

## Additional information: Background material for single points

In recent years, the public debate around sunbeds and UV exposure has been addressed by the medical community utilizing a unilateral approach, purely focusing on the risks linked to UV exposure on sunbeds without attributing any positive effects, disregarding:

- a) the actual outdoor exposure to sunlight;
- b) the complexities around the developments of any sort of cancer, skin cancer in particular.
- c) input from the industry.

This approach has been used again in the latest WHO report on [Artificial tanning devices: public health interventions to manage sunbeds](#), wherein a ban of sunbeds is called for or greater restrictions even though the latest systemic review ([Colantonio 2014](#)) showing a lower risk of melanoma for under and over 25 years of age. A similar approach has been taken by the Superior Health Council of Belgium, calling for a complete ban in its latest [advisory report](#) of June 2017.

New research out in 2018 seem to condemn both the WHO and European SCHEER report. “We are deeply concerned that these assessments appear to be based on an incomplete, unbalanced and non-critical evaluation of the literature,” the authors wrote in the lead study, Reichrath et al, 2018. “The stance taken by both agencies is not sufficiently supported by the data and in particular, current scientific knowledge does not support the conclusion that sunbed use increases melanoma risk.”

The [Reichrath et al study](#) is authored by an international team of researchers from the dermatology, epidemiology, endocrinology and vitamin D research fields in Canada, the United States and Europe. The authors criticized the WHO for failing to acknowledge weaknesses in the data and for being unbalanced. “*While these reports were purportedly based on the best available scientific evidence, we are deeply concerned about their scientific quality and obvious lack of objectivity, most likely owing to an infusion with the laudable zeal to combat alarming increases in skin cancer. Both publications show an implicit tendency toward an unbalanced view and must be criticized because of many scientific misinterpretations and shortcomings. The main conclusions are not sufficiently supported by the data presented nor by our scientific knowledge.*”

Specifically, the authors state that WHO and SCHEER Report:

- Failed to mention that the quality of the data used by WHO and SCHEER in their reports was acknowledged by contributing authors to be poor or weak and incapable of isolating the effects of sunburn from non-burning exposure.
- Ignored epidemiological and animal studies that show no increase in melanoma following both chronic and sub-burning UV exposure.
- Ignored research demonstrating beneficial effects of UV exposure.
- Ignored scientifically established consequences of vitamin D deficiency.

Selective omission or suppression of relevant confounding information in an academic report is considered academic fraud by most research institutions. The authors stopped short of using that term in their paper but were clear that WHO and SCHEER appear to have selectively removed material that would have affected their conclusions.

The conclusion of Reichrath 2018: “*In conclusion, both the SCHEER and WHO reports claim to assess health effects of sunbed use. Unfortunately, however, as such they are partially unbalanced and inaccurate. Both documents mainly assess negative health effects of UV exposure, conceal the large body of evidence demonstrating beneficial health effects of UV radiation, and major conclusions drawn are not sufficiently supported by current scientific knowledge. It should be emphasized that the main conclusions drawn by the SCHEER and WHO reports are not in accordance with generally accepted principles of evidence-based medicine, they not only are not in line with recommendations of the Oxford Centre for Evidence-based Medicine, but, as outlined in this critical appraisal, also do not fulfill the criteria proposed by Bradford Hill for examining causality in a biological system*”

*(strength of association, consistency, specificity, temporality, biological gradient, plausibility, coherence, experiment and analogy). Other researchers added the ruling out of confounding factors and bias. With this unscientific approach, both the SCHEER and WHO reports are not adequate and do not properly summarize current knowledge on comparing beneficial and adverse effects of UV exposure from sunbeds.”*

A second paper published in the same journal ([Burgard et al 2018](#)) critically evaluated and summarized sunbed research studies and determined that the quality of the studies was poor and did not meet scientific standards to establish a causative link between sunbeds and melanoma risk, based on criteria established by the Oxford Centre for Evidence based Medicine. The WHO did not acknowledge these weaknesses. The paper states: *“In summary, our review has highlighted the poor quality of the evidence available at present on this topic. We conclude that (i) results of our and previously published meta-analyses most likely overestimated the association of melanoma risk with solarium use, (ii) both the level of evidence and grade of recommendation of studies published previously investigating the association of melanoma risk with solarium use are weak, and therefore (iii) present scientific knowledge does not support the hypothesis of an increased melanoma risk due to solarium use, and questions studies that try to attribute melanoma cases to indoor tanning, and does not support initiatives that aim to ban responsible/moderate solarium use for tanning purposes,”* the authors wrote.

