All people should wear sunscreen or other protection for their skin whenever they are exposed to sunlight

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YES

Any discussion regarding sun protection relates to those with vulnerable skin (Fitzpatrick types I–IV) and does not relate to darker types V and VI, whose skin has 'built-in' sunscreen in the form of significant amounts of melanin in the stratum corneum.

Ultraviolet (UV) radiation has been recognised as a mutagen since 1936.[1] Indeed as early as the nineteenth century, sunlight was recognised as the cause of the higher incidence of skin cancer in rural outdoor workers and sailors.[2] More recent work shows that the different wavelengths of UV light interact with the skin in multiple adverse ways.[3]

Throughout history deliberate sun exposure has gone in and out of fashion. In Western countries, until the beginning of the twentieth century, tanned skin was associated with the lower (rural) classes, and women went out of their way to preserve their pale skin. In some Asian cultures this is still prevalent. Outdoor clothing was designed to avoid sun exposure with long sleeves, large brimmed hats or sun bonnets, and parasols. It is only in the mid- to late-twentieth century that deliberate sun exposure has become widespread, and increased leisure time associated with increasing affluence has resulted in ever increasing levels of 'accidental' sun exposure. This, and increasing longevity, may, in part, be responsible for the increasing prevalence of all types of skin cancer. There has also been a coincident increase in incident UV radiation, due to a decrease in atmospheric ozone, resulting in less absorption within the lower stratosphere.

The National Toxicology Program Report on Carcinogens from the (US) Department of Health and Human Services considers broad-spectrum UV radiation to be a carcinogen contributing to most of the estimated 1.5 million skin cancers and 8000 deaths due to melanoma that occur each year in the United States.[4,5] New Zealand has much worse incidence than this. It is not known whether there is a safe level of regular sun exposure that imposes no (or minimal) skin cancer risk over time.[6]

Cumulative lifetime sun exposure is also responsible for much of the adverse cosmetic changes to the skin that we associate with ageing, including wrinkling, thinning, loss of elasticity, scaliness, dryness, telangiectasia and dyspigmentation.

It therefore makes sense from the point of view of causation, and applying the precautionary prin-

BACK TO BACK this issue:


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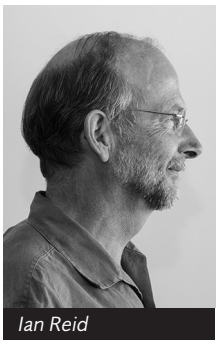
Ian Reid

While evidence can help inform best practice, it needs to be placed in context. There may be no evidence available or applicable for a specific patient with his or her own set of conditions, capabilities, beliefs, expectations and social circumstances. There are areas of uncertainty, ethics and aspects of care for which there is no one right answer. General practice is an art as well as a science. Quality of care also lies with the nature of the clinical relationship, with communication and with truly informed decision-making. The **BACK TO BACK** section stimulates debate, with two professionals presenting their opposing views regarding a clinical, ethical or political issue.

ciple, that sun exposure should be reduced from its current levels.

Unfortunately, due to factors including the long lead time in the development of both mutagenic changes and chronic sun damage, the difficulty of accurately quantifying sun exposure and sun protection measures retrospectively, and changes in social attitudes and habits over time, it has been difficult to produce hard scientific proof of the benefit of sun avoidance/sun protection. Additionally, different skin cancers have a different relationship to timing of sun exposure. Epidemiological evidence suggests that melanoma incidence is most influenced by childhood sunburn, whereas non-melanoma skin cancer incidence appears to correlate with total cumulated exposure.

Despite that, one prospective randomised study has shown that even relatively short periods of the use of a moderately protective sunscreen (SPF15) does reduce the subsequent incidence of squamous cell carcinoma (SCC) and actinic keratois (an SCC precursor).[7] This prospective study also suggested a reduction in melanoma.[8] Basal cell carcinoma was unaffected.

