

The current public health message on UV exposure overlooks many health benefits

The recent review of the current public health message on UV exposure¹ appears to have overemphasized the health risks and undervalued the health benefits of solar ultraviolet-B (UVB) irradiance. For example, the health benefits of solar UVB and vitamin D in reducing the risk of cancer have been well documented. The authors of the review overlooked many recent papers on that topic.²⁻⁷ Although several appeared after the WHO International Workshop on UV Exposure Guidance, in Munich, 17-18 October 2005, in which two of the authors participated. However, some of these papers were reviews and interpretations of papers that were discussed at the workshop.^{2,3,6}

What is now in the literature shows vitamin D from UVB or oral sources reduces the risk of about 24 types of cancer,⁴⁻⁷ that 1000-1500 IU of vitamin D per day is required to reduce cancer rates by 30-50%,^{2,4} and that the evidence generally satisfies the criteria for causality in a biological system,⁶ i.e. strength of association, nearly linear dose-response relation, consistency in different populations, identification of the mechanisms, and ruling out confounding factors.

So it is unclear what evidence from observational studies the authors would deem to be convincing. None of the adverse effects of UVB that they accept were established in clinical trials of humans, of course. Other authors have called for double-blinded intervention studies for the benefits. However, such trials are extremely time-consuming and would be impractical, as exposure to the sun, the main source of circulating vitamin D metabolites, cannot be randomly allocated.

Humans evolved with solar UVB and vitamin D, and there exist plenty of data to use in testing the UVB/vitamin D/cancer hypothesis, generally using the ecologic approach. When interpreted

wisely and with modern multivariate methods to control for confounding, the ecologic approach can provide results that rival the validity of other observational approaches or (usually impossible) intervention studies.

One criticism of the ecologic studies used to make the link between solar UVB doses and cancer risk reduction is that those living in regions with higher UVB doses may not have higher UVB irradiances. However, this line of argument has been invalidated by a recent study that showed that a diagnosis of non-melanoma skin cancer, which is a biomarker of UVR dosage, is associated with reduced risk of a wide range of internal cancers if population average smoking rates are included in the analysis. In addition, it has been noted that non-melanoma skin cancer rates are inversely correlated with rates of many internal cancers in Spain and the United States of America.

It is neither necessary nor advised that people receive excess UV irradiance to obtain adequate vitamin D production. While it is now evident that ordinary dietary sources of vitamin D3 do not supply enough for adequate health (around 250-300 IU/day in the USA; very little fortification with vitamin D3 in Europe), supplements are a safe and reliable source of vitamin D3.³ However, supplements are not consumed by enough people at high enough doses to have a substantial impact on health status, in part because there is little economic incentive to encourage use of supplements.

As for the rising epidemic of melanoma, there is strong evidence that it can be attributed to the effects of increased travel to sunny locations.⁸ Europeans travelling from northern and central Europe to sunny vacation spots generally do not have sufficiently pigmented skin for the amount of time they spend in the sun, and many sunscreens in use historically did not (and still do not) provide adequate protection against UVA, the spectral region most strongly associated with melanoma risk.⁹ Chronic UV irradiance such as through occupation is a risk reduction factor for

melanoma at higher latitudes.¹⁰ UVB irradiance is actually a risk reduction factor for melanoma, due in part to its role in eliciting the normal human photoprotective response (hypertrophy of the stratum corneum, upregulation of thymine dimer repair enzymes, and increased skin pigmentation) and in part to vitamin D production.¹¹

A study in the USA estimated that the economic burden due to excess UV irradiance was US\$ 5-6 billion, while that due to insufficient UVB and/or vitamin D was US\$ 40-56 billion per year.¹² Similar studies for other non-tropical regions of the world would very likely find similar results.

WHO has a distinguished record of service to humanity. It is hoped that future reviews in the *Bulletin* contrasting the risks and benefits of UVB will provide more balanced coverage of the benefits that incorporates the latest research findings in this rapidly advancing field. ■

William B Grant^a

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^a SUNARC, 2115 Van Ness Ave., San Francisco, CA, USA. Correspondence to William B Grant (e-mail: wgrant@sunarc.org).

Letters

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