, 5 country European study which found that the OR forever using a sunbed was 0.90 or a 10% reduced risk of melanoma
- the mean age of first use in the study was 24, so the majority of people in the study would be below 35 years of age and the OR close to 1.0, or no risk would seem reasonable
- the WHO IARC study selectively used the only age data reported in the study – Ever sunbed use before age 15 OR 1.82. This is but a sliver of the information contained in this study and clearly does not represent the melanoma risk for all people under age of 35 for this study. This is report bias as information for all people in the study under age 35 was not reported because it was not a risk
- The research concluded *"In conclusion, sunbed and sun exposure were not found to be significant risk factors for melanoma in this case-control study performed in five European countries"*

"In conclusion, sunbed and sun exposure were not found to be significant risk factors for melanoma in this case-control study performed in five European countries"

Bataille et al,. A multicentre epidemiological study on sunbed use and cutaneous melanoma in Europe. European Journal of Cancer 41 (2005) 2141-2149

In summary, the 7 studies used by the WHO IARC in their 2006 sunbed meta-analysis study all have major discrepancy issues and in no way present solid scientific evidence of an increased melanoma risk for people under age 35. Professional medical and research organizations like the AHS should have first reviewed each of these individual studies in detail before blindly supporting the WHO recommendations. The Website should not have been quoting the WHO IARC sunbed study 75% risk for people under age 35, especially when referencing to the risk for commercial tanning facilities.

In addition, all the studies had inconsistent data. It was not a compilation of 7 studies of data on people who were age 35 and under, who ever used a sunbed. There is a mixture of ages, regular versus ever use of the equipment. In the majority of cases IARC falls short due to publication bias as studies only report sub-analysis results for problems, not for OR results close to 1.0. Bataille is a prime example; they only reported separate results for ever sunbed use before age 15.

Swerdlow 1988 – Age <30 – Ever use of sunbed

Walter 1990 – Age <30 – Ever use of sunbed

Westerdahl 1994 – Age <30 – Ever use of sunbed

Chen 1998 – Age <25 – Ever use of sunbed

Westerdahl 2000 – Age <35 – Regular use of sunbed

Veierod 2003 – Age 20-29 - >1 time/mo (regular)

Bataille 2005 – Age <15 – Ever use of sunbed

Absolute Risk vs Relative Risk

But what do the numbers really mean? A 75% increase from what? *"Melanoma is pretty rare and almost all the time, the way to make it look scarier is to present the relative change, the 75 percent increase, rather than to point out that it is still really rare,"* Dr. L. Schwartz, a general internist at Veterans Affairs Medical Center in White River Junction, Vt. While Dr. Ivan Oransky M.D. elaborated further *"Absolute risk just tells you the chance of something happening, while relative risk tells you how that risk compares to another risk, as a ratio. If a risk doubles, for example, that's a relative risk of 2, or 200 percent. If it halves, it's .5, or 50 percent. Generally, when you're dealing with small absolute risks, as we are with melanoma, the relative risk differences will seem much greater than the absolute risk differences. You can see how if someone is lobbying to ban something – or, in the case of a new drug, trying to show a dramatic effect – they would probably want to use the relative risk."*

http://www.healthjournalism.org/blog/2010/05/tanning-beds-what-do-the-numbers-really-mean/

"Melanoma is pretty rare and almost all the time, the way to make it look scarier is to present the relative change, the 75 percent increase, rather than to point out that it is still really rare," Dr. L. Schwartz, a general internist at Veterans Affairs Medical Center in White River Junction, Vt.

The largest study used in the WHO IARC meta-analysis of 7 studies was a cohort study by Veierod 2003 and the study is following 106,366 women. In an updated issue of this cohort study in 2010, the study reported an age adjusted Relative Risk of 1.39 and a Multivariable Relative Risk of 1.53 or an adjusted increased risk of

53% down from the 2003 report which 158%. The study reported that for women age 20-29, 70,550 never used a tanning bed, and 279 of them got melanoma. That works out to an absolute risk of 279/70550=.0039546. For women 20-29y that used a tanning bed >1 time/mo, 6,368 women, 25 of them got melanoma. That works out to an absolute risk of 25/6368=.0039258. So the women who used a tanning bed actually had LESS absolute risk of melanoma than those who did not use a tanning bed.

Table 5. RRs and 95% CIs for cutaneous malignant melanoma according to solarium use in successive decades of age

Age period and solarium use	Frequencies No. (%)	No. of cases	Age-adjusted RR (95% CI)	Multivariable* RR 95% CI
10-19 y (n = 85,210)				
Never	83,554 (98)	326	1.00	1.00
Rarely or ≥1 time/mo	1,656 (2)	7	1.30 (0.61-2.75)	1.19 (0.56-2.53)
			P_{trend} = 0.51	P_{trend} = 0.66
20-29 y (n = 88,478)				
Never	70,550 (80)	279	1.00	1.00
Rarely	11,560 (13)	41	1.15 (0.81-1.61)	1.08 (0.77-1.53)
≥1 time/mo	6,368 (7)	25	1.39 (0.90-2.14)	1.53 (0.99-2.38)
			P_{trend} = 0.13	P_{trend} = 0.09
30-39 y (n = 87,219)				
Never	43,863 (50)	166	1.00	1.00
Rarely	28,243 (32)	119	1.23 (0.96-1.56)	1.14 (0.89-1.45)
≥1 time/mo	15,113 (17)	71	1.41 (1.06-1.87)	1.49 (1.11-2.00)
			P_{trend} = 0.01	P_{trend} = 0.01
40-49 y (n = 41,022)				
Never	17,063 (42)	68	1.00	1.00
Rarely	14,449 (35)	65	1.12 (0.79-1.57)	1.14 (0.81-1.62)
≥1 time/mo	9,510 (23)	51	1.34 (0.93-1.93)	1.61 (1.10-2.35)
			P_{trend} = 0.12	P_{trend} = 0.02
Combined, 10-39 y (n = 79,042)				
Never in all decades, 10-39 y	37,991 (48)	137	1.00	1.00
Rarely but not ≥1 time/mo in any decade, 10-39 y	26,599 (34)	114	1.36 (1.05-1.75)	1.24 (0.96-1.61)
≥1 time/mo in one decade, 10-39 y	11,576 (15)	48	1.33 (0.95-1.86)	1.38 (0.98-1.94)
≥1 time/mo in two or three decades, 10-39 y	2,876 (4)	16	2.13 (1.25-3.64)	2.37 (1.37-4.08)
			P_{trend} = 0.004	P_{trend} = 0.003

NOTE: Poisson regression analysis. All statistical tests were two-sided. Analyses of solarium use at ages 40 to 49 y included only women ≥40 y when answering the questionnaire.
*Multivariable models included attained age, region of residence, pigmentation characteristics (hair color and skin color after heavy sun exposure in the beginning of the summer and after repeated sun exposure) and solar exposure (corresponding number of age-specific sunburns and weeks on annual bathing vacations).

Veierod et al,. Sun and solarium exposure and melanoma risk: Effects of age, pigmentary characteristics, and nevi. American Association for Cancer Research doi: 10.1158/1055-9965 EPI-09-0567 Cancer Epidemiol Biomarkers Prev; 19(1); 111-20. 2010

"Absolute risk just tells you the chance of something happening, while relative risk tells you how that risk compares to another risk, as a ratio. If a risk doubles, for example, that's a relative risk of 2, or 200 percent. If it halves, it's .5, or 50 percent. Generally, when you're dealing with small absolute risks, as we are with melanoma, the relative risk differences will seem much greater than the absolute risk differences. You can see how if someone is lobbying to ban something – or, in the case of a new drug, trying to show a dramatic effect – they would probably want to use the relative risk."

Ugly Truth: *The International Agency of Research on Cancer recently upgraded artificial ultraviolet radiation, the kind found in tanning beds, to a Group 1 carcinogen.[2] That's the same classification as cigarettes, asbestos and arsenic.[3]*

In 2009 the World Health Organization moved tanning equipment to Group 1, or carcinogenic to humans, the same category as the sun has been in since 1992. This was not as a result of any additional research on tanning equipment. The rationale appears to have been that UV from the sun and UV from sunbeds is the same thing. The Big Burn website fails to mention that natural sunlight is a Group 1 carcinogen and the majority of the population is exposed to this type of UV light compared to tanning equipment. The WHO IARC report did not quantify how much UV exposure is carcinogenic, but they did identify risk factors for Skin Types. Also included in Group 1 carcinogens are birth control pills, phototherapy units using drugs (PUVA Treatments) and salted fish.

Alcohol is listed as a Group 1 carcinogen by the WHO IARC monographs. What effect does alcohol consumption have on melanoma risk? A large case-control study in 2004 found that consuming 2.8 liquor drinks per week was associated with a 69% increased risk. This risk would be present for all people of drinking age and over, not just people under age 35 and represented over 11 times the increase risk of a commercial tanning facilities. The AHS has not created a website warning people to stop drinking alcohol because it is a Group 1 carcinogen or implemented warning signs at liquor retailers.

Millen et al,. Diet and Melanoma in a case-control study. Cancer Epidemiology Biomarkers Prev 2004;13(6):1042-51

Cigarette smoking increases one's risk of any cancer by 2,000% -- 333 times greater than the relative risk increase that the IARC data reports for commercial sunbed users. The comparison between tobacco and commercial tanning is both unfair and misrepresentative. Smoking should never be compared to UV exposure. This shows the vast different in the increase risk for what is listed in Group 1. This will dilute the importance of the anti-smoking message and adds dangerous credence to the misinformed notion that "everything causes cancer these days".

Cigarette smoking increases one's risk of any cancer by 2,000% -- 333 times greater than the relative risk increase that the IARC reports for commercial sunbed users.

Ugly Truth: *A base tan is the equivalent of wearing sunscreen with an SPF of 3-4. Its about as effective as coating yourself in butter. SPF 30 is the minimum you need to be properly protected.*

No reference is provided on the TheBigBurn.ca website to back the claim that a base tan has a SPF value of 3-4. In addition, no reference is given for the *"as effective as coating yourself in butter"* quote. This is a gross misrepresentation of the facts and not supported by scientific evidence. This is marketing, anti-tanning hype at its strongest and has no place in a website from a professional medical organization. There is no reference study that compares the protection a base tan offers compared to someone coated in butter. Should this be how a public medical organization (AHS) who claims to be evidence-based provides information to the public.

The actual value of a natural base tan is an SPF of 6 when following the exposure schedule of tanning equipment. This is based on research studies where people start off with non-burning exposures that are increased by a factor of 6 as their tan becomes darker and strengthens and prevents burning.

Miller et al,. Reduction of the UV burden it indoor tanners through new exposure schedules: a pilot study. Photodermatol Photoimmunol Photomed 2006; 22:59-66
Caswell et al,. The kinetics of the tanning response to tanning bed exposures. Photodermatol Photoimmunol Photomed 2000; 16:10-14

Studies have shown that people rarely apply the amount of chemical sunscreen that the chemical sunscreen manufacturers use to determine an SPF rating, which is a covering of 2.0 mg/cm2. People under-apply sunscreen with an average application of between 0.25 to 0.50 mg/cm2. The result is the actual SPF value that the average person gets from under applying an SPF 30 would be an SPF value of 2.3.

Letter from Don Smith, Non-Ionizing Radiation Research Institute, 2/24/2011 – PHOTOPROTECTION COMPARISON SUNSCREEN vs NATURAL TAN

When you compare a chemical sunscreen with an SPF rating of 30, under applied by the public which provides an SPF rating of 2.3 to a natural fully developed base tan with an SPF rating of 6, the natural tan would provide almost three times the protection from burning than an SPF 30 chemical sunscreen. A natural tan never has to be re-applied when you sweat or swim, it's always there when you need it. A natural tan does not involve exposing your body to any harmful chemicals. A natural tan provides far better burn protection when compared objectively to an SPF 30 sunscreen.

Letter from Don Smith, Non-Ionizing Radiation Research Institute, **Skin Damage Prevention: (Artificial) Sunscreen vs (Natural) Facultative Pigmentation**

A study published in 2011 by Lazovich found *"Our data suggest ranking other sun protection methods, such as clothing or sun avoidance, higher than sunscreen for reducing melanoma risk."*
Lazovich, Vogel, Berwick, Weinstock, Warshaw, Anderson 2011. Melanoma Risk in Relation to Use of Sunscreen or Other Sun Protection Methods. Cancer Epidemiol Biomarkers Prev; 1–11. _2011 AACR

Ugly Truth: *Studies have shown that tanning can be addictive. It causes a release of endorphins in your brain – the same reaction as heroin, cocaine and methamphetamine trigger.2 That's why what starts as a one-time thing can turn into an all-the-time thing.*

Sunshine UV exposure causes the same effect. It's natural. It's why you feel good on a sunny spring day after a long Alberta winter. Tanning is not an addiction. It's an attraction. Humans have been biologically programmed to be attracted to UV light. We need it to live. To call it an addiction is like saying that people are addicted to oxygen or water. It just isn't accurate. Here's the core science that is being twisted: Ultraviolet light exposure produces endorphins in the skin — substances that literally make us feel good. Because sunshine is natural and humans need sunshine in order to be healthy, endorphin production is nature's way of telling us that sunshine is good. Just as food does the same thing. Tanning (color of the skin) doesn't actually produce endorphins. It is UV light that has this effect, and you do not have to produce a tan to create endorphins.

Ugly Truth: *Tanning beds are NOT a safe way to get your vitamin D. Why increase your risk of skin cancer when taking a vitamin D supplement is safer and cheaper?*

It has long been understood that our bodies produces vitamin D through exposure of the skin to Ultraviolet B. The two sources of UVB available to Canadians are sunlight and sunbeds. Because of our Northern geography, sunlight does not produce vitamin D in humans from approximately October - March. The other way to get vitamin D is through diet or supplements. A typical Canadian diets provides very little vitamin D.

Tanners have been scientifically shown to have 90% higher vitamin D levels than non-tanners. A study in Alberta found that regular indoor tanners had the highest vitamin D levels compared to supplement users and people who got lots of sun exposure.

