

WHO Issues Sunbed Warning, But Will Patients Listen?

In a recent statement, the World Health Organization recommended no person under 18 should tan, highlighting the long-term risks of UV exposure.

By Jonathan Wolfe, MD

Faced with potentially far-reaching, life-threatening health issues that are often complicated by tremendous financial and political implications, the World Health Organization leads global efforts to identify and respond to dire medical crises such as Marburg hemorrhagic fever, HIV/AIDS, and bird flu. Amidst these challenges, the multinational organization's recent warning about tanning beds should demonstrate the breadth of the danger these devices pose to patients. Though dermatologists are well aware of the risks of UV exposure, it's worth reviewing WHO's rationale in issuing its warning and considering ways to capitalize on it when dealing with at-risk patients.

WHO Cares

In its statement this spring, the World Health Organization said "sunbed use poses a risk of skin cancer, and that no person under 18 years of age should use a sunbed." The evidence linking tanning bed use and skin cancer is strong. It's well accepted that UV radiation—both in the UVA and UVB range—plays a role in the development of SCC, BCC, and melanoma. Additionally, UV exposure is linked to immunosuppression, photo-oxidative damage, photoaging,¹ and ocular damage, including development of cataracts and pterygium.

According to WHO, few countries have strict regulations on tanning units or on access to tanning salons. Even in countries that legislate limits on UVB levels emitted by lamps, permissible lev-

els match those emitted by the sun. Furthermore, the organization reports, some sunbeds emit UV radiation at levels much higher than the midday sun.

Mounting Evidence

Evidence shows that exposure of cultured human fibroblasts to artificial tanning lamps results in the types of DNA damage implicated in photocarcinogenesis. Specifically, on exposure one popular unit was shown to induce cyclobutane pyrimidine dimers (CPDs—implicated in mutations in tumor suppressor genes and oncogenes) at rates similar to natural sunlight.²

Research also confirms an association between sunbed use and the development of nonmelanoma skin cancers, with one study finding any use of tanning devices was associated with odds ratios of 2.5 for SCC and 1.5 for BCC. Assessment of other contributing factors, such as history of sunburns, sunbathing, etc., did not alter the ratios.⁷

There's no documented direct relationship between sunlamps and melanoma development in humans, but there's significant evidence of a link. A UK-based case-control study published last year maintains that phenotypic risk factors for melanoma, such as skin type and nevus counts, are significantly greater compared to risks associated with natural and artificial UV exposure. That same study, however, identified significant risk associated with sunbed use by young individuals with fair skin (odds ratio: 2.66) and noted that the short

seven-year mean lag time between sunbed exposure and melanoma development in the study might have led to underestimation of risk.³

Several other recent studies reveal links between melanoma development and sunbed use. A recently published review and meta-analysis of studies that identified an association between sunbed exposure and melanoma risk confirmed a "significantly increased risk of cutaneous melanoma subsequent to sunbed/sunlamp exposure." Based on evaluation of 10 studies, the odds ratio for development of melanoma for those who "ever" used a sunbed was 1.25. Again, greatest risk was among those with "first exposure as a young adult" and those with the longest duration and frequency of exposures.⁴

A large prospective study of 106,379 Norwegian and Swedish women noted a "significant, moderate increase in melanoma risk among regular sunbed users."⁵ British researchers attempted to quantify mortality from cosmetic use of tanning beds and concluded that the activity contributes to about 100 deaths annually in the UK. Interestingly, the authors nonetheless discourage regulations to bar sunbeds, noting that relative to other self-imposed "pleasurable" health risks, such as smoking, the mortality rate is low.⁶

Of note, indoor tanning is not shown to induce epidermal thickening, which has been implicated in the supposed "protection" offered by a "pre-tan" or "base tan." Therefore, contrary to

Table 1. WHO Says:**Citing recent estimates, WHO reports the following figures:**

132,000 worldwide cases of malignant melanoma annually

66,000 worldwide deaths annually due to malignant melanoma and other skin cancers

1.1 million annual cases of skin cancer in the US

200% increase in annual incidence of melanoma in the US over 30 years

300% increase in annual incidence of melanoma in Norway and Sweden over 45 years

1:3 cancers worldwide is skin-related

1:2 cancers in the US is skin-related

salon claims, there's no scientific support for using UV lamps to achieve a pre-tan.

