Sunscreens, suntans, and skin cancer

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Sunscreens should not be seen as a safe way to prolong sun exposure

Sunlight causes sunburn, photoaging, and skin cancer,[1] the price many people seem prepared to pay for a tan. Yet recent studies suggest that tanning is a direct consequence of damage to DNA caused by ultraviolet radiation.[2] Even seemingly trivial sun exposure, enough just to turn the skin red, causes considerable damage to both keratinocytes[3] and melanocytes and is sufficient for many cells in the skin to sustain lethal doses of ultraviolet radiation. Patients with xeroderma pigmentosum, who are unable to repair this damage, develop skin cancer in the first 5-10 years of life, but in normal individuals the accumulation of genetic alterations sufficient to cause skin cancer may take five to six decades. However, despite the efficiency of our DNA repair machinery, the rising incidence of both melanoma and non-melanoma skin cancer in fair skinned populations suggests that in many cases DNA repair is not able to keep pace with 20th century lifestyle.

In recognition of the economic and public health concerns, the government's strategy document, *Health of the Nation*, has as one of its major targets the reversal of the year on year increase in melanoma and non-melanoma skin cancer by 2005. The key to achieving this target is public health education, to increase awareness of the dangers of sun exposure, even in Britain, and to promote a healthier, less "sun seeking" lifestyle. The slogan of Britain's Health Education Authority, "Shift to the Shade," emphasises that the safest way to reduce sun exposure is by changing behaviour. The use of sunscreens to prevent skin cancer is more controversial, not least because by preventing sunburn they may encourage longer exposure to the sun.

Sunscreens work mainly by blocking solar ultraviolet B wavelengths (295-320 nm), which (despite accounting for less than 5% of solar ultraviolet radiation) are primarily responsible for sunburn. There is increasing evidence that ultraviolet A (320-400 nm) can also damage the skin, and most sunscreens in Britain now contain good ultraviolet A blocking agents, providing "broad spectrum" cover. A sunscreen's ability to prevent sunburn is designated by its "sun protection factor" (SPF), which is defined as the ratio of the minimum erythemal dose of simulated sunlight on protected skin compared with unprotected skin. In reality, it is widely perceived as how many times longer it takes to obtain a mild sunburn, the skin's early warning system, while wearing a sunscreen. But we know little about the precise relation between sunburn and skin cancer. Although sunscreens are highly effective at preventing sunburn, there is concern that they may be less effective at preventing skin cancer.

Studies in hairless albino mice have shown that, as with sunburn, ultraviolet B is the main cause of non-melanoma skin cancer.[4] This suggests that sunscreens used to prevent sunburn might also prevent, or at least reduce the incidence of, non-melanoma skin cancer. Evidence to support this comes from mouse experiments[5] as well as preliminary human sunscreen studies.[6] These show that the incidence of malignant and premalignant lesions is indeed reduced by the use of sunscreens, although the limited evidence suggests that the "cancer protection factor" of sunscreens may be lower than their "sunburn protection factor."

The complex relation between sunscreens and skin cancer is further illustrated by reports of an increased risk of malignant melanoma in sunscreen users.[7 8] Confounders apart, one possible explanation is that some sunscreens fail to provide adequate protection from ultraviolet A. Studies on fish models,[9] supported by limited evidence that sunbeds are a risk factor for melanoma,[10] suggest that ultraviolet A wavelengths may be particularly important in the induction of this tumour type. The sunscreens used in the malignant melanoma studies were almost certainly primarily ultraviolet B blocking agents: although most British sunscreens now contain effective ultraviolet A blocking agents, this is not always the case in other countries. Sunscreens containing only ultraviolet B blocks would protect against sunburn and therefore enable greater exposure to ultraviolet A than would otherwise be possible to obtain. Another possibility is that sunscreens may afford insufficient protection against the immunosuppressant effects of ultraviolet radiation.[11] This immunosuppression is thought to have an important role in the promotion of non-melanoma skin cancer and may also be involved in melanoma.

Whatever the potential shortcomings of sunscreens in preventing skin cancer, they do provide an important way of reducing cumulative exposure to solar ultraviolet radiation if they are used in conjunction with other photoprotective measures. However, all photoprotection is lost if sunscreens are used to prolong sun exposure to the maximum achievable by the sun protection factor; so that, for example, sunburn develops over five hours instead of 30 minutes. Thus the marketing of sunscreens as a safe way to stay out in the sun longer may be misleading. Indeed, animal[12] and human studies[7 8] suggest that this approach may actually increase the risk of both melanoma and non-melanoma skin cancer for the same daily exposure dose.