Reduction of sun exposure can be achieved by a number of methods, which are best combined and matched to individual circumstances.

- Sun avoidance (e.g. seeking shade, deferring exposure to a time of day when UV levels are lower)
- Sun protective clothing (e.g. hat, long sleeves, one-piece swimsuit rather than bikini)
- Sunscreen (physical or chemical).

Risks

Sun avoidance and protective clothing carry no risks in themselves other than any risk associated with a reduction in exposure below the levels necessary to synthesise vitamin D. Therefore, it is a sensible first part of any strategy to reduce UV dose.

A number of potential risks have been raised regarding the routine use of sunscreens. Sunscreens take the form of chemicals which absorb UV light, physical particles that reflect UV light, or a combination of both.

Numerous chemicals are used in modern sunscreens, many can be absorbed, but have high safety indices, and although some have been shown to have potential systemic effects, these are at levels many times higher than can be observed, even when applied to the entire body surface of adults. Additionally, all active substances in sunscreens used in the USA are subject to FDA approval.[9] A review of the evidence by Burnett and Wang from Memorial Sloan Kettering, New York in 2011 concluded '..none of the data published to date conclusively demonstrates adverse effects on the health of humans from the use of sunscreen'.[10]

Children, particularly infants, have a larger surface to volume ratio, and have a skin structure that is both more vulnerable to UV-induced changes, and also higher absorptive potential. This is why sun avoidance and protective clothing should be used as the predominant means of reducing sun exposure in the young, and physical sunblocks preferred to chemical blocks.

Physical sunblocks generally comprise zinc oxide, titanium dioxide, or a combination of both. In recent years, to improve the cosmetic acceptability and physical properties of these compounds, the particle size has been significantly reduced down to 'nano' level. This has raised concerns about the potential for these compounds to be absorbed and have a systemic effect. This is unfounded as in fact they are only absorbed into the accelular/avascular stratum corneum.[11]

Vitamin D

Early in the twentieth century vitamin D deficiency was recognised as the cause of rickets, which was cured by regular sun exposure. UV exposure of vitamin D precusors in the skin is an initiating step in the metabolic pathway. Vitamin D can, however, be taken and absorbed orally. Several studies have looked at sunscreen use and its impact on vitamin D levels and have failed to show that there is a clinically significant reduction in levels.[12,13]

Apart from its long-known effects on bone metabolism, vitamin D has more recently been mooted as having an effect on mortality, cardiovascular disease, multiple sclerosis, malignancy, and immunity. None has been proven to date.

In conclusion, there is clear evidence that both acute and chronic UV exposure causes damage to the skin. There is clear evidence that sun protection measures, including avoidance, sun protective clothing, and sunscreen, will all reduce the dose of radiation that the skin receives. There is some evidence that the reduction in exposure that is currently achievable does reduce some of the risks associated with such exposure. There is little evidence to support a real harm associated with these sun avoidance measures, and therefore, on balance, it is still advisable that individuals with skin types I–IV take measures to protect themselves from the sun whenever they are exposed or likely to be exposed.

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NO

Bone doctors seem prone to contradicting colleagues from other disciplines when it comes to public health messages. The first obvious example is advice regarding body weight—most doctors badger their patients to remain thin but, in bone health, excessive thinness is a significant risk factor for osteoporotic fractures. Sunlight exposure represents a similar set of contradictions. New Zealand has many fair-skinned residents and a sunny climate, resulting in one of the world's highest rates of skin cancer, so sunlight avoidance seems logical. However, mineral metabolism is critically dependent on adequate levels of vitamin D which, despite its name, is absent from most diets and is in fact a pro-hormone made in the skin as a result of ultraviolet (UV) light exposure. Thus, vitamin D deficiency is usually a result of poor sunlight exposure and the cheapest strategy for its prevention is encouragement of regular time in the sun. Is this compatible with the sun-safe messages promoted by dermatologists?

The answer is probably yes. In temperate countries, the individuals most at risk of vitamin D