Tangpricha V et al. Tanning is associated with optimal vitamin D status (serum 25-hydroxyvitamin D concentration) and higher bone mineral density. Am J Clin Nutr 2004;80:1645–9

Schwalfenberg et al,. Addressing vitamin D deficiency in Canada: A public health innovation whose time has come. Public Health (2010), doi:10.1016/j.puhe.2010.03.003

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Court Affidavit by Dr. Reinhold Vieth, Mount Sinai Hospital, Toronto, foremost researcher on Vitamin D in Canada

". . . sunbeds and summer sunshine are effective means by which to increase our serum 25(OH)D levels. The advantage of a tanning bed is that exposure to UV light can be controlled more precisely than casual sun exposure and thus can be safer than advising the public to guess at their own sun exposure from sunlight,"

Vitamin D obtained through UV exposure poses no risk of toxicity as the body has a natural shut-off system for its production of Vitamin D. The “Big Burn” website unfairly states that taking a vitamin D supplement is “safer”. No published scientific evidence or references to support this statement were found on the website.

Consider that the 2010 UK Vitamin D Consensus from 7 health organizations recommended:

“There is not enough evidence to support a recommendation for food fortification or widespread vitamin D supplementation for the general population. Unlike vitamin D produced in the skin, there is the potential that vitamin D from supplements and fortificants could build up to toxic levels and there is not enough evidence about the possible risks of raised vitamin D blood levels in the general population over a long period of time.”

The 7 organizations were; the British Association of Dermatologists, Cancer Research UK, Diabetes UK, the Multiple Sclerosis Society, the National Heart Forum, the National Osteoporosis Society, and the Primary Care Dermatology Society.

http://info.cancerresearchuk.org/prod_consump/groups/cr_common/@nre/@sun/documents/generalcontent/cr_052628.pdf

A tanning bed on the other hand will generate over 10,000 IU of vitamin D per session. (Holick). Given that this is natural production, there is no risk of overdose or toxicity. According to research published by Edmonton's Dr. Gerry Schwalfenberg from subjects in Edmonton, Alberta, in the medical journal "Public Health", regular sunbed users had optimum vitamin D levels, even higher than those who take high-dosage vitamin D supplements.

Holick. Environmental factors that influence the cutaneous production of vitamin D. Am J Clin Nutr 1995;61(suppl):638S-45S
Schwalfenberg et al,. Addressing vitamin D deficiency in Canada: A public health innovation whose time has come. Public Health (2010), doi:10.1016/j.puhe.2010.03.003

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So are people who use solariums increasing their risk of cancer as the "Big Burn" website suggests?

Solarium use was found to be inversely associated with breast cancer incidence in a large Swedish cohort study. The study reported *"reduced breast cancer risk consistently appeared among women who spent one week or more per year on sunbathing vacations between ages 10 and 29 years, or who used solarium between ages 10 and 39 years, after controlling for the other risk factors"*. "*A 15% statistically significant decreased risk of breast cancer was found for women whose skin colour was brown after chronic sun exposure, compared with those whose skin was light or never brown"*. The study reported that 10-39 year old women who used a solarium and tanned >1 time/month in two or three decades, had a statistically significant 37% reduced risk of breast cancer incidence (HR 0.63 (0.41-0.96)).
Yang et al., Prospective Study of UV Exposure and Cancer Incidence Among Swedish Women. Cancer Epidemiol Biomarkers Prev; 20(7) July 2011

A large population-based, case-control study of 3,101 people, in Ontario, Canada found that time spent outdoors between May and September was associated with reduced breast cancer risk of 50% for women aged 60-74 years old and 29% for teenage women. The authors concluded *"This study suggest that factors suggestive of increased cutaneous production of vitamin D are associated with reduced breast cancer risk."*
Anderson et al., Ultraviolet Sunlight Exposure During Adolescence and Adulthood and Breast Cancer Risk : A Population-based Case-Control Study Among Ontario Women. American Journal of Epidemiology June 2011 DOI: 10.1093/aje/kwr091

A study of 972 breast cancer cases from the Ontario Cancer Registry were reviewed and matched to 1135 controls. Researchers found that reduced breast cancer risks of 35% were associated with increased sun exposure from ages 10 to 19. They concluded *"We found strong evidence to support the hypothesis that vitamin D could help prevent breast cancer. Our results suggest that exposure earlier in life, particularly during breast development, may be most relevant"*.
Knight et al., Vitamin D and Reduced Risk of Breast Cancer: A Population-Based Case-Control Study. Cancer Epidemiol Biomarkers Prev 2007;16(3):422–9)

A large population-based case-control study in Mexico found that breast cancer risk was reduced by 47% for women who had 25(OH)D blood serum levels greater than 30 ng/ml (75 nmol/L) compared with those < 20 ng/ml (50 nmol/L). The study concluded *"our findings strongly support the hypothesis that higher vitamin D status may reduce risk of breast cancer in both pre and postmenopausal women in Mexico"*.

Fedirko et al., Serum 25-Hydroxyvitamin D and risk of breast cancer: results of a large population-based case-control study in Mexican women. Cancer Causes Control DOI 10.1007/s10552-012-9984-

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Yang et al., Prospective Study of UV Exposure and Cancer Incidence Among Swedish Women. Cancer Epidemiol Biomarkers Prev; 20(7) July 2011

Solarium use prevented other cancers too

The Yang study reported that 10-39 year old women who used a solarium and tanned >1 time/month in two or three decades, had a statistically significant 37% reduced risk of breast cancer incidence (HR 0.63 (0.41-0.96)). The study also showed positive incidence reductions with other cancers – 46% less Ovarian cancer incidence, 51% less lung cancer incidence, and 79% less brain cancer incidence.

Yang et al., Prospective Study of UV Exposure and Cancer Incidence Among Swedish Women. Cancer Epidemiol Biomarkers Prev; 20(7) July 2011

Ugly Truth: *Artificial tanning is more dangerous than the sun. Some tanning beds emit 10-15 times more UVA radiation than the midday sun. That means eight minutes in a bed is like 40 minutes on a beach. And you're not wearing sunscreen!*

If sunbeds provide 10-15 times more UVA radiation than midday sun how does 8 minutes in a bed equate to 40 minutes on a beach? That is only a difference of 5 times, as opposed to the ten to fifteen times stated on the Big Burn website.

The key is overall dosage of UV and making sure that the body does not receive enough UV to create a burn. Whether that comes in 40 minutes on a beach or 8 minutes in a sunbed, it's the same thing. The same total dosage.

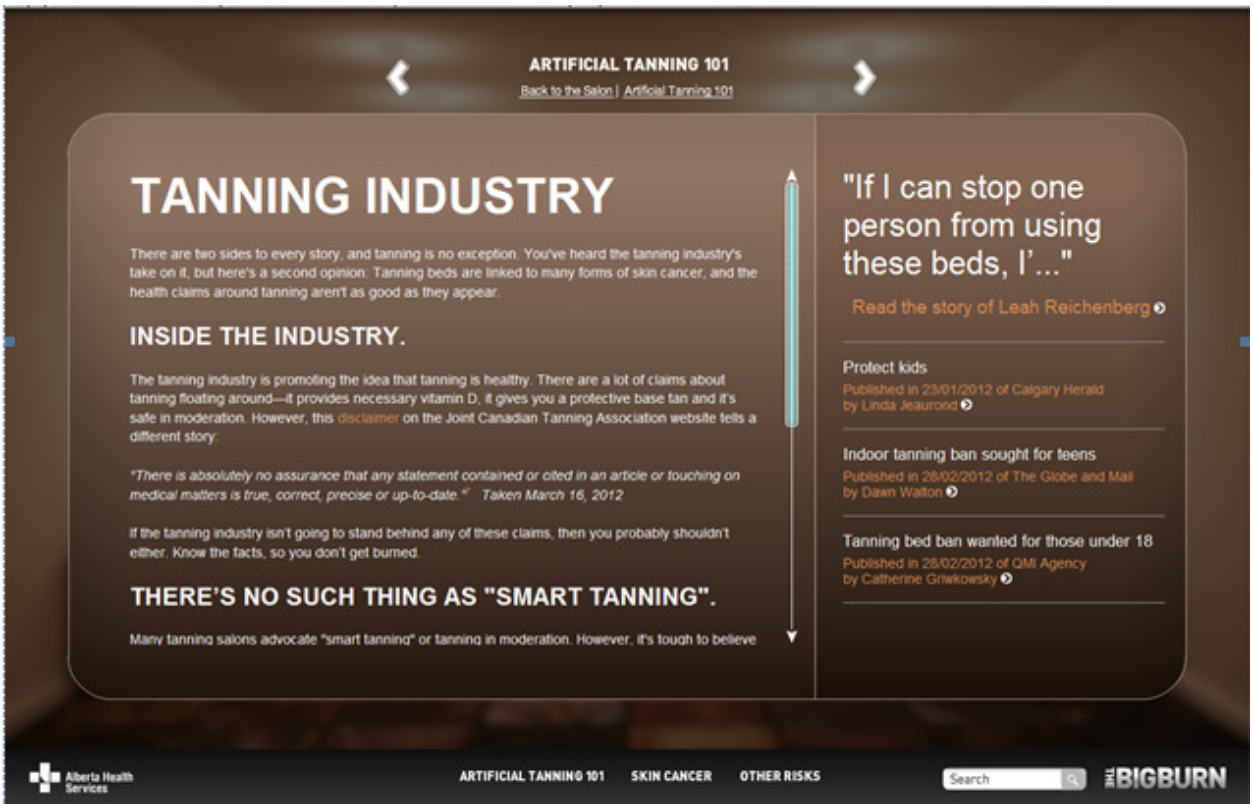
Are there scientific studies that show that you are at a higher risk if you receive UV exposure in a higher, quicker dosage? There are no research references that we know of.

When valid data is compared, we find that a sunbed equipped with traditional low pressure sunlamps emits 20% less UVA than sunlight; a sunbed equipped with a new-era sunlamp emits only 30% (1.3 times) more UVA than sunlight; and a HID/high pressure sunbed emits only 70% (1.7 times) more UVA than sunlight. However, a PUVA booth like those used by the dermatology community emits 5.8 times (580%) more UVA than sunlight and a xenon solar simulator like those used for sunscreen testing emits 6.8 times (680%) more UVA than sunlight.

Patricia E. Reykdal, Donal L. Smith, Sunlight vs Sunbeds: The Truth About UVA

The real risk of sunbeds was published in the 2006 study by WHO IARC as a 15% lifetime increased risk, based on a meta-analysis of 19 studies.

Tanning Industry



On its Tanning Industry page, the Big Burn website misrepresents the commercial tanning industry by claiming that it does not stand behind its information, citing a disclaimer used by the JCTA to inform people that information written in articles posted to the JCTA website are outside of its control. Most websites that post news articles on medical information use a similar type quote. The tanning industry cannot stand fully behind something that it is merely posted and not written by the JCTA.

JCTA Website quote – "*There is absolutely no assurance that any statement contained in an article or touching on medical matters is true, correct, precise or up-to-date*"

AHS Website Quote – *"If the tanning industry is not going to stand behind any of these claims, then you probably shouldn't either. Know the facts so that you don't get burned."*

The JCTA suggest that after this information is reviewed, the Big Burn website may need its own disclaimer. The JCTA is seeking legal advice on the "The BigBurn.ca" website.

Website Statement: *A study commissioned by the Canadian Cancer Society in Ontario showed that 60% of tanning facilities didn't ask the age of tanners or assessed their type of skin for the possibility of burning, and 99% didn't advise* ***those with a probability of burning*** *not to tan.*

First, there is no law that requires a tanning facility to ask the age of tanners or to skin type clients. It's a recommendation by Health Canada and also a JCTA guideline. Our organization supports the implementation of professional standards which would require such disclosure

Second, this is an Ontario survey. This may not be the case in Alberta.

According to the Youthography survey, the researchers visited the salons but never went through and actually signed up for a tanning session. Salon's normally discuss pricing first, then there is a purchase at which time a client card is filled out, which includes skin typing and age. The results would have been very different if the researchers had actually paid for a tan and gone into the tanning room.

Quote: *Not to mention that just 10 artificial tanning sessions over a lifetime increases your risk of melanoma by 50%.*

The reference for this quote is a previously cited study from Australia. For one thing the reference study is not Canadian and does not represent our environment, people or the indoor tanning industry in our country. As well, this study was recently repeated in the UK which did not find or confirm any of the findings of the Cust study which makes the Cust study results/evidence highly suspect. Not surprisingly, the Big Burn website does not cite or even mention the Elliott study, choosing instead to go with the report that cast the industry in the worst possible light. The Cust research was made up of 60% of tanners using home units, which would have nothing to do with commercial tanning salons. This shows bias on the part of the Big Burn website when reviewing the available scientific evidence or lack of rigor in checking for all pertinent research or a complete review of the research paper.