A recent survey by Britain's Health Education Authority showed that 57% of the public had bought or used sunscreens in the past two to three years. Most people claimed an interest in the photoprotective aspects of sunscreens against sunburn (80%) and skin cancer (53%) rather than their use to get a good tan (35%).

Along with the ongoing trend for buying products with higher sun protection factors, this suggests that the public increasingly regards sunscreens as health rather than cosmetic products. Though this is certainly encouraging, the role of sunscreens in preventing skin cancer still needs clarifying.

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European health policy: must redefine its raison d'être

Market model has failed: more imaginative individual national policies are needed

See p 1663

WHO's Ljubljana Charter: summary

European health care systems should be:

- Driven by values of human dignity, equity, solidarity, and professional ethics
- Targeted on protecting and promoting health
- Centred on people, allowing citizens to influence health services and take responsibility for their own health
- Focused on quality, including cost effectiveness
- Based on sustainable finances, to allow universal coverage and equitable access
- Orientated towards primary care

Market ideology, language, principles, and practices have been incorporated into the healthcare reforms in Europe over the past 10 to 15 years. The rationale has been to increase efficiency in largely government run health services and put a brake on escalating healthcare costs. The reforms have also promoted private sector funding and provisions of services and increased sharing of costs by patients. The resulting public-private mix has assumed different forms, but experts on healthcare policy throughout Europe agree that no one has got it right. Healthcare costs have continued to rise in 19 of the 20 countries of the OECD (Organisation for Economic Cooperation and Development), and gains in efficiency have been more than offset by rising inequity in the quality and distribution of care.

In recognition of this, the World Health Organisation (WHO) has drawn up a charter—adopted last week by the member states of WHO's[1] European region and reproduced on p 1663 of this week's *BMJ*. This underlines that the fundamental principle of healthcare reform should be to improve people's health, not contain costs. (Whether the British government supports this new move is unclear; its delegates were absent from the meeting that adopted the charter by consensus.)

But if the market is not the solution to Europe's provision of health care, what is? This question was debated at a recent meeting of members of the European Health Systems Reform Network—a network of health policy makers and researchers led by the Nuffield Institute for Health in Leeds, which has set up a database of information on health reforms in Europe. Part of the problem in defining a way forward, participants agreed, is that while there are many descriptive accounts of the reforms there is little information about their impact. Governments have undertaken little evaluative research. Emphasis has been on measuring activity, not outcomes. What is clear, however, is that introducing markets has increased transaction costs. Also, it is clear that by pursuing competition and efficiency, some governments—perhaps those in the United Kingdom and the Netherlands in particular—have lost sight of what a healthcare system is there to achieve.

What is needed, it was agreed, is a change in philosophy and direction. Health care should not be seen as an industry in which more management and more competition can go on squeezing more services from a finite pool of money. There should be a return to the ideology of health as a public good where the rights of individuals are balanced more equitably with the health needs of the whole community. Control of spending on health care will not be achieved by minor adjustments to the mix of public and private sectors. A more radical approach is necessary, based on a much more critical look at current provision. "We tend to take the existing level of health service provision for granted,"said Professor Ole Berg of the Centre for Health Administration at Oslo University, "when what we really have in many countries in western Europe is oversupply. Arguably, as much as half of what we do—take investigations in specialist units, for example—is of little value. We must stop providing unnecessary services and build up our primary care base."

Another way to tackle rising costs, suggested Professor Berg, is to reduce spending on the salaries of healthcare staff. "Many of the services provided by doctors could be carried out equally well by nurses. Similarly, many of the things nurses do could be delegated to patients and their carers. Patients can and should be educated to take more responsibility for their own health, and each doctor-patient or nurse-patient encounter is a potential opportunity for this." Such opportunities are often lost, several speakers emphasised, as doctors are increasingly being driven to "process" patients and provide compartmentalised care under unrealistic time constraints.

The "co op" wing in New York University Hospital was cited as an innovative approach to patient education. Patients are admitted to the ward with a relative or other carer, and during the admission both are taught about the nature of the disease, how to monitor it, and how to manage it. This approach emphasises that the doctor's role as advocate and educator is just as important as that of disease manager and dispenser of care.