



# Health Watch

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## Sunlight and vitamin D: debate in this issue

AS CANCER Research UK highlights the dangers of getting too much sun, warning that rates of deadly skin cancer are set to treble\*, some cancer experts fear that staying in the shade could be even more harmful, according to a feature in the *Independent*. Even in sun-soaked Australia there is now concern that some people may get too little sun to maintain vitamin D levels, says the report.

In this issue of the *HealthWatch Newsletter* medical journalist

Oliver Gillie, author of *Sunlight Robbery*, explains the possible health risks of being too sun-shy, while Sara Hiom of Cancer Research UK defends the charity's advice to take care in the sun. (see pages 4, 5 and 6 for reports and full references).

*Independent*, 22 March 2005

\*<http://info.cancerresearchuk.org/pressoffice/pressreleases/2005/march/70331>

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2. Consumer protection of all forms of health care, both by thorough testing of all products and procedures, and better regulation of all practitioners;
3. Better understanding by the public and the media that valid clinical trials are the best way of ensuring protection.

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# CHARITY ADVICE PUTS LIVES AT RISK

Award-winning medical journalist Oliver Gillie is the author of *Sunlight Robbery*, an independent report into the health risks of inadequate exposure to the sun. Here he argues that government-sponsored advice on sun protection, as is currently being issued by Cancer Research UK as part of its SunSmart publicity campaign, could claim more lives than it saves.

**OUTDATED ADVICE to avoid exposure to the sun is putting the public at risk of a number of serious diseases including cancer. Ironically, this advice—to cover up and avoid bright sunlight—is part of a programme called “Reduce the Risk” which has been devised by Cancer Research UK, Britain’s premier cancer charity.**

Tragically the charity’s well meant advice will increase the risk of cancer. Cancer Research UK, and government which has underwritten their campaign with more than £1 million so far, has overlooked the fact that exposure of the skin to sunlight is necessary to obtain vitamin D, and that vitamin D is essential for normal growth and protection against cancer. Vitamin D is needed, not only to make strong bones, but for the healthy functioning of more than 30 different tissues or organs in the body.

Two recently published scientific studies<sup>1,2</sup> provide a profound challenge to the established ideas of skin cancer specialists who advise against exposure to the sun. These two studies have found that people with a greater exposure to sunlight have a lower risk of developing melanoma, the most serious form of skin cancer, and a lower risk of dying from it. This is consistent with other studies suggesting that the risk of 16 or more different types of cancer are reduced by exposure to the sun<sup>3</sup>. These cancers are generally much more common in the northern states of America or in the northern countries of Europe than in southern states or southern countries where people generally receive more exposure to the sun.

Other studies<sup>4</sup> using different methods (“case-control” or “cohort” studies) have confirmed that the risks of lymphoma, and cancer of the breast, colon, ovary and prostate, increase when sun exposure is reduced. The most recent of these studies, published in December 2004 and January 2005<sup>5,6</sup>, have shown that lymphoma is less likely to occur in people who have a high exposure to UV light as a result of sunbathing, foreign sunshine holidays or use of sunbeds. The reduction in lymphoma associated with UV exposure was found to be as much as 30–40 per cent—a startling result which suggests that a major reduction in these cancers could be achieved by a reversal of Cancer Research UK’s sun-avoidance policy. Similar reductions might be obtained for a number of other cancers if sunbathing was actively encouraged, instead of discouraged, by Cancer Research UK’s policy on sunlight<sup>7</sup>.

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***“It is tragic that this distinguished charity is in the position of endorsing advice which has no proper scientific basis”***

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The charity’s advice is intended to prevent skin cancer. It has of course been devised with the very best intentions but it originated from a consensus statement that never had a secure scientific basis. This mistaken advice, presented to the public as the SunSmart programme, assumes that sufficient vitamin D can be obtained by casual exposure of the hands and face to the sun during normal activities.