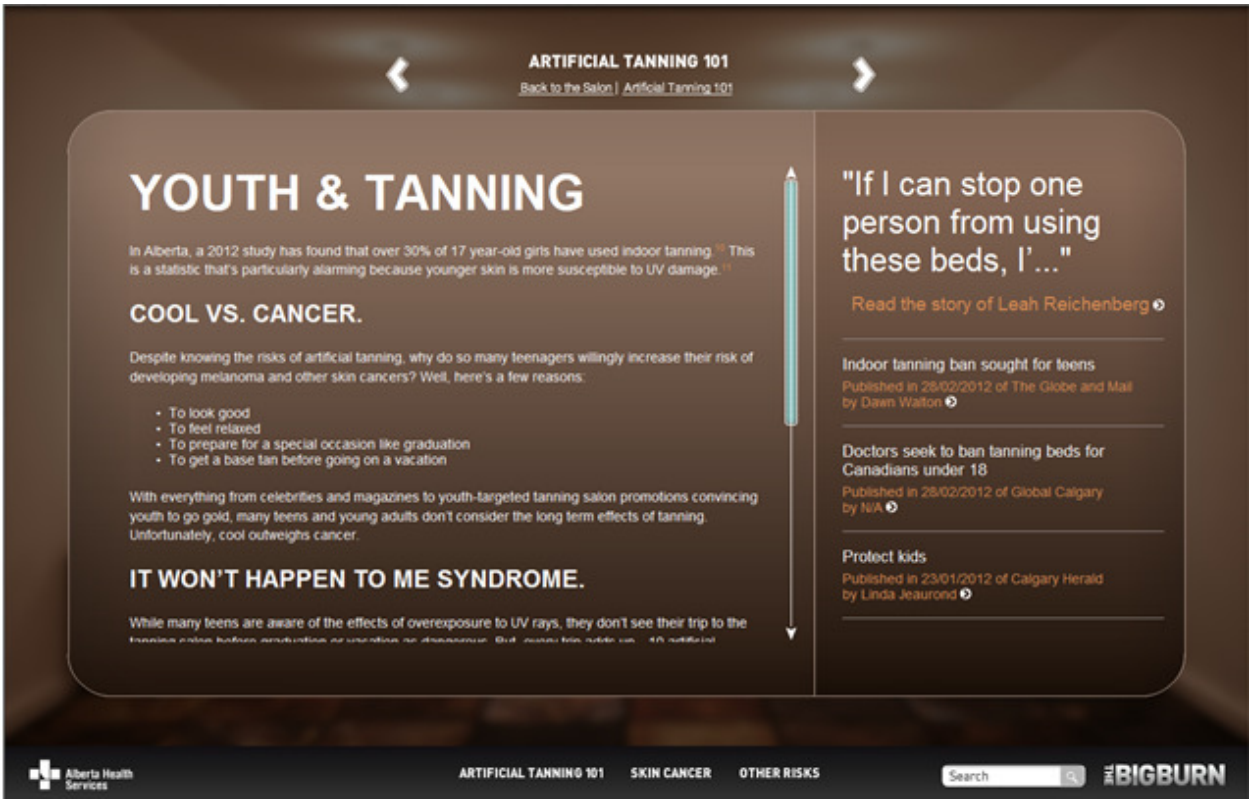
Cust, A. E., Armstrong, B. K., Goumas, C., Jenkins, M. A., Schmid, H., Hopper,J. L., Kefford, R. F., Giles, G. G., Aitken, J. F. and Mann, G. J. (2011), Sunbed useduring adolescence and early adulthood is associated with increased risk ofearly-onset melanoma. International Journal of Cancer, 128: 2425–2435

Here is what the Elliott UK study found while replicating the Cust Australian study in the UK: *"In multiple regression analyses, ever-use of sunbeds was not a significant risk factor for melanoma (adjusted OR 1.06, 95% CI 0.83–1.36, Table 1)"* Age at first use <25 years – OR 1.16. Number of lifetime sessions >20 – OR 0.99 – no melanoma risk at all. Years since first use >23 – OR 0.99 again no risk.

Faye Elliott, Mariano Suppa, May Chan, Susan Leake, Birute Karpavicius, Sue Haynes, Jennifer H. Barrett, D. Timothy Bishop and Julia A. Newton-Bishop (2011) Relationship between sunbed use and melanoma risk in a large case-control study in the United Kingdom. Int. J. Cancer: 000, 000–000 (2011) Vc 2011 UICC

The right hand side of this page also references newspaper articles which contain factually incorrect information and again cast the commercial indoor tanning industry in a consistently negative fashion.

Youth & Tanning



In Alberta, A 2012 study has found that over 30% of 17 year old girls have used indoor tanning. This is a statistic that's particularly alarming because younger skin is more susceptible to UV damage.

This is backed up to a reference study by Phillipe Autier in the European Journal of Cancer which states: "*Childhood and adolescence are periods of greater biological vulnerability to UV radiations, and thus prohibition of the use of tanning devices before 18 years old seems wise"* This study is not based on any hard scientific evidence. There is no data analyzing skin damage from people receiving enough UV to tan versus people receiving no UV exposure.

Autier also states: *"Sunburn experience during childhood or during adulthood is a risk factor for melanoma, and the risk increases with increasing numbers of sunburns"* but concedes that *"at present, there are no scientific data indicating that intentional exposure to UV radiations emitted by sunbeds is less harmful than intentional exposure to sunlight."* Essentially, Autier is arguing that sunlight and sunbeds are the same with presumably corresponding benefits and risks. Managed properly, sunbeds do not pose an inherently higher risk than natural sunlight.

Philippe Autier. Perspectives in melanoma prevention: the case of sunbeds. European Journal of Cancer 40 (2004) 2367-2376

In fact, two studies from Australia confirm the fact that melanoma for childhood and adolescents comes from genetic factors, not cumulative UV exposure.

Queensland, Australia has the highest incidence rates of childhood melanoma in the world. A study of risk factors for childhood melanoma (children less than 15 years) found that the strongest determinants were constitutional factors including the presence of more than 10 naevi greater than 5 mm RR 9.9, heavy facial

freckling RR 6.4, an inability to tan on exposure to the sun RR 8.8, and a family history of melanoma RR 4.2. The study found: *"No measures of acute or chronic exposure to solar UV radiation were associated with childhood melanoma in our study."*

Whiteman et al,. Risk factors for childhood melanoma in Queensland, Australia. Int. J. Cancer: 70, 26-31 (1997)

A study from Australia looking at melanoma risk in adolescents (15-19 years) found that *"the strongest risk factor associated with melanoma in adolescents in a multivariate model was the presence of more than 100 nevi, 2 mm or more in diameter – Odds Ratio = 46.5." "Other risk factors were red hair OR 5.4, blue eyes OR 4.5, inability to tan after prolonged sun exposure OR 4.7, heavy facial freckling OR 3.2 and family history of melanoma OR 4.0."* There was no association with sunscreen use overall and no difference between cases and controls in cumulative sun exposure in Australia's high exposure environment. The study *concluded "Lack of association with reported sun exposure is consistent with the high genetic susceptibility in this group".*

Youl et al,. Melanoma in adolescents: A case-control study of risk factors in Queensland, Australia. Int. J. Cancer: 98, 92-98 (2002) DOI 10.1002/ijc.10117

"No measures of acute or chronic exposure to solar UV radiation were associated with childhood melanoma in our study."

Whiteman et al,. Risk factors for childhood melanoma in Queensland, Australia. Int. J. Cancer: 70, 26-31 (1997)

Does using a sunbed actually increase the melanoma risk of younger users? A recent study in the US reports that it actually lowers the melanoma risk. A large case-control study conducted in the US and completed in 2011 looked at sunbeds and sunlamps and their risk of melanoma. They found for females, use before age 20 yr, current use and years of use were not significant after adjustments. The estimated relative odds of melanoma was 0.8 for occasional users (<10 sessions) and 1.1 for more frequent users (10+ sessions). For males, the melanoma risk from sunbeds was 0.90 with no significant difference between occasional and frequent users.

Fears et al,. Sunbeds and sunlamps: who used them and their risk for melanoma. Pigment Cell Melanoma RES. doi: 10,1111/j.1755-148X.2011.00842.x

A large-scale case-control study in Western Canada found *"in terms of sunburn history in childhood, this suggests that rather than the occurrence of sunburn itself increasing the risk of melanoma, the risk is due to the characteristics of pigmentation associated with poor sun tolerance."* According to Elwood et al., sunburn is not a likely independent risk factor for melanoma, but more likely an associated event that seems to be determined by some constitutional factors, such as degree of pigmentation, capability for tanning, inclination to burning (the less epidermal melanin, the less ability to tan), and greater propensity for burning, with all of these being factors which seem to put a person at increased risk for developing melanoma.

Elwood et al., Pigmentation and skin reaction to sun as risk factors for cutaneous melanoma: western Canada Melanoma Study. Br Med J (Clin Res Ed). 1984 Jan 14;288(6411):99-102

"the strongest risk factor associated with melanoma in adolescents in a multivariate model was the presence of more than 100 nevi, 2 mm or more in diameter – Odds Ratio = 46.5."

Youl et al,. Melanoma in adolescents: A case-control study of risk factors in Queensland, Australia. Int. J. Cancer: 98, 92-98 (2002) DOI 10.1002/ijc.10117

Quote: *But, every trip adds up—10 artificial tanning sessions over a lifetime increases the risk of melanoma by 50%.*

Again this is referenced to an Australian study by Cust which was not confirmed by a study by Elliott in the UK. Since it was not confirmed, the Big Burn website should not misrepresent the facts. (see above)

"The lowest risk was in subjects with a moderate or deep tan in both summer and winter".

Elwood et al,. Sunburn, suntan and the risk of cutaneous malignant melanoma – The Western Canada Melanoma Study. Br. J. Cancer (1985), 51, 543-549

Quote: *Most people get more than half of their lifetime sun exposure before the age of 18.*

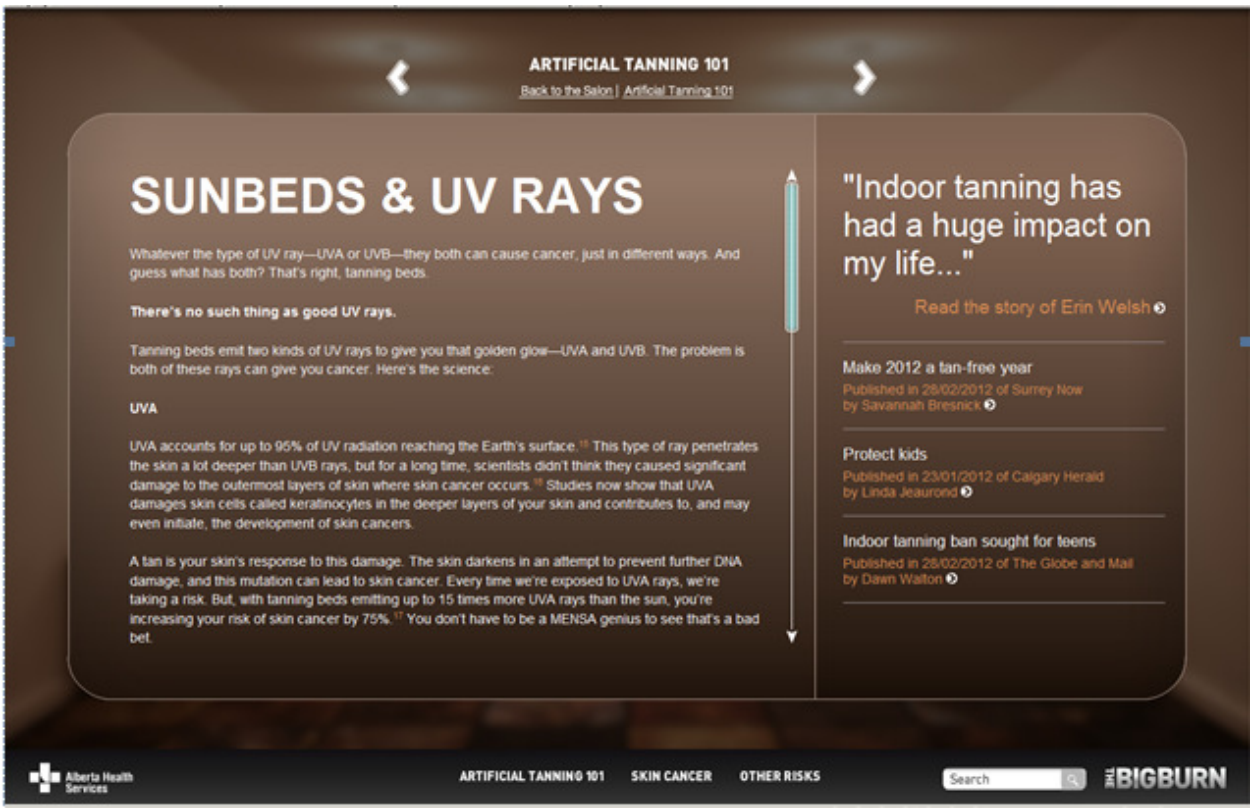
Dadlani, C., & Orlow, S. J. (2008). Planning for a brighter future: A review of sun protection and barriers to behavioral change in children and adolescents. Dermatology Online Journal, 14(9), 1.

This constitutes another gross misrepresentation of the facts; 50% of lifetime sun exposure is not received by age 18. The Dadlini study actually said 25-50 percent of a person's lifetime sun exposure is said to occur before 18-21 years of age. It was referenced to two studies by Godar. The Big Burn website took the most damaging quote and published the highest number available

In fact, Godar reported that only about 23 percent of lifetime exposure occurs by age 18. This research was also the reason why Health Canada removed their statement from its website with respect to UV exposure before the age of 18, as did medical associations around the world

Godar DE, Urbach F, Gasparro FP, Van der Leun JC. UV doses of young adults. Photochem Photobiol 2003; 77(4):453-457

Sunbeds & UV Rays



Quote: *Whatever the type of UV ray – UVA or UVB – they both can cause cancer, just in different ways. And guess what has both? That's right, tanning beds.*

Of course tanning beds have both UVA and UVB. That is what natural sunlight has as well. Tanning beds have similar UV content as the sun – 95% UVA and 5% UVB. The Big Burn website attempts to confuse and mislead the public by trying to get them to think that only tanning beds and not the sun has both UVA and UVB rays.

Quote: *The skin darkens in an attempt to prevent further DNA damage, and this mutation can lead to skin cancer. Every time we are exposed to UVA rays we're taking a risk.*

True to form, the statement exaggerates the risk without providing the public with hard facts and numbers which tell a different tale. On page 222 of the IARC (International Agency for Research on Cancer) Monographs Volume 55, section 5.4.2 it states *"In humans, pigmentation protects against erythema and histopathological changes. People with a poor ability to tan, who burn easily and have light eye and hair colour are at a higher risk of developing melanoma, basal-cell and squamous-cell carcinomas."* A tan is increased pigmentation. Therefore a tan protects against DNA damage.

http://monographs.iarc.fr/ENG/Monographs/vol55/index.php

On page 223 of the IARC Monographs Volume 55, section 5.4.5 it states *"Most of the DNA damage after a single exposure is repaired within 24 h."* If the damage is repaired naturally by the body in 24 h, it's hard to call that damage or a cancer risk.

http://monographs.iarc.fr/ENG/Monographs/vol55/index.php

Dr. Sam Shuster, Emeritus Professor of Dermatology, Newcastle University UK said this about a tan *"A suntan is an evolutionary device, it protects against burning. A suntan is just a sign of increased pigment, melanin, in the skin and is a natural biological response to the sun, not a sign of skin damage."*

http://www.dailymail.co.uk/health/article-1301722/The-melanoma-epidemic-Dont-panic--terrible-mistake.html

In 2010, researchers from Lund University in Sweden found that the health benefits of sun exposure far outweighed the risks – as long as you sunbathe sensibly. Oncologist Hakan Olsson told a Swedish newspaper *'Our studies show that women with active sunbathing habits live longer.'* They reported their controversial finding after studying the effect of sun exposure on 40,000 Swedish women.