As representatives of the indoor tanning industry at a global level, we take stock of these developments with disappointment: policy cannot be conducted based upon assertions and innuendo. Evidence needs to be considered in order to make an informed decision. We know that extremists overplay the issue. There are health risks with all aspects of our life. It is proportion that matters. Processed meat, Mobile Phones and Wireless networks are perfect examples.

The issue is not sunbeds, the issue is overexposure, or burning exposure, which is why we highlight the need of focusing on the facts to build a constructive debate on the journey towards responsible and controlled sunbathing. We believe by looking at risks, benefits and control of UV exposure that a better understanding can be reached for public health. Therefore, we stress the importance of reflecting on the few key points mentioned above and having actual open discussions with tanning industry representatives.

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## **1. A Suntan is natural**

Is any UV exposure harmful? Humans have been exposed to UV rays from the dawn of time: sun avoidance has been repeatedly proven as harmful, as sunlight helps to keep healthy Vitamin D levels in the blood, along with other photoproducts like nitric oxide, which fights chronic diseases. Mortality rate was twice as high in women who avoided sun exposure as in those who were more exposed to the sun. Therefore, it is necessary to educate people about the harmful effects of both excessive and insufficient sun exposure. Balance is needed.

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## **2. Sunbeds are basically like the sun: enjoy it in moderation!**

**A photon of light is a photo of light whether from the sun or a sunbed.** The intensity is the only thing that changes. UV light is controllable in a sunbed where with sunlight it is not. The problem of overexposure lies in the person controlling the equipment.

“Sun and sun beds act similarly: one quantum of radiation at a given wavelength has the same biological effect, irrespective of the source from which it comes.” ([Moan 2009](#))

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### 3. Regular UV exposure actually lowers melanoma risk

**Outdoor workers have a lower risk of melanoma than indoor workers**, according to WHO IARC (International Agency on Cancer Research) Monograph 2012 on Solar and Ultraviolet Radiation. This

could be due to a higher risk of intermittent exposure leading to sunburns. Also according to the same report, the inability to tan or acclimatize your skin is a risk factor.

The largest meta-analysis of risk factors for melanoma found that people with the most UV exposure, chronic UV exposure which was defined as continuous regular UV exposure, had a 5% REDUCED risk of melanoma. ([Gandini 2005](#)). The WHO uses this research extensively in their IARC Monographs

Moderate exposure was exactly what was recommended in the UK in 2010 by Cancer Research UK, Diabetes UK, the multiple Sclerosis Society, the National Heart Forum, the National Osteoporosis Society, British Association of Dermatologists and Primary Care Dermatology Society who recommended: “Enjoying the sun safely, while taking care not to burn, can help to provide the benefits of vitamin D without unduly raising the risk of skin cancer..” The Dutch Cancer Society also revised their Sun Smart recommendations in 2010 to acknowledge the importance of vitamin D and sun exposure in cancer reduction and recommend that people in the Netherlands expose their head, hands and forearms for 15-30 minutes each day during early afternoon (12:00-15:00)

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### 4. The risks and benefits of sunbeds use are not discussed correctly

The **relationship between solar UVR and skin cancer is extremely complex**, it is inappropriate to attribute any single factor to the development of a cancer. This may depend on the interaction between many variables, such as age, genetics, diet, smoking, alcohol, environment and lifestyle.

Recent studies confirmed that **two cancers out of three are basically unavoidable**, due to DNA copying errors rather than environmental factors. Hence, we cannot ignore this multilayered context when designing public health policies, steering away from any simplification targeting a single factor.

- **Pretanning before a sunny vacation will reduce your risk of sunburning by 75% and DNA damage by 60%**, which allows your skin to repair itself without over tasking your repair system. ([de Winter 2001](#))
- According to the WHO Sunbeds and Processed Meat have about the same increased risk for cancer and both are listed as Group 1 Carcinogens yet there is no call to ban processed meats which would have a far greater prevalence of exposure by the public.
- According to the WHO the risk to develop skin cancer with ever-use of sunbeds in 2006 (IARC) was 1.75 for someone under 35 and 1.15 for lifetime risk. The latest research ([Colantonio 2014](#)) reference by the WHO report mentioned above is now 1.34 for under 25 and over 25 was 1.11 for a combine lifetime risk of 1.16 which includes confounders (such as location of equipment – controlled or uncontrolled, medical device and including a Skin Type 1- always burn, never tan).
- However, Colantonio 2014, which is the latest systemic review and meta-analysis referenced in the WHO report for the first time states the limitations of the research papers used by all systemic reviews and meta-analysis, it states: “The quality of evidence contributing to review results ranges from poor to mediocre.” The latest research published in 2018 (Burgard), 2 cohort and 29 case-control studies, found “Overall, quality of included studies was poor as a result of severe limitations, including possible recall and selection bias, and due to lack of interventional trials. Summary risk estimates suggested a weak association (odds ratio (OR)=1.19, 95% confidence interval (CI)=1.04- 1.35, p=0.009) for ever-exposure to UV radiation from a solarium with melanoma risk. However, sensitivity analyses did not show an

association for studies from Europe (OR=1.10; 95%CI=0.95-1.27, p=0.218), studies with low risk of bias (OR=1.15; 95%CI=0.94-1.41, p=0.179), and studies conducted after 1990 (OR 1.09;