Cancer Research UK has said that its advice is supported by the National Radiological Protection Board, among others. The NRPB endorsed the “hands and face assumption” in a report<sup>7</sup> published in 2002, although the assumption was not supported by any comprehensive scientific evidence. But late last year, realising that the evidence was flawed, NRPB officially withdrew its support for the “hands and face assumption” leaving Cancer Research UK’s sunlight policy without a reasoned basis for safety<sup>8</sup>.

The SunSmart programme, which was originally developed in Australia where casual exposure to the sun is very much greater than in the UK, recommends putting on a high factor sunscreen 30 minutes before going out. It also advises against going into the sun for four hours around midday. At other times of day sunlight is rel-

atively weak in the UK because the sun is low in the sky and UV light is filtered out by the atmosphere. So the SunSmart advice effectively blocks any useful synthesis of vitamin D in the skin.

The injunctions of Cancer Research UK against sunlight are endorsed by government and more specifically by the chief medical officer Sir Liam Donaldson. Together they are responsible for the fact that anyone following their guidance will obtain insufficient vitamin D and put themselves at risk of a number of chronic diseases including cancer itself. It is tragic that this distinguished charity has got itself into the position of endorsing advice which has no proper scientific basis. It can only be hoped that Cancer Research UK will redeem itself by a rapid reversal of policy before the coming summer.

The consequences of insufficient sunlight and vitamin D go much further than increasing the risk of cancer. Insufficient vitamin D is also associated with a number of quite different chronic diseases including multiple sclerosis, diabetes (types 1 and 2), raised blood pressure, inflammatory bowel diseases, polycystic ovary disease, infertility and resistance to certain infections as well as the classic bone diseases<sup>4</sup>.

It may seem difficult to believe that one vitamin could be necessary for the healthy function of so many different parts of the body. But vitamin D is now known to have profound effects which involve not only regulation of calcium metabolism, but the switching on and off of genes which cause cells to differentiate, to mature, and to die by organised cell death (apoptosis). Vitamin D also has hormone actions which may alter growth signals to cells, inhibit growth of blood vessels and modulate activity of the immune system<sup>4</sup>.

The action of vitamin D is particularly important during pregnancy which ends with a rapid growth of the baby’s bones. At this time the mother’s body may become acutely short of vitamin D with long term consequences for the baby which include multiple sclerosis or other nervous system problems developing in later life. People born in northern latitudes, in Canada, Great Britain and Scandinavia have a risk of developing MS that is significantly increased—by 8% above average—if born in May, that is at the end of winter when vitamin D in the mother’s body is lowest. And the risk of MS is decreased by 8% below average if born in November, at the summer’s end when vitamin D reserves in the body are highest<sup>9</sup>. This seasonal birth of people with MS has been found to be most marked in Scotland, possibly because the poor weather there does not encourage sunbathing while in Scandinavia, which is at a comparable latitude, sun-bathing and sunbed use are popular.

The cost of diseases which might be prevented by increased exposure to sunlight runs to billions of pounds in the UK. The direct cost of hip fractures alone is £1.7 billion in the UK<sup>7</sup>. A number of studies have shown that vitamin D not only prevents fractures by strengthening bones, but also prevents falls through its effect on the nervous system<sup>7</sup>. William Grant, an independent researcher based in San Francisco, has calculated that increased sun exposure and fortification of food with vitamin D could reduce deaths from cancer in the UK by about 20%, saving some 30,000 lives a year and very large sums of money at present spent on complex treatments<sup>3,10</sup>.

Over the last ten years melanoma and several other cancers have been occurring with increasing frequency in the UK. This increase in incidence of melanoma has been blamed on foreign holidays

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## WHY IT'S STILL SMART TO COVER UP IN THE SUN

Sara Hiom is Head of Health Information in Cancer Research UK's Policy and Communication Directorate. Her background is in research, including six years at the MRC's National Institute for Medical Research. She explains why the SunSmart Campaign should continue.

**P**UBLICATIONS indicating a protective role for sunlight and vitamin D in several diseases, including some cancers, continue to spark debate and controversy. This often prompts a media response encouraging increased sun exposure. So it is no wonder that the public is uncertain about the authority of health messages that warn against too much sun exposure.