Lindqvist PG et al., Does an active sun exposure habit lower the risk of venous thrombotic events? A D-lightful hypothesis. J Thromb Haemost 2009; 7: 605-10

In 2008, Johan Moan from the University of Oslo in Norway published a paper – to try and answer the question – *"will increased sun exposure lead to net health benefits or risks?"* The study concluded *"These data indicate that increased sun exposure may lead to improved cancer prognosis and, possibly, give more positive than adverse health effects."*

Moan J. et al,. Addressing the health benefits and risks, involving vitamin D or skin cancer, of increased sun exposure www.pnas.org/cgi/doi/10.1073/pnas.0710615105

Professor Tim Oliver, Medical Oncologist, Barts and the London Hospital, UK – *"Current medical advice is to cover up in the sun, but I believe the health benefits of exposure to its UVA and UVB rays greatly outweigh the disadvantages, even if that means using a sunbed during winter months."*

http://www.dailymail.co.uk/health/article-1127175/Top-cancer-doctor-says-SHOULD-sunbed-session.html

Yuji Yamaguchi in 2008 initiated a study to assess whether facultative pigmentation (tanning) induced by repeated UV irradiation is photoprotective. The study concluded *"These results suggest that pigmentation induced in skin by repeated UV irradiation protects against subsequent UV-induced DNA damage."* The report went on to say *"it may reflect development of a mature, efficient defense system."*

Yamaguchi Y. et al., Cyclobutane pyrimidine dimmer formation and p53 production in human skin after repeated UV irradiation Experimental Dermatology 2008; 17: 916-924

Professor Julia Newton-Bishop, an epidemiologist who led the research at Leeds University, UK, said *"it seems regular exposure helps the skin adapt and protect itself against the harmful affects of sunshine". "Increased levels of vitamin D made in the skin while exposed to sunlight may also be protective."* They found that those who spent between four to five hours in the sun each day over the weekend were less likely to develop tumours.

Newton-Bishop JA et al., Relationship between sun exposure and melanoma risk for tumours in different body sites in a large case-control study in a temperate climate, Eur J Cancer (2010), doi:10.1016/j.ejca.2010.10.008

"These results suggest that pigmentation induced in skin by repeated UV irradiation protects against subsequent UV-induced DNA damage."

Yamaguchi Y. et al., Cyclobutane pyrimidine dimmer formation and p53 production in human skin after repeated UV irradiation Experimental Dermatology 2008; 17: 916-924

This was confirmed by Rebecca Mason, University of Sydney, Australia. Their research in 2010 showed that *"like increased cornification and increased pigmentation, increased concentrations of Vitamin D compounds in skin act to protect against the next, rather than the initial UV Exposure."*

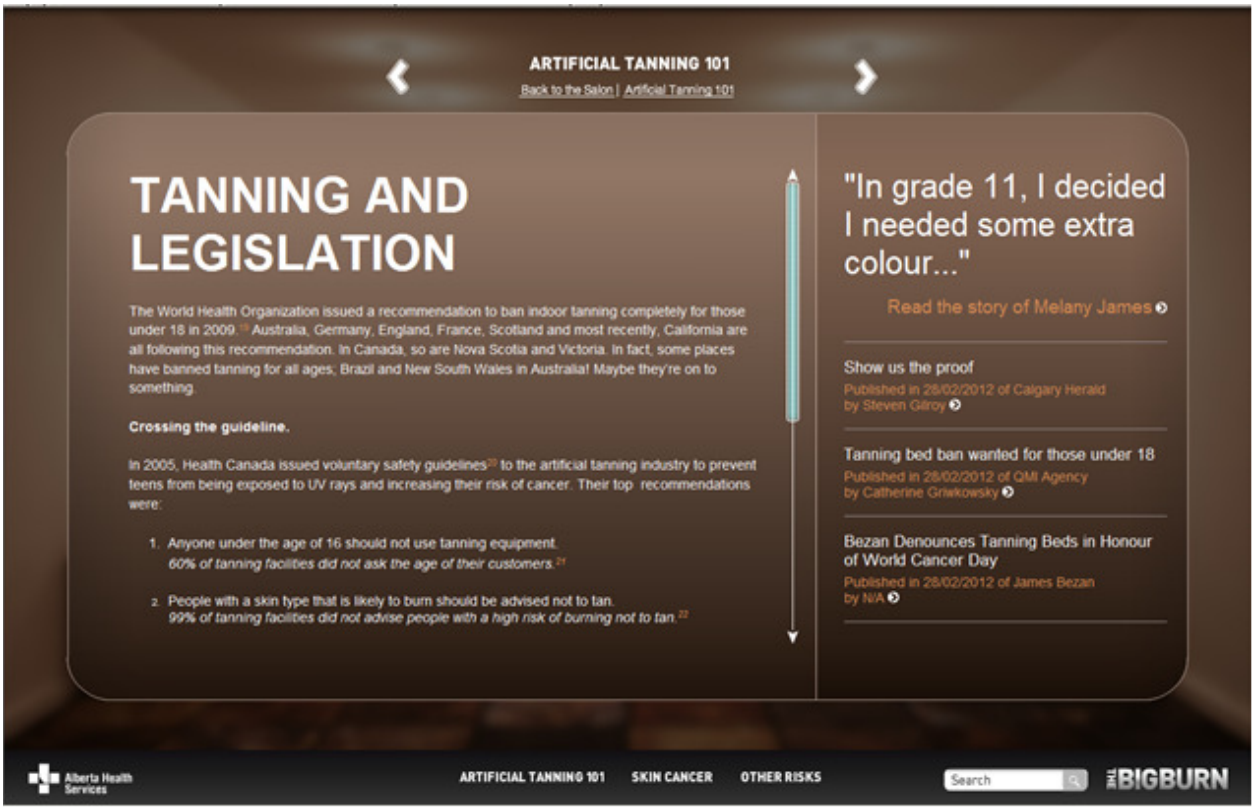
Mason, R et al, Photoprotection by 1,25-dihydroxyvitamin D and analogs: Further studies on mechanisms and implications for UV-damage Journal of Steroid Biochemistry & Molecular Biology 121 (2010) 164-168

Quote: *But with tanning beds emitting up to 15 times more UVA rays than the sun you're increasing your risk of skin cancer by 75%.*

This statement is in error and incorrectly mixes 2 distinct points – 15 times and 75% and references both to – IARC working group on Artificial Ultraviolet (UV) light & skin cancer. "The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: A systematic review," 2006, International Journal of Cancer. (120), 1116.

The IARC study did not report that tanning beds emitting up to 15 times more UVA increase your risk of skin cancer by 75%. This is a complete misrepresentation of the facts and research and used out of context. The IARC study was related to age not UVA tanning beds.
There is no reference given for this statement.

Tanning and Legislation



Quote: *The World Health Organization issued a recommendation to ban indoor tanning completely for those under 18 in 2009.*

This is a generalized statement from the WHO, the data from this report shows tanning salons having the lowest risk and home units having 7 times that risk with medical units having 16 times the risk of a professional

salon. The risk is about who controls the equipment and ensuring that users are not allowed to sunburn. The WHO IARC Report also said in their executive summary *"Epidemiologic studies to date give no consistent evidence that use of indoor tanning facilities in general is associated with the development of melanoma or skin cancer."*

The Big Burn website discriminates unfairly against indoor tanning UV by failing to recognize the corresponding UV risk of outdoor exposure. This is exactly where banned teens will go for their tans - uncontrolled outside UV sun exposure or home units.

Quote: *"some places have banned tanning for all ages; Brazil and New South Wales in Australia."*

For New South Wales, Australia – The all-out ban is not in effect until 2014 and is currently under review. In the case of Brazil, its indoor tanning market was so small that it could not continue to fight the government's decision, even after a judge overturned the initial ban.

Skin Cancer

Skin Types

This chart is actually quite accurate. It correctly shows that the UV risk is based on skin type. This is why the JCTA has been pushing for professional standards which would include a ban on skin type 1 individuals using sunbeds, regardless of their age. This chart should also be used by the Alberta Health Services to warn people of outdoor UV exposure as well.

The WHO IARC Report states the following on skin types *"There is a considerable range of susceptibility of the human skin to the carcinogenic effects of UV radiation, and in humans, there is an estimated 1000-fold variability in DNA repair capacity after UV exposure (Hemminki et al., 2001).*

Susceptibility to sun-induced skin damage is closely related to pigmentary traits, and subjects having the following characteristics are at increased risk for developing a skin cancer (melanoma, SCC and BCC):

• Red hair, followed by blond hair, followed by light brown hair.

• Skin phototype (Fitzpatrick, 1988): subjects who always burn and never tan when going unprotected in the sun (skin phototype I) have a much higher risk for skin cancer than subjects who never burn and always develop a deep tan (skin phototype IV). Intermediate risk categories are subjects who always burn then develop a light tan (skin phototype II), and subjects who sometimes burn and always develop a tan (skin phototype III). Subjects of skin phototypes V and VI belong to populations with natural brown or black skin, and are resistant to sunlight.

• Freckles (ephelides) on the face, arms or shoulders. The skin cancer risk increases with increasing sensitivity to freckling.

• Skin colour: pale colour, followed by increasing depth of pigmentation.

• Eye colour: blue, followed by grey/green eyes, then by brown eyes.

World Health Organization (WHO), International Agency for Research on Cancer (IARC), Exposure to Artificial UV Radiation and Skin Cancer. IARC 2006 Page 9

Risk Factors

This page reinforces the fact that the risk factors for melanoma are genetic, with skin type and moles being solid indicators of susceptibility. The focus should be on people of all ages that represent the genetic risk. This is exactly what the JCTA has been asking for, namely an outright ban on users who are Skin Type I.

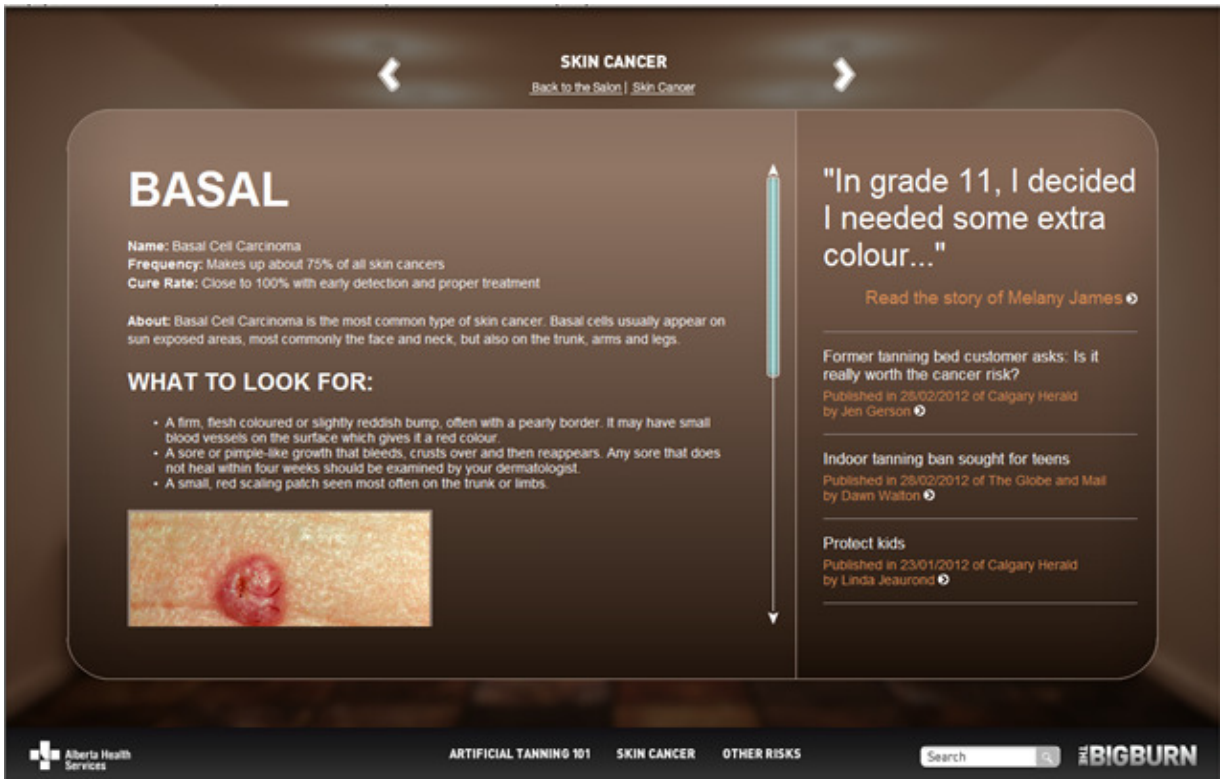
Quote: *The greater the number of nevi on a person's skin, the greater the risk of melanoma. An individual who has more than 100 common nevi or more than two atypical nevi has a five-to twenty-fold increased risk of melanoma.*

This statement is accurate; the number one melanoma risk factor is moles. These are genetic-based. In fact research by Davies 2002 reports that 66% of all melanoma arise from nevi with BRAF mutations which are not related to damage by UV light.

Davies et al,. Mutations of the BRAF gene in human cancer. Nature Vol 417 27 June 2002

At the same time, there are numerous inaccuracies in the news stories listed on the right hand side of the page.

Basal Cell Carcinoma (BCC) – Makes up 80% of all Skin Cancers



This website insinuates that UV exposure and sunbeds are the largest risk for Non Melanoma Skin Cancer. Numerous studies show that there is no relationship between sunbeds and Basal Cell Carcinoma (BCC).

The 2006 IARC WHO study that was peer reviewed and published on sunbeds also included a meta-analysis of studies for BCC. They reviewed 4 studies on sunbeds and BCC. They reported an OR of 1.03 or a 3% increased risk of BCC for those who have used a sunbed. This was not considered significant. *"For basal cell carcinoma, the studies did not support an association."*

According to the 2006 WHO IARC Data *"For basal cell carcinoma, the studies did not support an association."*

A 1996 Canadian study with data from the Alberta Cancer Registry evaluated non-solar ultraviolet radiation and the risk of basal and squamous cell skin cancer. The study showed no evidence of elevated risk for BCC (Basal Cell Carcinoma) or SCC (Squamous Cell Carcinoma) among subjects exposed to various types of NSUVR (non solar ultraviolet radiation) including sunlamps and sunbeds.

