Commentary: The complexities of minimizing risks due to UV exposures

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For many years, the public health message about solar ultraviolet radiation (UV) focused nearly exclusively on its toxicity. Sunlight was a risk to be avoided. Yet, as has been increasingly emphasized in the scientific literature and lay press, UV is an agent that poses both harms and benefits to health. Solar UV exposure presents established risks to the skin and eyes, as well as initiating the predominant source of vitamin D, with recognized contributions to bone health and other possible health benefits. Understanding both sides of the UV and human health ledger is crucial to developing public health policy that will minimize the net burdens associated with UV.

Lucas et al.1 address the complexities of UV exposure by estimating with a single metric [disability-adjusted life years (DALYs)] both the international burden of disease resulting from actual exposures to UV and the health burdens that would follow if very low world UV exposures were achieved. The comparison is limited to established health risks of UV, principally melanoma, other skin cancers, sunburn and certain types of cataracts, and the established health benefits of vitamin D in preventing rickets, osteoporosis and osteomalacia. In examining the potential trade-off between UV damage and inadequate vitamin D, the study assumes existing patterns of vitamin D exposure from non-UV sources, such as diet (natural and fortified foods) and oral supplementation. Although, readers may question or challenge the myriad assumptions that underlie such an exercise, the study dramatizes how much may be at stake if public health policy addresses the risks of UV without being mindful of its impact on vitamin D status.

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The results are striking: the analysis estimated that only 0.1% of global disease burden in the year 2000 was due to the known toxic/immunosuppressive effects of UV compared with an enormously greater harm to bone health if UV exposures were minimized. Moreover, the decision to evaluate only established benefits may underestimate the potential health penalties associated with minimal UV exposure. Because established benefits were limited to bone health, Lucas et al. excluded the extensive list of potential salutary effects that have been linked to vitamin D by some experimental and epidemiologic studies, with varying degrees of evidence. These include (and are not limited to) reducing the risk of colorectal cancer, cardiovascular disease, diabetes and multiple sclerosis. Even if only part of vitamin D’s potential benefits are borne out by future studies, the potential harm of UV avoidance could be even greater.

An alternative perspective that is presented by Gilchrest rejects any comparison of relative UV burdens as misleading. As noted above, Lucas et al. estimate the burdens of minimal UV exposure, assuming current exposures to sources of vitamin D such as diet and supplements. Gilchrest emphasizes that current practices related to diet and supplements are not immutable. There are, as she argues, and Lucas et al. acknowledge, other ways to improve vitamin D status without increasing UV exposure. Some foods, principally fatty fish, supplements and fortification practices, such as vitamin D fortification of milk as has occurred in some countries, provide alternative routes to higher vitamin D levels. But the importance of the exercise undertaken by Lucas et al. is to make clear that unless dietary/supplement intake in fact substitutes for some UV exposure, there are potentially substantial risks to markedly reducing UV exposure. What is clear is that the shaping of sun exposure policy should not ignore the major benefits of vitamin D associated with various benefits. Does heterogeneity in vitamin D status over time matter and in what respects? To elaborate on the latter, does consistency in exposure over seasons matter? Over life stages? We need to know more about how to achieve the optimal vitamin D levels we define. How does ambient UV level, skin type, sun protective behaviour, length and time of exposure and age, among other factors, affect vitamin D status? And how does dietary/supplement intake affect status? Knowing more about vitamin D benefits and the degree to which various kinds of exposure to UV and vitamin D intake contribute to vitamin D status should help in guiding diverse segments of the public about reasonable sun/vitamin D behaviours.

The views of the author do not necessarily represent the official views of the National Cancer Institute.

References