Since the 1980s skin cancer prevention campaigns, in countries with predominantly white populations, have been set up because of rising incidence in all skin cancers and belief that most could be prevented by moderating sun exposure. Solar radiation is classified as a Group 1 carcinogen, known to cause cancer in humans<sup>1</sup>. It is accepted as being the major environmental cause of skin cancer and excessive exposure to ultraviolet radiation (UVR) is estimated to cause about 90% of non-melanoma skin cancer (NMSC) and at least two thirds of melanomas<sup>2</sup>.

NMSCs are very common with an estimated 100,000 cases diagnosed each year in the UK<sup>3</sup>. These are rarely life threatening but can involve disfiguring surgery and place a great burden on health services. Malignant melanomas are more often fatal, causing more than 1,600 deaths in the UK in 2002<sup>4</sup>. Although still relatively rare, incidence rates have been increasing rapidly for several decades in all Caucasian populations<sup>5,6</sup>. In Britain, melanoma is the third most common cancer in 15-39 year olds. Age standardised incidence grew by 49% over the ten-year period 1991-2000 and since the 1970s rates have risen faster than for any other major cancer<sup>7</sup>. Rising incidence trends look set to continue<sup>8,9</sup>.

Intermittent sun exposure<sup>10</sup> and a history of sunburn<sup>11</sup> are linked to increased risk of melanoma, whereas low-level, chronic and cumulative exposures are not<sup>12</sup>. Exposure to intense sunlight and sunburn in childhood significantly increases risk<sup>10,13</sup>. Skin cancer prevention advice is therefore to advise against sunburn by avoiding the summer sun between 11am and 3pm, covering up with suitable clothing and using a high factor sunscreen when shade or clothing are not practical options. These messages—together with a reminder to take extra care of children—form the basis of Cancer Research UK's SunSmart campaign.

Public health campaigns should have a firm scientific evidence base. All new research must be regularly evaluated to inform any changes to policy or messages. Recently there has been a call for SunSmart to be abandoned<sup>14</sup>. The author asserts that, "Advice should only be given to the public to reduce sun exposure if it can be shown that this is likely to do no harm and to provide substantial benefit." But, despite the increase in publications claiming a

role for sunlight/vitamin D in the reduction of incidence and mortality from certain cancers, the data are still incomplete and the mechanisms underlying the observed associations are yet to be defined. In contrast, evidence for a link between sun exposure and skin cancer is solid.

*"since the 1970s rates of melanoma incidence in Britain have risen faster than for any other major cancer"*

The studies described in reference 14, and elsewhere, are mainly based on observations of cancer incidence and mortality variations with latitude in the United States. Increased rates for prostate, colon and breast cancers were observed with increasing latitude (distance from the equator) and these results taken as further confirmation of a protective role for sunlight. But applying this hypothesis to a comparison of rates of these cancers in Australia and New Zealand with those in the UK is less successful. The annual ambient solar UV radiation in southern Australia and New Zealand is about two to three times that in Great Britain<sup>15</sup> and studies of individual exposure to sunlight demonstrate that average doses in Australia are significantly greater than those measured in a similar cohort of subjects in England<sup>16</sup>. So we can conclude that people living in Australia and New Zealand are exposed to considerably more solar UV radiation than those living in the UK. This is borne out by a comparison of the rates of melanoma. Both incidence and mortality rates are higher in Australia and New Zealand than in the UK<sup>17</sup>. But rather than indicate a protective effect for sunlight, the data for prostate, colon and breast cancer rates show that mortality rates do not vary significantly between countries. Incidence data imply generally higher rates for these cancers in Australia and New Zealand, but it is likely that mortality data are more reliable due to possible differences in diagnosis.