Bajdik et al,. Non-solar ultraviolet radiation and the risk of basal and squamous cell skin cancer. British Journal of Cancer (1996) 73, 1612-1614

Regarding the role of artificial UV radiation sources, this study did not provide any evidence of increased BCC risk due to exposure to sunbeds or sunlamps. The absence of risk could be due to the fact that exposure to UV radiation is small compared with that from sunlight, and the latter is likely to overwhelm any effect due to artificial sources of UV radiation. The results of most published studies aimed at investigating the relative importance of phenotypic traits, sun sensitivity and different indicators of sun exposure in the development of BCC are largely inconsistent.

Corona et al,. Risk factors for Basal Cell Carcinoma in a Mediterranean population. Arch Dermatol/Vol 137, Sep 2001

A study that evaluated Basal Cell Carcinoma in young women found that although women with BCC had almost twice as many tanning salon visits (152.2 vs 83.1) on average, this was not considered to be statistically significant. Young women with a BCC are more likely to have a past or current history of cigarette smoking and blistering sunburns.

Boyd et al,. Basal cell carcinoma in young women: an evaluation of the association of tanning bed use and smoking. J Am Acad Dermatol. 2002 May;46(5):706-9

- What type of UV exposure?

The relationship between UV and BCC is complex. A large study in the UK looking at risk factors for BCC found outdoor occupation was not a factor; thus, intermittent recreational exposure may be more important than chronic ultraviolet exposure.

Lear et al,. Risk factors for basal cell carcinoma in the UK: case-control study in 806 patients. J R Soc Med 1997;90:371-374

- Genetics and BCC

Only a fraction of individuals who have been exposed to increasing levels of solar UV radiation will develop BCC or SCC (NMSC), suggesting a genetic susceptibility to UV light-induced carcinogenesis in the general population. DNA repair capacity is under genetic control and was associated with a 62% increase risk of BCC and a 63% increase in SCC.

Wang et al,. Repair capacity for UV light-induced DNA damage associated with risk of nonmelanoma skin cancer and tumor progression. Clin Cancer res 2007;13(21) November 1, 2007

A study looking at DNA repair found *"Mutations in Hedgehog pathway related genes, especially PTCH1, are well known to represent the most significant pathogenic event in BCC. However, specific UV-induced mutations can be found only in approximately 50% of sporadic BCCs. Thus, cumulative UVB radiation can not be considered to be the single etiologic risk factor for BCC development."*

Rass et al,. UV damage and DNA repair in malignant melanoma and nonmelanoma skin cancer. Adv Exp Med Biol. 2008;624:162-78

- Ability to Tan

A study from Australia found that *"People who reported that their skin tanned deeply had lower rates for both types of NMSC than people whose skin did not tan. Rates increased steadily with a decreasing tendency of the skin to tan. The increase from lowest to highest rates was about 2-2.5 times for BCC and 3.5-3.6 times for SCC."*

Staples et al,. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. MJA 2006; 184:6-10

- Family History

A remarkably strong association emerged for family history of skin cancer, emphasizing the importance of genetic predisposition to BCC. Subjects reporting a family history of skin cancer had an extremely increased risk of BCC with an OR of 17.8 or a 17 times greater risk of BCC.

Corona et al,. Risk factors for Basal Cell Carcinoma in a Mediterranean population. Arch Dermatol/Vol 137, Sep 2001

- HPV

Not all skin cancers are caused from sun or UV exposure. Skin cancer from human papilloma virus (HPV) develops on genital skin in both men and women. It is estimated that half of all deaths from skin cancer other than melanoma are from genital skin cancer.

A study published in 2007 looked at non-melanoma skin cancer mortality rates in the United States from 1969 to 2000. It found that 40% of deaths were due to NMSC arising on genital skin. The study concluded *"These data suggest that greater emphasis could be placed on the risk of mortality from genital skin cancer"*. It went on to say "*The magnitude of the public health burden is great; nevertheless, efforts on the part of the dermatology community to prevent human papilloma virus infection in the United States have been slight compared to similar effort to reduce excess exposure to UV light."*

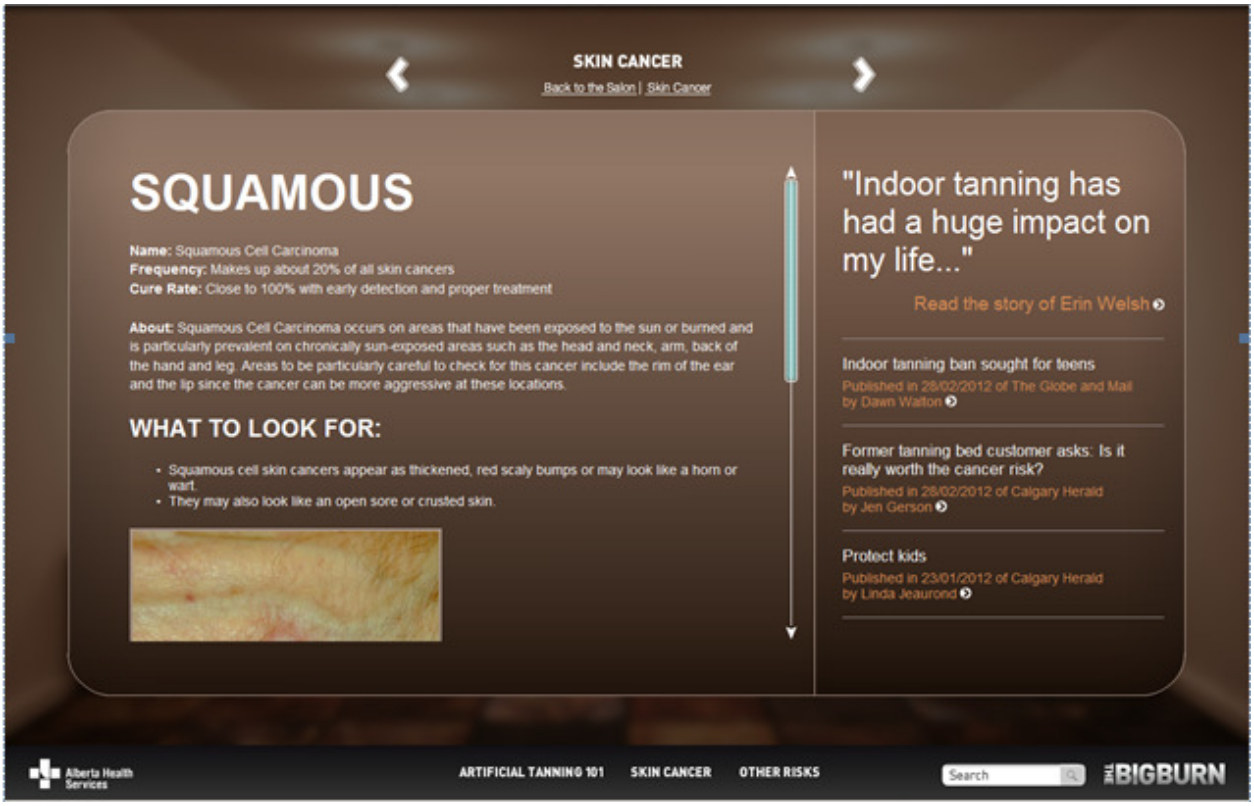
Lewis and Weinstock. Trends in Nonmelanoma Skin Cancer Mortality Rates in the United States, 1969 through 2000. Journal of Investigative Dermatology (2007) 127, 2323-2327

- Other Factors for BCC

Skin cancer patients whose childhood included periods of neglect or maltreatment are at a much greater risk for their cancers to return when they face a major stressful event, based on a new study. The research suggests that such experiences during a person's youth can set a lower level of immune response for life, which in turn might make them more susceptible to the kind of cancers that are often successfully fought by the immune system, so-called immunogenic tumors.

Fagundes et al,. Basal Cell Carcinoma. Stressful Life Events and the Tumor Environment. Arch Gen Psychiatry/Vol 69 (No. 6), June 2012

Squamous Cell Carcinoma (SCC) – Makes up 15% of all Skin Cancers



The UV role in squamous cell carcinoma is also complicated. UV exposure whether through outdoor sunshine or a sunbed is the same – 95% UVA and 5% UVB. A photon of light is a photon of light. The same risk of over-exposure and the same benefits (Vitamin D production) of exposure.

A study completed from the Alberta Cancer Registry reported that age-adjusted crude odds ratios for phenotype and pigmentary factors demonstrate an increased risk of SCC (Squamous Cell Carcinoma) for subjects with light skin colour and red hair who burn rather than tan when first exposed to the sun and who are unable to develop a tan even after a week or more of exposure to sunshine. It also stated *"After adjustment for the mother's ethnic origin, hair colour, and skin colour, no association was seen with recreational sun exposure during childhood and adolescence"*. It concluded: *"Thus, it might be hypothesized that subjects at risk of SCC are those who are phenotypically sensitive to the sun (fair skin, red hair, propensity to burn rather than tan in the sun), develop severe sunburns in childhood as initiating events in the sequence of development of malignancy"*.

Gallagher et al,. Sunlight Exposure, Pigmentation Factors and Risk of Nonmelanocytic Skin Cancer II. Squamous Cell Carcinoma. Arch Dermatol 1995 Feb;131(2):164-9

that subjects at risk of SCC are those who are phenotypically sensitive to the sun (fair skin, red hair, propensity to burn rather than tan in the sun), develop severe sunburns in childhood as initiating events in the sequence of development of malignancy"

Health Study) found that red hair RR 2.0 and light brown hair RR 1.7 were associated with an increased risk of SCC compared to dark brown hair. In addition, the actual number of severe burns appeared to be a more important factor – RR 2.4. Finally, current cigarette smokers showed a 50% increase in the risk of SCC compared with those who had never smoked RR 1.5.

Grodstein et al,. A prospective study of incident squamous cell carcinoma of the skin in the nurses' health study. J Natl Cancer Inst. 1995 Jul 19;87(14):1061-6

The JCTA guidelines for tanning salons recommend that people with Skin Type 1, that always burns and never tans, do not use a sunbed or UV tan. Tanning salons do not burn people. In fact a tan will protect people from burning.

- Diet

Diet also plays an enormous role in the development of SCC. Dr. Homer Black from Baylor College completed a study in 1995 that found that patients who maintained a low fat diet of 21% fat, reduced their risk of non melanoma skin cancer by over 90%.

Black H, et al, Evidence that a low-fat diet reduces the occurrence of non-melanoma skin cancer. Int. J. Cancer: 62, 165-169 (1995)

Research reported by Dr. Hughes and colleagues in the International Journal of Cancer indicated that of those people who had previously had at least one squamous cell carcinoma (SCC), those who had the highest intake of green leafy vegetables had only 45% of the risk of developing another. Furthermore, those with the highest intake of dairy had two-and-one-half times the risk.

Hughes et al,. Food intake and risk of squamous cell carcinoma of the skin in a community: The Nambour skin cancer cohort study. Int J Cancer 2006

- Ability to Tan

A study from Australia found that *"People who reported that their skin tanned deeply had lower rates for both types of NMSC than people whose skin did not tan. Rates increased steadily with a decreasing tendency of the skin to tan. The increase from lowest to highest rates was about 2-2.5 times for BCC and 3.5-3.6 times for SCC."*

Staples et al,. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. MJA 2006; 184:6-10

- Other Factors

By 1977, psoralen and ultraviolet A (PUVA) was established as a highly effective therapy for psoriasis. A follow-up on a 30 year prospective study found that exposure to more than 350 PUVA treatments greatly increases the risk of SCC.

Stern et al,. The risk of squamous cell and basal cell cancer associated with psoralen and ultraviolet A therapy: A 30-year prospective study. JAAD 20 January 2012

This type of phototherapy is listed as a Group 1 by the WHO and is still used today no matter what age you are.

Arsenic is a well-known Group 1 (IARC) carcinogen. Skin cancer is the most common malignancy associated with arsenic ingestion through drinking water from wells. Substantial evidence led the International Agency for Research on Cancer (IARC) to conclude that ingestion of inorganic arsenic can cause skin cancer.

IARC Monographs on the Evaluation of the carcinogenic Risk of Chemicals to Man: Some Metals and metallic Compounds, Vol 23. Lyon 980

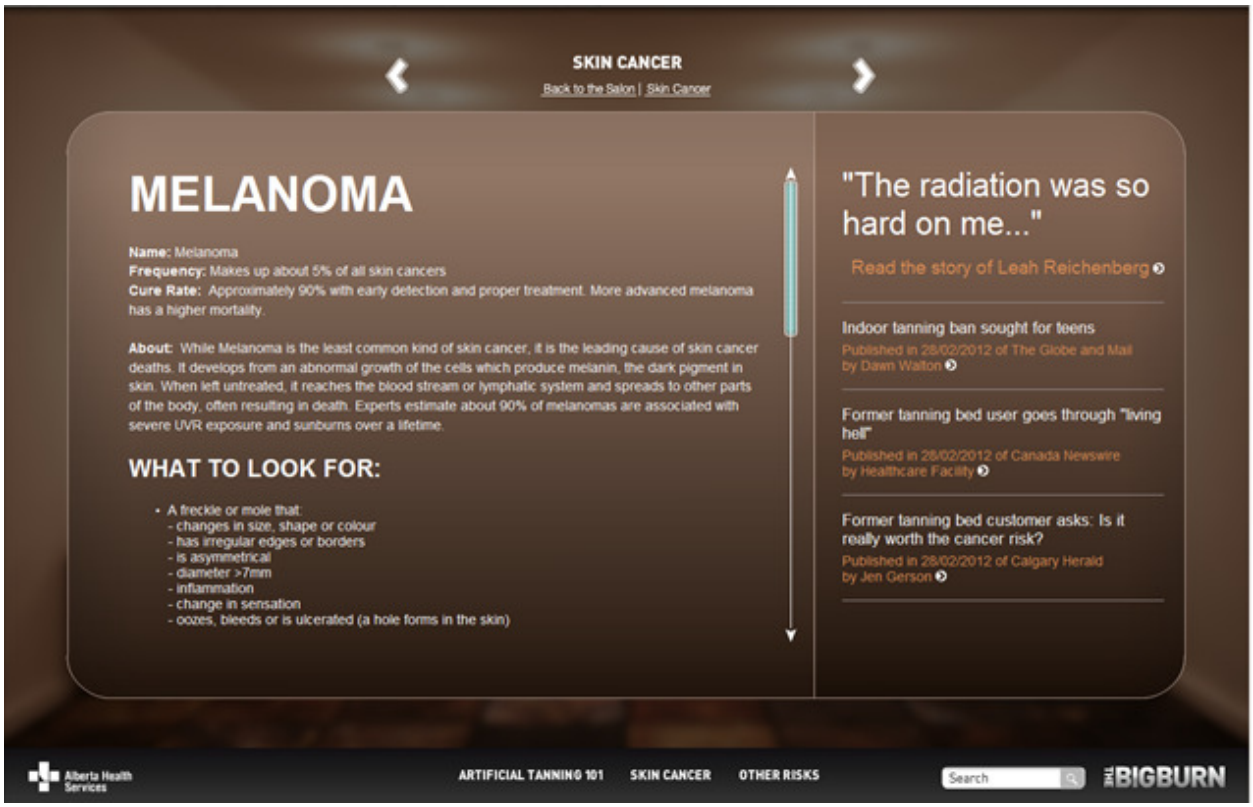
A case-control study in New Hampshire, USA found that among individuals with toenail arsenic concentrations above the 97th percentile the adjusted odds ratios were 2.07 for SCC and 1.44 for BCC, compared with those with concentrations at or below the median.

