Introduction
Topical sun protection agents (sunscreen products) contain substances that protect the skin against the UV radiation (UVA and UVB), which causes sunburn, and contributes to the pathogenesis of skin cancer and ageing, photosensitivity reactions and photodermatoses. The 2004 WHO Model Formulary states that the best way to protect against the hazards of exposure of skin to sunlight is to reduce exposure by the use of protective clothing or, when this is not practicable, by regular use of sunscreen products with a sun protection factor (SPF) of at least 15. In the WHO Model List of Essential Medicines (revised in April 2003), topical sun protection agents with activity against UVA and UVB radiation are listed as complementary.

Product and Dosage
The topical sun protection agents listed are available as creams, lotions or gels. The major categories of chemical sunscreens include cinnamates, which are UVB absorbers, and dibenzoylmethanes, which are UVA absorbers. Physical sunscreens, such as titanium dioxide, are opaque and reflect UV light. Many sunscreen products combine sunscreens from different groups in order to widen the range of protection. An example of a broad-spectrum topical sun protection product, which protects from both UVA and UVB, contains octinoxate 3%, avobenzone 2% and titanium dioxide 2%, formulated in an acrylate polymer or oily base.

According to the British National Formulary, for optimum photoprotection, sunscreen preparations should be applied thickly and frequently (about 2 hourly), and preparations with the highest SPF should be used.

Evidence of value

Squamous cell cancer
One randomised control trial involving 1,621 people living in Australia compared daily sunscreen use (SPF 15+) versus discretionary sunscreen use. People allocated to daily sunscreen use were told to apply it to the head, neck, arms and hands every morning and to reapply it after heavy sweating, bathing or long sun exposure. The trial found that daily sunscreen use significantly reduced the incidence of squamous cell cancer after 4.5 years compared with discretionary sunscreen use. However, there was no effect on basal cell cancer. Another randomised controlled trial, involving 588 people living in Australia (all with previous solar keratosis and aged over 40 years), found that daily sunscreen use significantly reduced the incidence or progression of solar keratosis compared with placebo. Solar keratosis is a precursor of squamous cell cancers.

Melanoma
Clinical Evidence found no randomised controlled trials assessing the effects of sunscreens in preventing malignant melanoma (non-metastatic). It assessed three systematic reviews of case control studies, but found the evidence from these to be inconclusive. It concluded that consensus suggests the appropriate use of sunscreen to reduce excessive exposure to
sunlight (rather than to prolong the time spent in the sun) may reduce the risk of developing melanoma. A further meta-analysis of 19 case control studies looking at sunscreen use and the risk for melanoma found no association between melanoma and sunscreen use. It concluded that failure to control for confounding factors may explain previous reports of positive associations linking melanoma to sunscreen use. The Australian guidelines on the management of cutaneous melanoma state that clothing should be used as the primary means of protecting against the sun, and that broad spectrum sunscreens with a minimum SPF of 15 should be used as an adjunct to sun avoidance and other sun protective measures, providing this does not lead to increased time spent in the sun. The U.S. Preventive Services Task Force drew similar conclusions from the results of the randomised controlled trials and case-control studies. The American College of Preventive Medicine concluded that sun-protective measures (e.g. clothing, hats, opaque sunscreens) are probably effective in reducing skin cancer, but also found that the evidence is insufficient to advise patients that chemical sunscreens protect against malignant melanoma and that their use may actually lead to increased risk. The International Agency for Research on Cancer stated that sunscreens probably prevent squamous cell carcinoma when used mainly during unintentional sun exposure. They also found that no conclusion can be drawn about the cancer-preventive activity of topical use of sunscreens against basal-cell carcinoma and cutaneous melanoma.

**Adverse effects**

Sunscreen products can cause contact allergy or skin irritation in some users. Some sunscreen preparations, particularly aminobenzoates, may rarely cause photosensitivity reactions. Sunscreen use may lead people to believe they are safe to increase the length of time they stay out in the sun, which could potentially increase their risk of sunburn and its consequences. Some ingredients in sunscreens may be carcinogenic, and little is known about their long-term use.

**Recommendation**

Using a sunscreen prevents squamous cell skin cancer. A combination product with a minimum sun protection factor (SPF) of 15, and containing chemical sunscreens that block UVA and UVB light plus a physical sunscreen, offers the best protection. The evidence for the effect of sunscreen use in preventing melanoma is mixed. Indeed, people who use sunscreen alone could increase their risk for melanoma if sunscreen use gives them an increased sense of security. Topical sunscreens should continue to be listed in the WHO Model List of Essential Medicines, which should be modified to reflect the problems arising when the use of such sunscreens reduces people taking other prophylactic measures such as wearing protective clothing.


**References**

6. www.clinicalevidence.com/ceweb
11. www.acpm.org/skinprot.htm

Search Strategy
In addition to the websites listed in the references above, the electronic databases, websites, guidelines, systematic reviews and journals searched were:
Agency for Healthcare Research and Quality
British Medical Journal
British National Formulary
Centre for Reviews and Dissemination
Clinical Evidence
Drug and Therapeutics Bulletin
Guidelines International Network
Lancet
Medical Letter
Medline (OVID)
MeReC
National Guideline Clearinghouse
National Institute of Clinical Excellence
New England Journal of Medicine
Prodigy Guidance
The Cochrane Library
Therapeutics Initiative