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Sun exposure and its effects on human health

A Public Health project for the quantification of sun exposure in Europe and its effects on health.
It is funded by the EU Public Health Programme from 2003 to 2008.

Sunlight is essential for health, for instance for providing our body with vitamin D. Unfortunately, sun exposure also presents some risks that can lead to damage to the skin, eyes and to the immune system. Exposure to solar ultraviolet radiation (UVR), especially during childhood, is the main environmental cause for skin cancer which is increasingly common throughout the European Union.

As UVR (including UVA, UVB, UVC radiation and artificial UV tanning devices) is an established carcinogen to humans, we consider of great importance to inform people about the risks of UVR exposure and the ways to prevent them.

Sun exposure risks

Skin The effects of over-exposure to the sun go beyond sunburn; the chronic effects including premature skin ageing and skin cancers can be much more serious. The latter include melanoma which is the most fatal skin cancer.

Eyes Sun exposure can damage the eyes, as more than 99% of UVR that penetrates into the eyes is absorbed by the cornea and the crystalline lens. High UVR doses can cause reversible damage like inflammation of the cornea and conjunctiva. They can also lead to severe damage resulting in declining vision or blindness, such as cataracts, and eye cancers.

Immune system UVA and UVB are recognised to cause immunosuppression in humans. Immunosuppression is caused by lower doses of UVR than those required to cause sunburn and so can result in a reactivation of latent infections such as the herpes simplex virus on the lips. UVR-induced immunosuppression could also contribute to the growth of skin cancers.

UVR intensity

Solar radiation reaching the Earth's surface is absorbed by the atmosphere layers. UVC and some UVB wavelengths are absorbed by ozone in the stratosphere. Thus, the intensity of the UVR depends on many factors :

Period of the year and time of the day The intensity of UVR is higher in summer than in winter. Snow reflects up to 80% of UVR and can double the overall exposure, especially at a high altitude. Furthermore, UVR is more intense during the two hours before and after the solar noon.

Latitude Overall, the level of UVR depends on latitude - the closer to equatorial regions the higher the UVR level. Of note, in spring and early summer in Europe, the UVR level is about the same in Nordic countries as it is in France.

Cloud cover A cloudy day does not protect from the sun. Up to 90% of solar UVR can penetrate light cloud cover so the UVR level can be high and cause sunburn and other damage. Some clouds may even actually enhance UVB transmission.

Altitude At higher altitude, the less dense atmosphere absorbs less UVR and so the UVR level increases by 5% every 1000m increase in altitude.

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EuroSun

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Public health advice

Easy ways to protect your health

Stay under the shade especially during the "hot hours" of the day (2h before and after the solar noon). Shade is the best means of protecting your skin.

Wear protective clothing such as a wide-brimmed hat to protect your head (eyes, neck, ears, face), sunglasses that provide effective UVR protection more especially in high altitude, and loose-fitting clothes that protect a large part of your skin.

Apply a broad-spectrum sunscreen (against UVA and UVB) with a Sun Protector Factor (SPF) of 15 or higher on skin areas that cannot be protected with clothes. In this respect, the skin of the trunk and shoulders should be protected with clothes. Sunscreen should not be used to increase a tan or to extend time spent in the sun.

Set a good example to children by using appropriate sun protection and keep the youngest in the shade. Babies under 12 months should not be sun exposed.

Sun protection is recommended when the UV Index is 3 and higher The total individual cumulative UVR exposure is mainly acquired at the place of residence. The "UV index" is a measure of the UVR intensity. Sun-protective behaviours should be adopted all year round and in any outdoor settings during holidays and at place of residence.

Be cautious in spring when temperatures are moderate since UVR intensity could be unexpectedly strong. UVR does not provide warmth and so can produce harm without giving a sensation of heating.

Stay away from sunbeds

Prevention programmes

Educational programme for school children Children and adolescents are highly vulnerable to the harmful effects of UVR. Children and adolescents should be educated on the risks of excessive exposure to UVR and on sun protections.

Programmes for outdoor workers Outdoor workers accumulate higher sun exposure to UVR than other workers. Sun safety precautions should be taken by employers to protect these worker's health (e.g. avoid outdoor work when UVR are the strongest, use sun protection methods).

Development of messages for tourists Prevention messages should be targeted to tourists with help of travel agencies and tourism industry. Several European populations, in particular Nordic populations who are more sun sensitive, take holidays abroad where/when UVR level is high.

Provide a UV index all year round The UV index is a useful tool to raise public awareness on the risks of excessive exposure to UVR. As the UV index could be high even at cold periods of the year (e.g. at high altitude), this index should be broadcast all year round.

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