Karagas et al,. Skin cancer risk in relation to toenail arsenic concentrations in a US population-based case-control study. Americal Journal of Epidemiology Vol. 153, No. 6 2001

A study just released in June 2012 reviewed the link between cutaneous human papillomavirus (HPV) infection and the risk of squamous cell carcinoma (SCC). The study *reported "SCC was significantly associated with seropositivity to any genus beta HPV type (OR=1.93; 95% CI=1.23-302)."* That's a 93% increased risk! The study concluded *"These findings support a role for cutaneous HPV as a co-factor in SCC carcinogenesis"*

Iannacone et al,. Case-control study of cutaneous human papillomaviruses in squamous cell carcinoma of the skin. Cancer Epidemiol Biomarkers Prev Published Online First June 15, 2012

Melanoma – Makes up 5% of all Skin Cancers



Quote – *Experts estimate that about 90% of melanomas are associated with severe UVR exposure and sunburns over a lifetime.*

This was referenced to the Canadian Dermatology Association (CDA) website but the CDA does not provide a peer reviewed or published reference paper that supports this statement. It is rather a CDA's estimate, albeit not one based on published facts or evidence.

In fact, the WHO in their Ultraviolet radiation and human health – Fact Sheet No. 305, December 2009 reported – *"Between 50% and 90% of skin cancers are due to UV radiation",* indicating the high degree of uncertainty which exists around the interrelationship between UV radiation and skin cancer.

World Health Organization (WHO) – Ultraviolet radiation and human health. Fact sheet No. 305, December 2009

It is questionable how much UV plays a role in melanoma. Davies reports that 66% of all malignant melanomas are due to BRAF mutations and UV does not play a role in BRAF mutations. Plus Whiteman reports UV exposure is also not involved in Acral melanoma – palms, soles, nails and mucous membranes.

It is questionable how much UV plays a role in melanoma. Davies reports that 66% of all malignant melanomas are due to BRAF mutations and UV does not play a role in BRAF mutations.

Davies et al,. Mutations of the BRAF gene in human cancer. Nature Vol 417 27 June 2002
Whiteman et al,. The melanomas: A synthesis of epidemiological, clinical, histopathological, genetic, and biological aspects, supporting distinct sub-types, casual pathways, and cells of origin. Pigment Cell Melanoma Res. Doi: 10.1111/j.1755-148X.2011.00880.x

"Sun exposure is commonly supposed to be the main cause of cutaneous malignant melanoma (CMM) in most populations. However, the matter is disputed, and we have reviewed the arguments for and against a causation. Several factors are probably involved, as exemplified by a relationship sometimes found between gross domestic product and CMM incidence. Intermittent sun exposure and severe sunburn in childhood are associated with an increased risk of CMM. CMM incidence rates per unit skin area are larger on trunk (intermittently exposed) than on head and neck, while the opposite is true for basal cell and squamous cell carcinomas. Occupational exposure (farmers, fishermen) and regular weekend sun exposure are associated with decreased risk of CMM. Sun exposure may even protect against CMM on shielded skin sites, and CMM arising on skin with signs of large UV exposure has the best prognosis. UV exposure earlier in life is related to reduced overall and breast cancer. It has also been observed that patients with the highest blood levels of vitamin D have thinner CMM and better survival prognosis from CMM."

Moan et al,. Vitamin D, sun, sunbeds and health. Public Health Nutrition doi:10.1017/S1368980011002801

A tan protects against UV-induced DNA damage in 3 ways. Increased pigmentation and cornification (skin thickening) guard against UV skin penetration. In addition, increased concentrations of vitamin D compound in skin resulting from UV exposure act to protect against DNA damage through the reduction of nitric oxide products and increase p53 expression, which facilitates DNA repair.

Mason et al,. Photoprotection by 1,25-dihydroxyvitamin D and analogs: Further studies on mechanisms and implications for UV-damage. Journal of Steroid Biochemistry & Molecular Biology 121 (2010) 164-168

A tan protects against UV-induced DNA damage in 3 ways.

A study looked at repair kinetics of UV-damaged DNA among healthy individuals and melanoma patients. They found a *"wide interindividual variation in DNA damage immediately after irradiation and its repair."* They concluded *"The worst-case scenario is that the differences between individuals are multiplicative, resulting in 1000-fold differences in sensitivity in the population, which would be likely to translate into differences in risks of skin cancer."*

Hemminki et al,. Ultraviolet radiation-induced photoproducts in human skin DNA as biomarkers of damage and its repair. IARC Sci Publ. 2001;154:69-79

The UVB in a tanning bed makes vitamin D through your skin the same as sunshine. Holick demonstrated that the skin has a large capacity to produce cholecalciferol (vitamin D) and that whole-body exposure to one minimal erythermal dose of simulated solar ultraviolet radiation is comparable with taking an oral dose of between 10,000 and 25,000 IU of Vitamin D without the chance of toxicity.

Holick. Environmental factors that influence the cutaneous production of vitamin D. Am J Clin Nutr 1995;61(suppl):638S-45S

At a professional, commercial tanning salon, trained operators review clients' skin type, past tanning history, and any medical conditions to develop an exposure time that does not burn the client. This is controlled exposure to a non-burning UV dose. The National Cancer Institute recommendation for primary prevention for melanoma is to avoid intense intermittent exposure to UV radiation. Sunburn is a marker of that exposure. Properly run tanning salons do not burn people, but rather gradually build up their tan so they are protected against intense intermittent exposure that they might encounter outdoors or on a sunny vacation.

Melanoma is a very complicated disease. A true meta-analysis of melanoma risks was completed by Dr. Sara Gandini in 2005. Her team reviewed over 60 studies and summarized the data. They found the following risk factors for melanoma: large number of moles +589%, freckles +110%, red hair +264%, Skin Type 1 +109%, Family history +74%, sunburns +103%, and intermittent UV exposure +61%. The study found that "Chronic" (defined as regular, continuous) sun exposure REDUCED the risk of melanoma by 5%. This is consistent with scientific studies of outdoor workers which show a higher, continuous, regular UV exposure results in a lower melanoma rate than indoor workers who get less UV.

Gandini S, et al., Meta-analysis of risk factors for cutaneous melanoma: I. Common and atypical naevi doi:10.1016/j.ejca.2004.10.015
Gandini S, et al., Meta-analysis of risk factors for cutaneous melanoma: II. Sun exposure doi:10.1016/j.ejca.2004.10.016
Gandini S, et al., Meta-analysis of risk factors for cutaneous melanoma: III. Family history, actinic damage and phenotypic factors doi:10.1016/j.ejca.2005.03.034

If you look at the Gandini study and look at four population-based case-control studies of a "well conducted" design which stated that controls with dermatological diseases had been excluded the results for chronic UV exposure were even better and statistically significant with a 36% reduced risk of melanoma (RR = 0.64, 95% CI: 0.51, 0.81)

Gandini S, et al., Meta-analysis of risk factors for cutaneous melanoma: II. Sun exposure doi:10.1016/j.ejca.2004.10.016

Herzfeld PM, Fitzgerald EF, Hwang SA, et al. A case-control study of malignant melanoma of the trunk among white males in upstate New York. Cancer Detect Prev 1993, 17, 601–608.

Holly EA, Aston DA, Cress RD, et al. Cutaneous melanoma in women. I. Exposure to sunlight, ability to tan, and other risk factors related to ultraviolet light. Am J Epidemiol 1995, 141, 923–933.

Holman CD, Armstrong BK, Heenan PJ. Relationship of cutaneous malignant melanoma to individual sunlight-exposure habits. J Natl Cancer Inst 1986, 76, 403–414.

White E, Kirkpatrick CS, Lee JA. Case-control study of malignant melanoma in Washington State. I. Constitutional factors and sun exposure. Am J Epidemiol 1994, 139, 857–868.

Dr. A. Bernard Ackerman MD, recognized by the American Academy of Dermatology in 2004 as Master Dermatologist, wrote a book entitled – The Sun and the Epidemic of Melanoma: Myth on Myth, published in 2008. When reviewing the evidence on the role genetics plays in melanoma, Ackerman stated that *"in my opinion, those who spawn one or more melanomas have a disposition genetic to that malignant neoplasm and without it no amount of sunlight and no length of time of exposure to it is sufficient to galvanize proliferation of the abnormal melanocytes constituent of it*". He went on to say *"the majority of melanomas in Caucasians occur in skin that is free of solar elastosis, that is a sign of unquestionable damage by virtue of exposure excessive and for very long to sunlight"*.

In fact, scientists cannot agree on how melanoma comes about. Is it total accumulated UV exposure, intermittent exposure or sun burning exposure? And how does melanoma develop when the UV hits the skin? Does UV cause mutations in genes or do they depress the capability of the skin to marshal an immune response against malignancy? If sunlight is responsible for melanoma, than melanoma would only occur on body sites that receive a lot of sun exposure, and they would be numerous – like freckles. This does not happen.

What role does a tan provide? A tan is just increased melanin in the skin. *"Melanoma occurs infrequently in type V-VI skin, suggesting that skin pigment plays a protective role [Fitzpatrick's Seventh Edition, 2008:1135]"*. And what about the genetic risks? Moles, Nevi, dysplastic nevus? The fact that dark skinned people get melanoma on the bottoms of their feet or palms of the hand? *"Factors genetic, alone, unrelated entirely to sunlight, could be solely responsible for melanoma."*

Dr. A. Bernard Ackerman MD, book – The Sun and the Epidemic of Melanoma: Myth on Myth published in 2008, Second Edition, page 154

MC1R Variants – partial loss of function mutation are associated not only with red hair, fair skin, and poor tanning, but also with increased skin cancer risk independent of cutaneous pigmentation. A study by Demenais found that carrying any one of the four most frequent MC1R variants was associated with an increased risk of melanoma. One variant increased the risk twofold, but having two or more variants increased melanoma risk nearly sixfold.

Demenais et al,. Association of MC1R Variants and Host Phenotypes With Melanoma Risk in CDKN2A mutation Carriers: A GenoMEL Study. J Natl Cancer Inst 2010;102:1-16

A Canadian study that looked at melanoma incidence from 1956 to 2005 concluded "*The rates of CMM are slowing; however, this change is confined to younger individuals"*. The report went on to say that *"Familial melanoma, which accounts for 10% of all melanoma, is characterized by early onset (typically <40 years). It is likely that the CMMs observed for those younger than 40 years are largely accounted for by this group of people."*

Pruthi et al,. Incidence and anatomic presentation of cutaneous malignant melanoma in central Canada during a 50-year period: 1956 to 2005. J Am. Acad. Dermatol., 2009, 61, 44-50

A study from the National Cancer Institute, U.S. Department of Health and Human Services published in 2007 studied cancer in young adults age 15-29 and found that melanoma was the 2nd most common type of cancer in this age group. It went on to say *"the etiology of melanoma in 15-29 year old individuals is not known. Solar/ultraviolet irradiation does not appear to be as important a causative factor in this age group as it is in older individuals"*. It concluded *"most of the melanomas that occur in young persons arise in dysplastic nevi or in parts of the body that are likely to have been protected from ultraviolet light exposure"*.

Bleyer A, O'Leary M, Barr R, Ries LAG (eds): Cancer Epidemiology in Older Adolescents and Young Adults 15 to 29 Years of Age, Including SEER Incidence and Survival: 1975-2000. Chapter 5. National Cancer Institute, NIH Pub. No. 06-5767. Bethesda, MD 2006.

A study from Australia looking at melanoma risk in adolescents (15-19 years) found that *"the strongest risk factor associated with melanoma in adolescents in a multivariate model was the presence of more than 100 nevi, 2 mm or more in diameter – Odds Ratio = 46.5." "Other risk factors were red hair OR 5.4, blue eyes OR 4.5, inability to tan after prolonged sun exposure OR 4.7, heavy facial freckling OR 3.2 and family history of melanoma OR 4.0."* There was no association with sunscreen use overall and no difference between cases and controls in cumulative sun exposure in Australia's high exposure environment. The study *concluded "Lack of association with reported sun exposure is consistent with the high genetic susceptibility in this group"*.

Youl et al,. Melanoma in adolescents: A case-control study of risk factors in Queensland, Australia. Int. J. Cancer: 98, 92-98 (2002) DOI 10.1002/ijc.10117

Queensland, Australia has the highest incidence rates of childhood melanoma in the world. A study of risk factors for childhood melanoma (children less than 15 years) found that the strongest determinants were constitutional factors including the presence of more than 10 naevi greater than 5 mm RR 9.9, heavy facial freckling RR 6.4, an inability to tan on exposure to the sun RR 8.8, and a family history of melanoma RR 4.2. The study found: *"No measures of acute or chronic exposure to solar UV radiation were associated with childhood melanoma in our study."*

Whiteman et al,. Risk factors for childhood melanoma in Queensland, Australia. Int. J. Cancer: 70, 26-31 (1997)

This evidence was further supported in a 2011 study by Faye Elliott, University of Leeds, UK. Elliott studied the relationship between sunbed use and melanoma risk in a large case-control study in the United Kingdom. They found no evidence for sunbed use as a risk factor for melanoma in the UK – OR 1.06. They also stated *"Age at first use of sunbeds showed a small non-significant increased risk for use < 25 years – OR 1.16"* [14].

