Authors' response

We thank Dr William B Grant for his comments on our paper, "Is the current public health message on UV exposure correct?" Our review reflects the current status of research, which has been heavily weighted towards the adverse effects of UVR exposure but is now beginning to recognize a wide range of possible beneficial effects. The latter evidence is still developing.

At the recent WHO International Workshop on UV Exposure Guidance in Munich on 17–18 October 2005, Kricker and Armstrong reviewed the evidence on vitamin D/UVR exposure and a variety of internal cancers.[1] The conclusion, reiterated in the rapporteur's report,[2] was that there was supportive evidence for an association with colon cancer incidence, but that there were sufficient conflicting results for other cancers that further work was required before a causal association could be considered proven. Also, there is stronger evidence of a protective effect for cancer mortality than for cancer incidence, for a range of cancer types.[3,4]

Much of the work showing a protective effect of vitamin D/UVR on internal cancers comes from ecological studies. This study design is more suited to suggesting possible associations than for causal inference. For the latter, there are two major difficulties: first, in ecological studies it is not clear that those with the outcome had the exposure (or lack of exposure) of interest; second, findings from ecological studies cannot satisfy the only essential criterion for causality — that the exposure preceded the outcome.

While modern multivariate methods can include possible confounders, this adjustment can only be for averaged levels of those confounders for which there are population-level data. Thus, while average smoking levels can be included in multivariate analyses (although the rationale for considering smoking as a confounder of the UVR/cancer association is not clear), other possibly important confounders may not be able to be considered, for example physical activity levels. The same difficulties of not being sure which individuals had the exposure, outcome or confounder remain.

Ecological studies have examined cancer incidence and mortality in relation to latitude, ambient UVR or particular UVR wavelengths.[5,6] These results do not directly extrapolate to a protective effect of vitamin D adequacy. Indeed, Diffey et al. have shown that there is no relation between latitude and vitamin D levels in adult populations.[7] There are several ways in which UVR exposure may be beneficial to health that do not involve the vitamin D pathway.[8,9] Individual-level studies will clarify whether it is vitamin D, personal UVR dose (a function of ambient UVR and time in the sun), or some other correlate of latitude/ambient UVR that is important to cancer incidence.

Furthermore, there is some evidence that higher levels of vitamin D increase risk of prostate cancer[10] and pancreatic cancer.[11] We believe this is a time for caution — sun safety messages were developed under fear of ozone depletion and rapidly increasing skin cancer incidence. We are now recognizing that perhaps those messages require some moderation and that modest sun exposure is beneficial to health. It would be imprudent to leap into promotion of widespread vitamin D supplementation before we have clear evidence on the prevalence of insufficiency, risk factors for insufficiency and health outcomes associated with various blood vitamin D levels.

Dr Grant does not provide a reference for his statement about the association of non-melanoma skin cancers with internal cancers, if average smoking rates are included in the analysis. However, this is in direct contrast to a recent individual level study that found an *increased* risk of a wide range of internal cancers following a diagnosis of SCC — the best biomarker of chronic sun exposure.[12] Clearly, further work is required to clarify these contradictory results.

We agree with Dr Grant that the economic and disease burden due to insufficient UVR exposure may be greater than that associated with excessive UVR exposure — this is clear from the recent global burden of disease due to UVR exposure report, released by WHO July 2006.[13] This is a rapidly advancing field and it is extremely important that the evidence be assessed critically. This assessment must take account of study design and issues of possible bias and confounding to ensure that a safe and appropriate public health message regarding sun exposure and vitamin D intake is formulated and promoted. ■

Robyn M Lucas [a]

References

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[a] National Centre for Epidemiology and Population Health, The Australian National University, Canberra, ACT 0200, Australia. Correspondence to Robyn M Lucas (e-mail: robyn.lucas@anu.edu.au).

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