- 95%CI=0.93-1.29, p=0.295).” (Reichrath 2018) *“The European Commission’s Scientific Committee on Health, Environmental and Emerging Risks and the World Health Organization recently published reports which concluded that a large proportion of melanoma and nonmelanoma skin cancer is attributable to sunbed use, and that there is no need to use sunbeds as there are no health benefits and they are not needed to achieve an optimal vitamin D level. The overall conclusion from both bodies was that there is no safe limit for UV irradiance from sunbeds. We are, however, deeply concerned that these assessments appear to be based on an incomplete, unbalanced and non-critical evaluation of the literature. Therefore, we rebut these conclusions by addressing the incomplete analysis of the adverse health effects of UV and sunbed exposure (what is “safe”?) and the censored representation of beneficial effects, not only but especially from vitamin D production. The stance taken by both agencies is not sufficiently supported by the data and in particular, current scientific knowledge does not support the conclusion sunbed use increases melanoma risk.”*
- Reichrath 2018 “In conclusion, both the SCHEER and WHO reports claim to assess health effects of sunbed use. Unfortunately, however, as such they are partially unbalanced and inaccurate. Both documents mainly assess negative health effects of UV exposure, conceal the large body of evidence demonstrating beneficial health effects of UV radiation, and major conclusions drawn are not sufficiently supported by current scientific knowledge. It should be emphasized that the main conclusions drawn by the SCHEER and WHO reports are not in accordance with generally accepted principles of evidence-based medicine, they not only are not in line with recommendations of the Oxford Centre for Evidence-based Medicine, but, as outlined in this critical appraisal, also do not fulfill the criteria proposed by Bradford Hill for examining causality in a biological system (strength of association, consistency, specificity, temporality, biological gradient, plausibility, coherence, experiment and analogy). Other researchers added the ruling out of confounding factors and bias. With this unscientific approach, both the SCHEER and WHO reports are not adequate and do not properly summarize current knowledge on comparing beneficial and adverse effects of UV exposure from sunbeds.”
- Research which differentiates where artificial UV is received has identified that the risk is from medical (1.96), and uncontrolled home use (1.40) and not from commercial units (1.06). Should research to ban or restrict commercial sunbeds not be evaluating commercial equipment risk of 1.06 which includes a Skin Type 1 people (always burn, never tan). (Papas) Professional salons and recommendation by equipment manufacturers ban skin type 1s from indoor sunbathing. A USA based paper reported that there was no risk for commercial sunbeds (OR 1.05) and that the risk was from unsupervised home beds (OR 1.53). ([Hoel 2016](#))
- Older research on sunbed risk should be removed since these types of equipment do not exist today.
- **Do people get more UV rays from sunbeds or sunlight?** The question is purely rhetoric, as even with regular users sunbed exposure is only a fraction compared to the natural sun. It is high time to acknowledge this distinction: more can be done to prevent regular sunburns during holidays, focusing our efforts to raise awareness on the main cause of overexposure to UV rays.
- **The risk of melanoma from intermittent exposure is 4 times greater outdoors from solar UV (OR 1.61 WHO 2012) where the UV dose is uncontrolled vs controlled sunbed exposure (OR 1.15 WHO IARC 2006).** Restricting sunbeds use will only lead to increased exposure to outdoor sunlight, driving public health costs up, instead of reducing it.<sup>1</sup>
- Public awareness campaigns on skin cancer have increased incidence, but mortality has not increased. Histopathologists today count lesions that were not considered to be cancerous in the past, but are now counted as possibly cancerous due to legal concerns.
- People who **consume citrus fruits at least twice a week are between two and four times more likely to develop melanoma than people using a sunbed.** A large Canadian cohort

study proved this phenomenon.<sup>1</sup> This shows once again that the complexities surrounding all sorts of cancer cannot be overlooked, for melanoma in particular.