[14] Elliott F, et al, Relationship between sunbed use and melanoma risk in a large case-control study in the United Kingdom. Int. J. Cancer: 000, 000-000 (2011)

If melanoma and skin cancer is really going up it would be hard to blame UV exposure since we all know that UV exposure overall is going down. People and children are spending more time indoors than ever before. We work indoors and play indoors. And when people are outside they are covered in chemical sunscreen.

Does using a sunbed actually increase the melanoma risk of younger users? A recent study in the US reports that it actually lowers the melanoma risk. A large case-control study completed in 2011 in the US looked at sunbeds and sunlamps and their risk of melanoma. They found for females, use before age 20 yr, current use and years of use were not significant after adjustments. The estimated relative odds of melanoma was 0.8 for occasional users (<10 sessions) and 1.1 for more frequent users (10+ sessions). For males the melanoma risk from sunbeds was 0.90 with no significant difference between occasional and frequent users.
Fears et al,. Sunbeds and sunlamps: who used them and their risk for melanoma. Pigment Cell Melanoma RES. doi: 10,1111/j.1755-148X.2011.00842.x

Adele Green, former chairperson for the IARC 2006 sunbed study, published a research paper in 2011 investigating the risk factors for melanoma on the arms and legs vs trunk. The study concluded *"After multivariate analysis, the strongest risk factor for both limb and trunk melanomas was the presence of more than 10 naevi on the arm (odds ratio limb melanoma =41.4, 95% confidence interval 10.4–164)"* The research also showed that the inability to tan was associated with a higher risk of melanoma than people who could tan.
Green et al, Risk factors for limb melanomas compared with trunk melanomas in Queensland DOI: 10.1097/CMR.0b013e32834ec02f

Doubt has been cast on sunlight as the major causative factor for malignant melanoma. A study by Shipman in 2010 found that sunnier European countries have lower melanoma mortality. *"It is possible that the major factor affecting MM mortality is therefore the difference in skin colour between northern and southern Europe." "In conclusion, this study supports the notion that research in MM epidemiology should focus on identifying genetic, phenotypic and other environmental triggers for fatal MM."*
Shipman et al. Sunnier European countries have lower melanoma mortality. Clinical and Experimental Dermatology doi:10.1111/j. 1365-2230.2011.04024.x

A study by Marianne Berwick in 2005 found that sunburn, high intermittent sun exposure, skin awareness histories and solar elastics were statistically inversely associated with death from melanoma. Patients with high solar elastosis had 60% better survival (HR of 0.40) than those without for melanoma deaths. The study concluded that *"sun exposure is associated with increased survival from melanoma"*.
Berwick et al. Sun exposure and mortality from melanoma. Journal of the National Cancer Institute, vol. 97, No. 3, February 2, 2005

In 2004, Dr. Jason Rivers from the Division of Dermatology, University of British Columbia published a paper – Is there more than one road to melanoma. In it he discussed how outdoor workers have a decreased risk of melanoma compared to indoor workers. In addition, how some melanomas form on sun-exposed regions and others do not. The report concluded *"These findings strongly suggest that distinct genetic pathways lead to melanoma"*.
Rivers JK. Is there more than one road to melanoma. Lancet 2004 feb 28;363(9410):728-30

Do factors other than UV radiation play a role in CMM? Richard Gallagher of BC Cancer, recently (2010) investigated the role of PCB's and cutaneous malignant melanoma (CMM). He found strong associations between risk of CMM and plasma levels of non-dioxin-like PCB's – OR 7.02 or a 700% increase in risk. He concluded that his study results *"suggest that environmental factors other than UV radiation may play a role in genesis of CMM, and indicate that it may be productive to search for further agents which might increase risk"*.
Gallagher et al – Plasma levels of polychlorinated biphenyls and risk of cutaneous malignant melanoma: a preliminary study. Int. J. Cancer: 000, 000-000 (2010)

Genetics

"Cancers arise owing to the accumulation of mutations in critical genes that alter normal programmes of cell proliferation, differentiation and death. Here we report BRAF somatic missense mutations in 66% of malignant melanomas and at lower frequency in a wide range of human cancers."

"The highest frequency of BRAF mutations is in malignant melanoma. This does not seem to be related to the effects of ultraviolet light, the only known environmental risk factor for this disease. The T to A change at nucleotide 1796, which accounts for 92% of BRAF mutations in melanoma is distinct from the CC to TT or C to T changes associated with pyrimidine dimmer formation following exposure to ultraviolet light – these changes commonly found , for example in the TP53 gene in non-melanoma skin cancers."
Davies et al,. Mutations of the BRAF gene in human cancer. Nature Vol 417 27 June 2002

"The highest frequency of BRAF mutations is in malignant melanoma. This does not seem to be related to the effects of ultraviolet light,

"*The majority of melanomas that occur on skin with little evidence of chronic sun-induced damage (non-CSD melanoma) have mutations in the BRAF oncogene, whereas in melanomas on skin with marked CSD (CSD melanoma) these mutations are less frequent."* This study shows that MC1R variants are strongly associated with BRAF mutations in non-CSD melanomas. *"Tumours on skin with few or no histopathologic signs of CSD, as evidenced by the relative absence of solar elastosis in the surrounding skin, occur in younger individuals and have frequent mutations in the BRAF oncogene (non-CSD melanoma). By contrast, melanomas on skin with signs of CSD affect older individuals, have different patterns of chromosomal aberrations and have lower frequency of BRAF mutations (CSD melanoma)."*

"We found that BRAF mutations were 6 to 13 times as frequent in those with at least one MC1R variant compared to those with no MC1R variants. The odds ratio increased from 7.2 for individuals with one MC1R variant to 17.0 for those with multiple variants compared to individuals with no MC1R variants. Moreover most BRAF mutations do not show the standard C > T signature of direct UVR induction."
Landi et al,. MC1R Germline Variants Confer Risk for BRAF-Mutant Melanoma. Science Vol 313 28 July 2006

"69% of the melanomas in patients under the age of 55 y had BRAF mutant tumors, while only 35.3% were BRAF mutant in older patients."
Viros et al,. Improving Melanoma Classification by Integrating Genetic and Morphologic Features. PLoS Med;5:e120 2008

"Mutational activation of BRAF is the earliest and most common genetic alteration in human melanoma."
Dankort et al,. BRAFV600E cooperates with PTEN silencing to elicit metastatic melanoma. Nat Genet. 2009 May ; 41(5): 544-552. doi:10.1038/ng.356

"Our findings suggest that a significant proportion of melanomas arise from nevi. Furthermore, these results demonstrate that PI3K pathway activation serves as a rate-limiting event in this setting, acting at least in part by abrogating OIS (oncogene-induced senescence). The PI3K pathway was often activated through either decreased PTEN or increased AKT3 expression in melanomas relative to their adjacent nevi."
Vredeveld et al,. Abrogation of BRAFV600E-induced senescence by PI3K pathway activation contributes to melanomagenesis. Genes & Development 26:000-000 2012

Even back in 1985 researchers knew that melanoma was primarily related to genetics. Elwood in his Western Canada Melanoma study concluded *"Melanoma risk is also increased in association with a tendency to burn easily and tan poorly and with pigmentation characteristics of light hair and skin colour, and history freckles; the associations with sunburn and suntan are no longer significant when these other factors are taken into account. This shows that pigmentation characteristics, and the usual skin reaction to sun, are more closely associated with melanoma risk than are sunburn and suntan histories."*
Elwood et al - Sunburn, suntan and the risk of cutaneous malignant melanoma - The Western Canada Melanoma Study. Br. J. Cancer (1985), 51, 543-549

Occupational exposure was reviewed in a large study by Elwood in 1997. This study reviewed 20 studies and calculated the OR for heavy occupational exposure at 0.86 or a 14% reduced risk of melanoma if you worked

outdoors in the sunshine. He concluded *" a significantly reduced risk for heavy occupational exposure (OR 0.86)"* He went on to say *"It seems likely that the neutral or protective effect of heavy chronic exposure is related to protective mechanisms such as tanning and skin thickening, but this may not be the total explanation"*.
Elwood et al, - Melanoma and sun exposure: An overview of published studies. Int. J. Cancer: 73, 198-203 (1997)

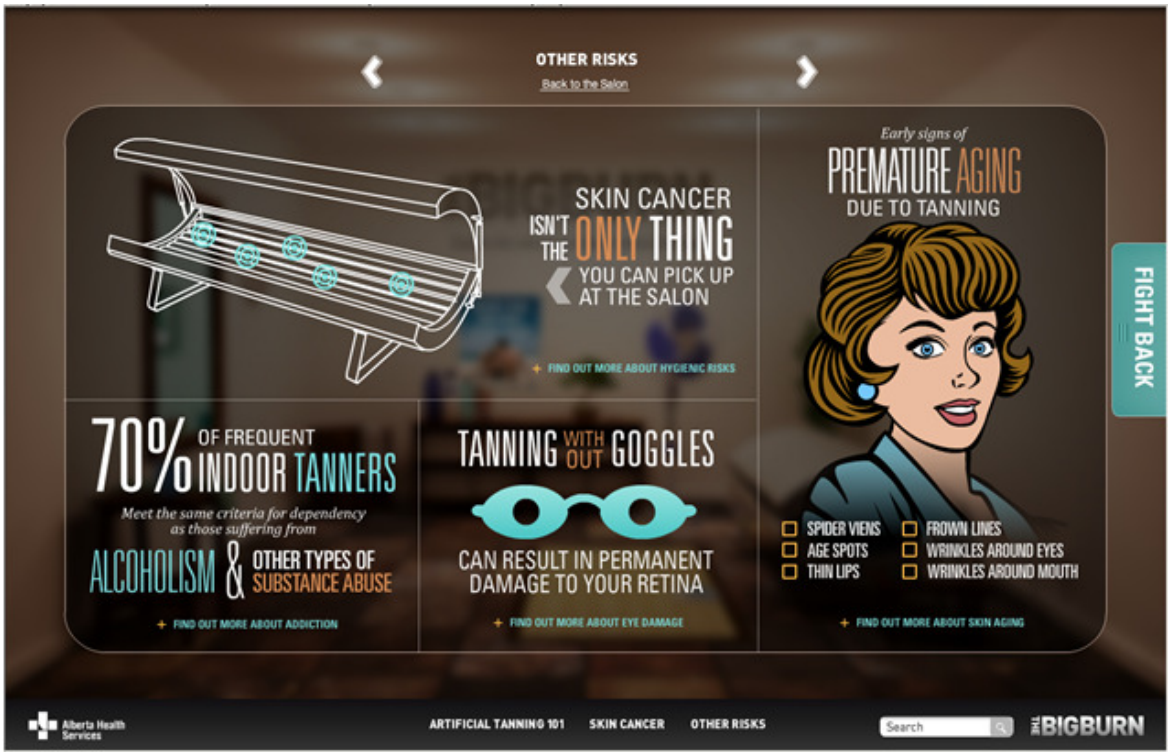
"Odds ratios associated with sun exposure are often no longer significant after adjustment for skin type, which supports a hypothesis that host response to ultraviolet radiation is more important than dose of sun exposure. Individuals with red hair and freckles, or multiple atypical naevi, with or without a family history of melanoma, should avoid sunbeds since their risks of developing both melanoma and non-melanoma skin cancer are already significantly increased. Having fair skin with poor ability to tan, or a freckled complexion with or without red hair, doubles a person's risk of melanoma. Naevi are the most powerful predictor of risk of melanoma. A meta-analysis of observational studies found that an individual who has more than 100 common naevi or more than two atypical naevi has a fivefold to 20-fold increased risk of melanoma (Gandini 2005)"
Bataille et al,. Melanoma – Part 1: epidemiology, risk factors and prevention. BMJ 29 November 2008 Volume 337

We're also discovering that skin tanning has a function in preventing the development of skin cancer. Researchers found that the protein p53, which plays a role in causing the skin to tan after sun exposure, also reduces the risk of melanoma. The ability to tan seems to be a protective factor against skin cancer. *"The number one risk factor for melanoma is an inability to tan,"* said Dr. David E. Fisher, director of the Melanoma Program at Dana-Farber. The study showed that p53, which is a tumor-suppressor protein in the skin, *"has a powerful role in protecting us against sun damage in the skin"* according to Fisher."
Cui et al., Central role of p53 in the suntan response and pathologic hyperpigmentation. Cell 128, 853-864, March 9, 2007

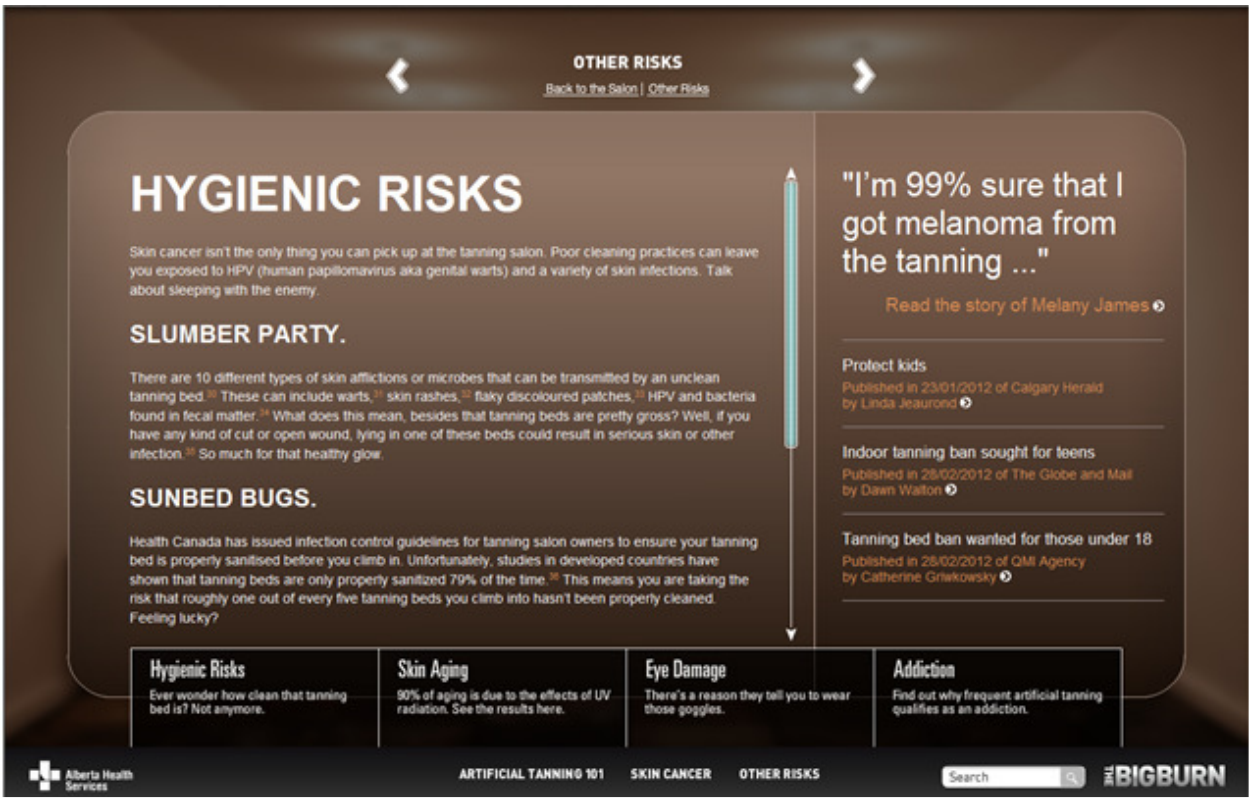
"The number one risk factor for melanoma is an inability to tan," said Dr. David E. Fisher, director of the Melanoma Program at Dana-Farber.