The Response

The tanning industry and UV lamp manufacturers continue to criticize studies that implicate sunbeds in skin cancer development, maintaining that regular UV exposure is beneficial and necessary for human health. Obviously dermatologists use therapeutic UV phototherapy, and some have advocated commercial sunbed use—under a physician's direction—by patients who cannot afford or do not have access to phototherapy in a medical office. However, some promotional materials from tanning salons exaggerate these facts by broadly touting indoor tanning devices as able to promote “skin health.” Some materials even promote indoor UV-based tanning for treatment of seasonal affective disorder.

Reports of health risks related to vitamin D deficiency continue to emerge, and these have also been used to encourage exposure to UV radiation from natural and/or artificial sources. Most recently, in his keynote address at the American Association for Cancer Research annual meeting in April, Edward L. Giovannucci, MD, Professor of Nutrition and Epidemiology at Harvard School of Public Health, proposed that vitamin D deficiency may contribute to total cancer incidence and mortality, influence the development of digestive organ cancers, and possibly affect survival for other forms of cancer.

He encouraged 1500 IU daily of vitamin D, either through higher intake or solar UVB exposure. Dr. Giovannucci also noted that the incidences of digestive organ cancers are significantly greater than those of skin cancer, implying that the benefits of UV exposure may outweigh the risks.⁸ His statements were reported in the lay media.

Others have attempted to link vitamin D levels with cancer risk or cancer protection, though such links are not proven. With so many known and strongly suspected risk factors, such as genetic history and diet, for GI cancers, there's little basis for assumptions about vitamin D. It is accepted that vitamin D deficiency results in calcium malabsorption and subsequent osteoporosis and hyperparathyroidism. Despite the known and hypothetical risks associated with insufficient vitamin D levels, there is no compelling evidence that most healthy individuals should seek greater exposure to UV radiation.

A review of the literature fails to reveal an epidemic of vitamin D deficiency in the general population, though there is evidence of higher rates of hypovitaminosis in certain populations, such as the institutionalized elderly. Importantly, studies show that vitamin D supplementation through consumption of fortified foods and/or nutritional supplements can reverse deficiency.^{9,10}

Despite wide and somewhat misleading reporting of his presentation, it's worth noting that Dr. Giovannucci con-

cluded, “No other inexpensive, non-toxic intervention has the potential to prevent as many cancer deaths as vitamin D,” but stressed, “Resolution of this hypothesis should be a high priority.”

Counter Claims

Dermatologists, other healthcare providers, and public health officials are making progress in their efforts to get the public to practice UV protection and avoidance. A recent Harris Interactive survey, sponsored by 3M, revealed that 75 percent of Baby Boomers regret previous sun exposure and say they would have practiced healthier habits had they known of UV risks when they were younger. However, the survey also revealed that the majority of Boomers who report current regular sunscreen use fail to reapply it properly.

Obviously, there is still much work to be done in terms of education, and false or misleading information from marketers and news reports only makes our task more daunting. Hopefully WHO's warning and future UV safety initiatives will help enlighten the public. ☒

1. Ma W, Wlaschek M, Tanchcheva-Poor I, et al. Chronological ageing and photoageing of the fibroblasts and the dermal connective tissue. *Clin Exp Dermatol*. 2001 Oct;26(7):592-9.
2. Woollons A, Clingen PH, Price ML, et al. Induction of mutagenic DNA damage in human fibroblasts after exposure to artificial tanning lamps. *Br J Dermatol* 1997 Nov;137(5):687-92.
3. Bataille V, Winnett A, Sasieni P, et al. Exposure to the sun and the risk of cutaneous melanoma in the UK: a case-control study. *Eur J Cancer* 2004 Feb;40(3):429-35.
4. Gallagher RP, Spinelli JJ, Lee TK. Tanning beds, sunlamps, and risk of cutaneous malignant melanoma. *Cancer Epidemiol Biomarkers Prev*. 2005 Mar;14(3):562-6.
5. Autier P. Perspectives in melanoma prevention: the case of sunbeds. *Eur J Cancer* 2004 Nov;40(16):2367-76.
6. Diffey BL. A quantitative estimate of melanoma mortality from ultraviolet A sunbed use in the UK. *Br J Dermatol* 2003 Sep;149(3):578-81.
7. Karagas MR, Stannard VA, Matt LA, et al. Use of tanning devices and risk of basal cell and squamous cell skin cancers. *J Natl Cancer Inst* 2002 Feb 6;94(3):224-6.
8. Accessed at www.aacr.org.
9. Calvo MS, Whiting SJ, Barton CN. Vitamin D fortification in the United States and Canada: current status and data needs. *Am J Clin Nutr* 2004 Dec;80(6 Suppl):1710S-6S.
10. Mosekilde L. Vitamin D and the elderly. *Clin Endocrinol* 2005 Mar;62(3):265-81.