

Sun Protection

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Introduction

A suntan is the goal of a summer holiday for many travellers, however, it should be remembered that a tan is the *visible* effect of damage to the skin from the ultraviolet rays of the sun. This damage may lead to skin ageing and cancer.

Ultraviolet radiation

Ultraviolet (UV) light is a small component of sunlight consisting of non-visible wavelengths. These UV wavelengths are subdivided into three types: UVA, UVB and UVC.

UVC light is completely absorbed by ozone in the atmosphere. The radiation that reaches us consists of approximately 5% UVB and 95% UVA, although these figures vary according to factors that include the time of day and year, and latitude.

Although UVB light accounts for a small percentage of the overall light, it is these rays that are mainly responsible for sun burn, skin ageing and cancer. UVA light also contributes to skin ageing and is increasingly linked to skin cancer.

Factors affecting UV radiation levels

Time of day

The highest levels of UV light are when the sun is at its highest point in the sky. This usually occurs between the hours of 10am and 3pm when sun exposure should be kept to a minimum.

Season

UVB and UVA levels vary greatly between winter and summer in mild climates but are more constant between seasons in areas closer to the equator such as Africa, Asia, the Caribbean, tropical South America and Australia.

Latitude and altitude

Sunlight has a shorter distance to travel in order to reach the earth's surface in areas closer to the tropics; UV radiation levels are higher in these areas because there is less spread of the rays as they travel to earth.

The level of UV radiation also increases with height above sea level as the atmosphere becomes thinner and there is less absorption of radiation.

Cloud cover and wind

Clouds have less effect on UV radiation levels than they do on temperature because their water content absorbs heat more efficiently than UV radiation. This means it is possible to experience the damaging effects of the sun on cool cloudy days. A cool wind also has a falsely reassuring effect because UVB levels remain high on windy days.

Surface reflection

White surfaces such as snow or sand reflect UV radiation resulting in more of it reaching the skin and therefore an increased risk of sunburn. Rippling water and rough seas also reflect more UVB radiation than calm, open water.

Effects of UV radiation on skin

Some UV radiation is immediately reflected by the skin's surface, but most will penetrate the skin. It then passes into tissues and can be absorbed by certain molecules including DNA (the chemical inside our cells that carries genetic information).

Sunburn

When UV radiation is absorbed by DNA damage to the cell occurs. As a result the cell tries to mend itself by releasing chemicals. Sunburn is a visible reaction to this repair process. In some cases the damage to the cell is so severe that it dies, resulting in skin peeling and blistering.

Sunburn is characterised by redness, warmth and pain of varying degrees. In more severe cases swelling, blistering and weeping of the skin can occur.

Drinking plenty of non alcoholic fluids, taking pain killers and a non-steroidal anti-inflammatory medicine such as ibuprofen can be useful in relieving these symptoms.

Skin tanning

Tanning occurs when melanin is produced in an attempt to protect the skin cells from UV radiation. A tan is therefore a sign of damaged skin. It may protect against

further burning, but offers no protection against the effects of radiation, that can lead to skin cancer.

Photo-ageing

Photo-ageing is the cumulative effect of skin damage by UV radiation and is caused by both UVB and UVA radiation. The damage causes the skin's structure to weaken, resulting in the skin becoming drier, rougher and thicker. In some people the skin becomes thin and fragile.

Skin malignancy

Skin cancers occur when skin cells undergo malignant changes because of UV radiation damage to their DNA. These cells reproduce independently to the rest of the body and may infiltrate neighbouring tissues or spread via the bloodstream to organs distant from the skin.

Skin cancers are usually treated by surgical removal, although sometimes radiotherapy or chemotherapy may be needed.

- Basal cell carcinomas

Basal cell carcinomas are the most common form of skin cancer and frequently occur in middle-aged and elderly persons.

They present as slow growing papules or nodules and often have a pearly rolled edge. They rarely spread to other organs but can cause extensive damage to the affected area.

- Squamous cell carcinomas

Squamous cell carcinomas are the second most common form of skin cancer. These tumours typically appear as firm, slightly tender, persistent nodules on sun damaged skin.

- Malignant melanoma

Malignant melanomas are the most serious form of skin cancer. There are four different types. The lesions or nodules of melanoma may be deeply pigmented and will enlarge and spread.

Doctors think a history of childhood sun exposure and taking holidays in very sunny countries without adequate sun protection are important risk factors for the development of malignant melanoma.

Treatment consists of removal of the lesion and chemotherapy or radiotherapy if the cancer has spread.

Polymorphic light eruption

Polymorphic light eruption (PLE) is one of several skin rashes caused by the UVA radiation in sunlight.

PLE develops within minutes to hours of exposure to the sun when an intensely itchy, red, spotty rash appears. The outbreak can last for a few days or several weeks before gradually going away. Most people will experience PLE only on very sunny days or at the beginning of an overseas holiday; but those that are more severely affected may suffer throughout the whole summer.

PLE can be prevented by reducing exposure to the sun and using a high sun protection factor (SPF).

Some people with PLE need to use prescription steroid creams and may need to see a specialist.

Prevention

The main way of avoiding UV damage is to reduce the amount of exposure to the sun. It is still possible to enjoy the sun, but extra precautions should be taken.

Sunscreen creams or lotions are the one of the most common methods used to protect skin against sun damage. They contain chemicals that absorb various wavelengths of UV light. Sunscreens are rated by their sun protection factor (SPF). This refers to the protection against sunburn received after applying the sunscreen compared to not using it. Sunscreens with higher SPF ratings give a longer duration of protection against the damaging effects of the sun. As an example, if it takes 10 minutes to become sunburned, applying a cream with an SPF of 15 means that it will take 15 times as long, or 150 minutes to develop sunburn. However, SPF only refers to protection against UVB rays, as there is no standard rating available for the assessment of UVA filters. UVA exposure is increasingly linked to long-term skin damage. Sunscreens containing the active ingredients avobenzone or oxybenzone are able to block a broad spectrum of ultraviolet light. Physical sunscreens containing titanium oxide or zinc oxide are also able to reflect both UVA and UVB rays.

- Avoid sun exposure when the sun is at its highest point in the sky (from 10am to 3pm).
- Always apply a correct amount of sun-cream. Most people apply too little which reduces the effectiveness of the sunscreen. About 2 tablespoons of sunscreen will be needed to protect an average adult; however, always follow the manufacturer's instructions.
- Always use a sunscreen with a high SPF (usually 15 or higher). They may need to be used even on cloudy days.
- Sunscreen should be applied at least 30 minutes before exposure to the sun. It should be reapplied about every two hours, and also after swimming and vigorous exercise.
- Sunscreens may be less effective in protecting against UVA rays, so it is very important to limit your time in the sun.
- Wear a wide-brimmed hat to protect the head and face.

- Cover as much skin as possible with sun-protective clothing if you are unable to avoid being out in the sun from 10am to 3pm.
- Children are particularly vulnerable to the damaging effects of sunlight. Babies under 6 months of age should never be exposed to direct sunlight and young children should always have a high SPF applied.

Link

Further information can be found on Cancer Research UK's SunSmart website:
<http://cancerresearchuk.org/sunsmart/>

Reading list

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