One of the first epidemiologic studies to investigate the association between melanoma and environmental arsenic exposure was conducted in Iowa, USA in 2005. The study found an increased risk of melanoma for participants with elevated toenail arsenic concentrations OR 2.1.
Beane Freeman et al,. Toenail arsenic content and cutaneous melanoma in Iowa. American Journal of Epidemiology Vol. 160, No. 7 (2004)

Other Risks



Hygienic Risks



Quote: *There are 10 different types of skin afflictions or microbes that can be transmitted by an unclean tanning bed. These can include warts, skin rashes, flakey discoloured patches, HPV and material found in fecal matter.*

Unfortunately studies in developed countries have shown that tanning beds are only properly sanitized 79% of the time. This means you are taking the risk that one out of every five tanning beds you climb into hasn't been properly cleaned. Feeling lucky?

Looking closely at the provided reference study from Northern Ireland it says *"Of the premises 98.8% reported that sunbeds were cleaned after use; however, this cleaning was performed by the staff in only 79.3% of premises with customers expected to provide cleaning in others."* So in reality the Big Burn website has taken this quote completely out of context.

Gavin et al,. Public at risk: a survey of sunbed parlour operating practices in Northern Ireland. British Journal of Dermatology 2010 162, pp627-632

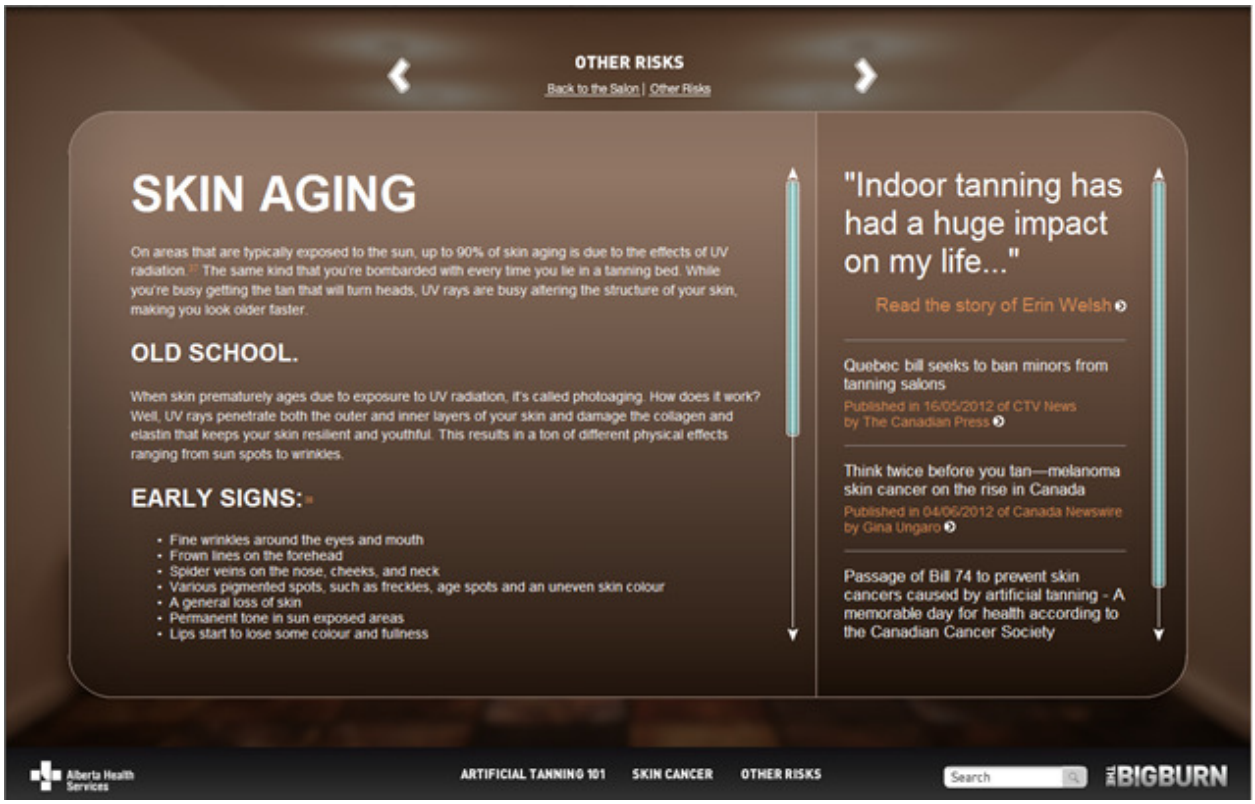
This statement is pure speculation. There needs to be a study completed and published in Alberta before scaring the public for a problem that might not even exist.

Looking closely at the provided reference study from Northern Ireland it says *"Of the premises 98.8% reported that sunbeds were cleaned after use; however, this cleaning was performed by the staff in only 79.3% of premises with customers expected to provide cleaning in others."* So in reality the Big Burn website has taken this quote completely out of context. The study cited found that sunbeds were cleaned in 98.8% of the premises. There is not a one in five chance that the sunbed hasn't been cleaned as stated. The salon customer was expected to clean the bed themselves in roughly 20% of the sunbeds. In Europe there are a large number of self-serve tanning beds with no operator control. These are coin operated with no operator on site. Self-service customers are expected to self-clean the sunbed before and after using.

This is another reason why the JCTA wants a ban on self-serve tanning equipment (client controlled equipment, coin-op, swipe-card.

Gavin et al,. Public at risk: a survey of sunbed parlour operating practices in Northern Ireland. British Journal of Dermatology 2010 162, pp627-63

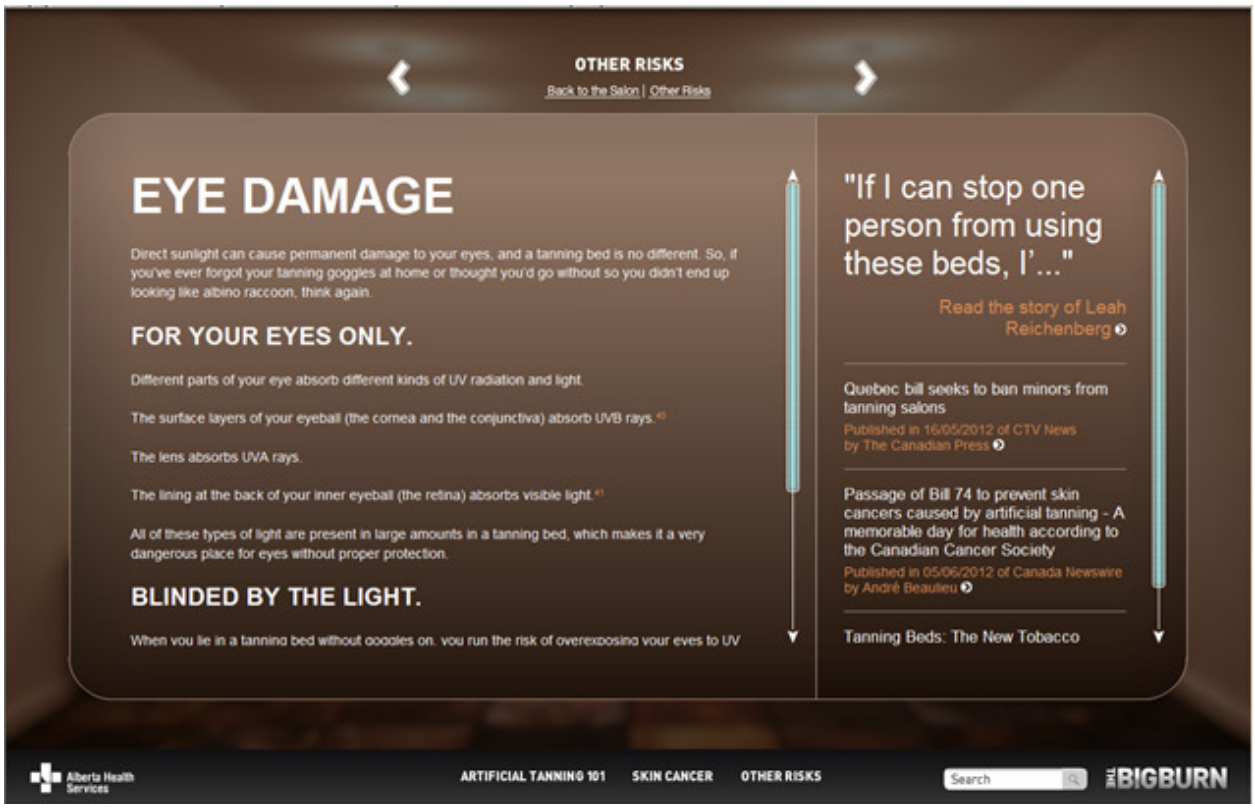
Skin Aging



Quote: *On areas that are typically exposed to the sun, up to 90% of skin aging is due to the effects of UV radiation.*

This quote was taken from the Canadian Dermatology Association website. Again, there is no hard data, nor a published peer-reviewed study to back up the 90% reference. It is merely the selective extrapolation of the 50% to 90% range postulated by the WHO.

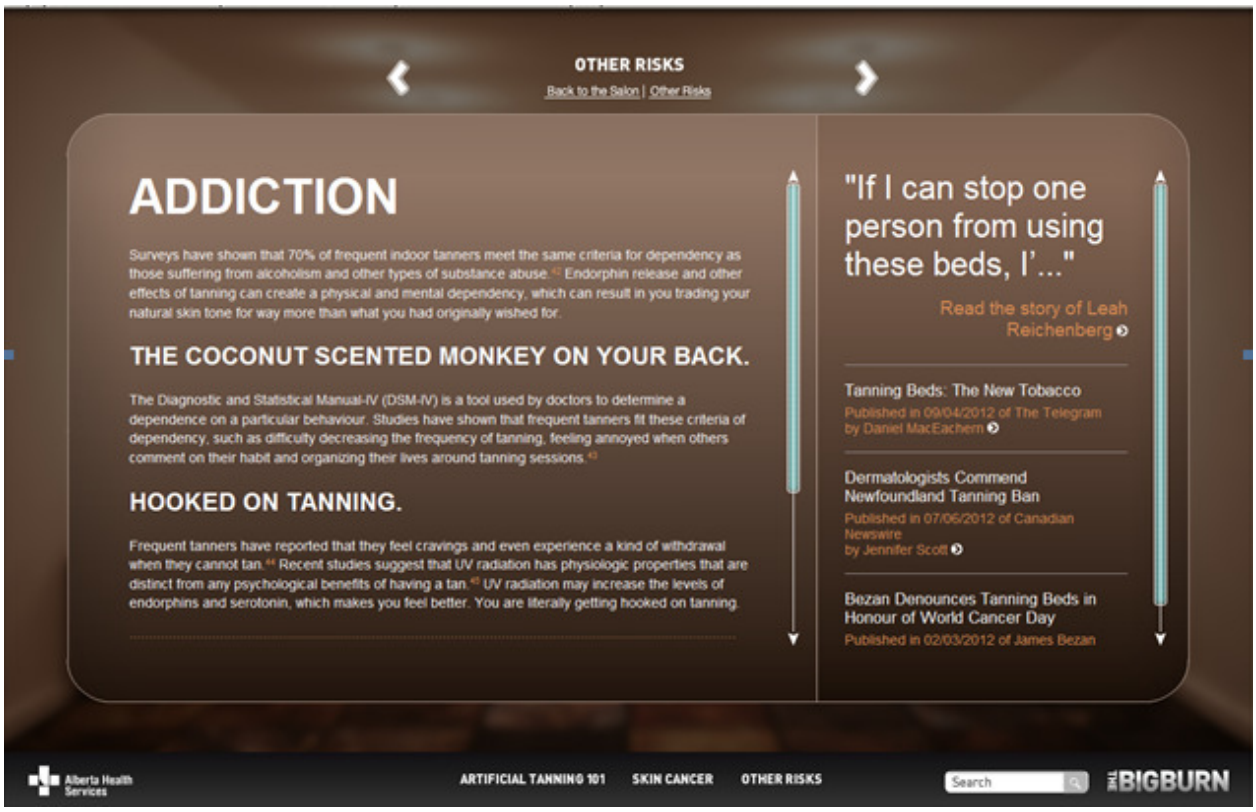
Eye Damage



Professional commercial tanning salons require that customers wear approved tanning goggles while tanning to prevent eye damage. Health Canada Warning Label says the same.

Unfortunately there are no provincial regulations that customers must have approved eyewear on each time they tan. That is why the JCTA is asking provincial governments to develop Professional Standard for the tanning industry.

Addiction



Quote: *Surveys have shown that 70% of frequent indoor tanners meet the same criteria for dependency as those suffering from alcoholism and other types of substance abuse.*

Is it an addiction that your body craves a nutrient – sunshine, UV, in the same way it craves water when you are thirsty? The body feels good being exposed to UV light and this is how your body rewards you and encourages you to get adequate sunshine for vitamin D purposes. Is it addiction? Or is it a natural urge bred into every human and other species by Mother Nature?

The JCTA asks the Alberta government to have the website taken down due misrepresentation of a tanning facility