- 95% of skin cancers are nonmelanoma (NMSC) which are estimated numbers (no actual numbers), which makes it the most common form of cancer, but it is also the least dangerous. **Melanoma hits 1.6% of the population in the US, sixteen times less than those facing lung cancer** and ten times less than diabetes. To put the issue into perspective, in the United States **there are about 9,000 deaths per year due to melanoma: half as many people loose their life swimming in the country.** Unintentional injuries, including falling and home accidents, amount to over 130,000 fatalities per year.

A great overview and collection of relevant studies are also provided in the commentary of Hoel and de Gruijl "[Sun exposure Public Health directives](#)". It states this directive: "The public health directive regarding sun exposure and human health should be adjusted to reflect current scientific knowledge. We recommend a public health directive as follows: All persons in the world regardless of skin color or latitude of residence, other than those with extraordinary sensitivity to sunlight, should get enough sun exposure to maintain a serum 25(OH)D level well over 20 ng/mL (desirably at 30–60 ng/mL) while taking care to avoid sunburn. As with all things in life, we must maintain a good balance, in this case between beneficial and adverse health effects from sunlight. Besides being impractical, completely avoiding sun exposure appears to be unhealthy in many ways."

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## 5. Indoor tanning facilities provide personalized counseling to their customers

Sunbeds have become safer and tanning studios more professional: sunbeds control UV irradiance, currently set in the European Union at a maximum level of 0.3 W/m<sup>2</sup>, as part of the mandatory standard EN 60335-2-27. No sunbeds commercialized after 2015 can go beyond this limit.

Tanning studios' staff also continues to update their knowledge and skills thanks to a series of training tools built together with policy makers and cancer leagues, such as the European Standard on training & service provision following the EN 16489. The wide range of stakeholders involved, from the European Cancer League and the Austrian Standards Institute, to the consumer standardization association ANEC, shows the willingness of the industry to improve consumer safety and the overall sunbed experience.

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## 6. Vitamin D deficiency is a global public health issue

Researchers have demonstrated in a new study that raising vitamin D levels can reduce considerably reduce cancer risk: when sufficient vitamin D synthesis in the body is combined with appropriate calcium levels overall cancer risk was found to be 30 percent lower ([Lappe 2017](#)). Regular and moderate exposure to sunlight has repeatedly being proven to be the most natural and efficient way to produce vitamin D, boosting our mood and protecting the immune system.

Regular and moderate exposure to sunlight has repeatedly being proven to be the most natural and efficient way to produce vitamin D, protecting our skin, boosting our mood and protecting the immune system. Moreover, many academics specialized on the role of vitamin D tend to agree on the need to raise the current daily recommendations, as much as doubling the current reference of 20 ng/ml. (50 nmol/L)

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<sup>1</sup> Sources: a)ARC, 2012; b)Gandini S, 2005; c)Armstrong, 2001; d)International Agency for Research on Cancer Working Group on artificial ultraviolet (UV) light and skin cancer, 2006; e)Hirst, 2009

<sup>2</sup> Shaowei Wu et al., [Citrus Consumption and Risk of Cutaneous Malignant Melanoma](#), Journal of Clinical Oncology, 2017.

A new Canadian study found people who use tanning salon sunbeds during the winter reach physiological blood levels (>100 nmol/L) of vitamin D in just 12 weeks. It found that participants who used typical sunbeds emitting UVB rays in the range equivalent to outdoor summer sunshine increased their vitamin D blood levels on average by 42 nmol/L. This was achieved using standard tanning exposure schedules on salon sunbeds. Sunbeds are highly efficient in producing vitamin D through the skin of participants due to the controlled exposure to nearly 100% of participants available skin area.

In just 8 weeks, a study from 2012 showed sub-sunburn sunbed treatment to be effective in tanning and in increasing the 25 (OH)D serum level, more so than oral vitamin D supplementation by 1000 IU per day ([de Gruijl 2012](#)).

“Living in high ambient UV-B areas during childhood and the years leading up to MS onset was associated with a lower MS risk. High summer sun exposure in high ambient UV-B areas was also associated with a reduced risk.” ([Tremlett 2018](#))

#### Further sources:

UK – Consensus Vitamin D Position Statement

[https://www.nhs.uk/livewell/summerhealth/documents/concensus\\_statement%20\\_vitd\\_dec\\_2010.pdf](https://www.nhs.uk/livewell/summerhealth/documents/concensus_statement%20_vitd_dec_2010.pdf)

The Dutch Cancer Society Sun Smart Recommendations

<https://www.kwf.nl/SiteCollectionDocuments/summary-report-on-the-relation-between-cancer,-sun-exposure-and-vitamin-D-2010.pdf>