The beneficial effects of sun exposure in maintaining adequate vitamin D levels to protect against bone disease are well documented. The vitamin D hormone plays an essential role in increasing calcium absorption. However, the exact amount of sunlight necessary to achieve optimal vitamin D levels is uncertain and will vary

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### THE PROBLEM OF VITAMIN D

Dr David Bender comments on our state of knowledge concerning bodily requirements of "the sunshine vitamin"

VERY FEW foods are good sources of vitamin D, and most of our requirement is met by synthesis in the skin following sunlight exposure. In UK we have reference intakes only for infants and the (house-bound) elderly; for this latter group the reference intake of 10µg/day is estimated on the basis of an intake that will maintain the same plasma concentration as is seen in younger adults at the end of winter—a time when their reserves are depleted after the dark winter months. This level of intake is adequate to prevent clinical deficiency disease, but it was established before the importance of vitamin D in controlling insulin release, immune sys-

tem function and cell differentiation and turnover (and hence its importance in preventing cancer) was known. The need to revisit requirements for vitamin D for optimum health, as opposed to absence of deficiency disease, has been acknowledged by the most recent call for research proposals by the Food Standards Agency. For details see pages 30 to 31 at <http://www.food.gov.uk/multimedia/pdfs/rrd16.PDF>

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and careless sun exposure. In fact the tragic SunSmart policy and its advice to avoid exposure to the sun may be in part responsible for the increase in several kinds of cancers. The government should halt the SunSmart programme immediately and promote a new policy of safe sunbathing instead.

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Medical Journalist

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## WHY IT'S STILL SMART TO COVER UP IN THE SUN

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depending on skin type, latitude, time of day, time of year, cloud cover, clothing, sunscreen usage, amount of skin exposed and age. Once a person's vitamin D requirement is met, any additional vitamin D is converted to inactive substances in the body<sup>18</sup>. So, increasing sunlight exposure, resulting in tanning or burning, does not improve vitamin D status while having increased carcinogenic effects on the skin. In the UK, vitamin D levels are known to decrease over the winter. But, normal plasma levels built up during the summer should be sufficient to last through the winter without experiencing vitamin D deficiency<sup>19</sup>. An important proponent of the beneficial effects of sun exposure has indicated that exposing about 10% of body surface several times a week to the amount of UV necessary to induce a slight reddening of white skin (the minimal erythemal dose or MED) from spring to autumn is easily sufficient<sup>20</sup>.

Further research is necessary to elucidate the exact role of sunlight and vitamin D in the prevention of diseases, the extent to which the population is vitamin D deficient and how any such deficiency can be addressed safely. Changing health behaviours is a slow process, and while evaluations show that knowledge of effective sun protection is increasing, the requisite action to reduce skin cancer risk is yet to be widely adopted in the UK. Those receiving insufficient sunlight for good health are likely to be avoiding sun at greater levels than current policy suggests. However, if there are people who might benefit from slight increases in casual exposure, then the nature of this exposure is crucial. The desire to tan, regardless of skin type, surely leads to the type of sun exposures that are most likely to increase melanoma risk.

In the current climate of concern about vitamin D deficiencies set against a backdrop of relentlessly rising melanoma rates, research must be constantly reviewed to ensure that health messages are appropriate. The weight of scientific evidence in this debate lies with a causal role for sun exposure in the development of malignant melanoma and non-melanoma skin cancers. The link between sun exposures, vitamin D levels and bone disease is also well established. Although a growing number of ecological studies indicate a possible protective effect of sunlight for certain internal cancers, these data are inconsistent and further exploration is necessary before current policy on sun exposure is overturned. In the meantime the challenge will be to promote a sensible attitude to sun exposure that safely balances the inherent risks and benefits.

Sara Hiom

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Cancer Research UK's SunSmart campaign is funded by UK Health Departments. Its advisory board includes representatives of the National Radiological Protection Board, British Association of Dermatologists, International Commission on Non-Ionising

Radiation Protection, EUROSkin, UK Skin Cancer Working Party and the British Photodermatology Group. For further information please go to [www.sunsmart.org.uk](http://www.sunsmart.org.uk)

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