

# Sun protection



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## Key Messages

A tan is not a sign of health – it is a *visible* sign of damage and shows that skin has been harmed by the sun.

Exposure to sunlight is a major cause of skin cancer.

The greatest risk of damage is when the sun is high in the sky, with countries in and around the equator normally experiencing the hottest sun.

Limit sun exposure and use an effective sun cream to protect skin. Sun cream absorbs ultraviolet (UV) light, but is not 100% protective.

Children should be protected with sun cream, clothes, hats, and sun shelters. Babies under 6 months should NEVER be left in direct sunlight.  
Remember:

Slip on a t-shirt

Slop on some sun cream

Urgent medical advice should be sought for any changes to moles: such as bleeding, itching, increases in size and changes in shape.

## Overview

A suntan is a goal for many travellers. However, prolonged and unprotected exposure to the sun can cause skin damage. A suntan is the visible effect of that damage, which can lead to ageing, wrinkles and skin cancer, including melanoma.

All travellers are at risk of the damaging effects of the sun, including those with dark skin. Certain groups are at particular risk including babies, infants, immunosuppressed individuals (those with weakened immunity), and those taking certain drugs, including some cancer treatments.

Skin damage results from exposure to the sun's ultraviolet (UV) radiation. Sand, snow and water reflect UV light and can increase sun exposure. Approximately 90-99% of UV radiation that reaches the earth is UVA and up to 10% is UVB [1]. UVA rays and UVB rays are different forms of UV radiation and both can cause cancer [2].

## Factors affecting UV radiation

### Altitude

At higher altitudes, a thinner atmosphere filters less UV radiation. With every 1000 metres increase in altitude, UV levels increase by 10% to 12% [3].

### Cloud cover and wind

It is possible to burn on cool, cloudy days as the water content in clouds does not absorb UV radiation in the same way it does heat. A cool wind also has a falsely reassuring effect because UVB levels remain unchanged on windy days.

### Time of day

Sun exposure should be limited between 10am and 3pm (local time) when the sun is usually at its strongest.

### Reflection

Sand and snow reflect UV radiation, increasing risk of sunburn. Rippling water and rough seas also reflect more UVB radiation than calm water.

### Season

UVA and UVB levels can vary greatly between winter and summer in areas such as northern Europe, but are higher and more consistent all year round in areas near the equator (tropical and sub-tropical

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countries) [4].

## Effects of UV radiation

Some UV radiation is immediately reflected by the skin's surface, but the majority will penetrate the skin. It then passes into tissues and can be absorbed by certain molecules, including DNA.

### Tanning

UVA radiation stimulates production of melanin pigment in cells of the upper layers of skin, causing it to tan.

UVB radiation leads to a darker and longer-lasting tan. It also stimulates skin cells to produce a thicker epidermis (the outer layer of skin) to protect against further damage. Tanning is therefore a sign that the skin has been damaged [5].

### Sunburn

When UVB penetrates deep skin layers, it is absorbed by DNA and cell damage occurs. As a result, the cell attempts to repair itself by releasing chemicals [1]. Sunburn is a visible reaction; in some cases, the damage to the cell is so severe that it dies, resulting in skin peeling and blistering.

Sunburn causes redness, warmth and pain. In more severe cases, skin swells, blisters and weeps. Fluids and pain relief such as paracetamol can help relieve symptoms.

### Photo-ageing

Photo-ageing is the long-term effect of skin damage by UV radiation and is caused by both UVA and UVB radiation. This causes the skin's structure to deteriorate; resulting in dry, rough, thickened skin: some skin can also become thin and fragile.

### Skin cancers

Skin cancers are divided into non-melanoma skin cancers (NMSC) and melanomas. NMSC include basal cell and squamous cell carcinomas. UV radiation is the major reason that people develop skin cancer [5]. Skin cancers occur when cells undergo malignant transformation due to UV radiation damage to their DNA. These cells reproduce independently and can spread to neighbouring tissues or spread via the bloodstream to the body's major organs.

Skin cancers are usually treated with surgery, although in some circumstances radiotherapy or chemotherapy may be needed as well.

### Non-melanoma skin cancers (NMSC)

Between 2 to 3 million cases of NMSC occur worldwide each year [6]. Around 100,000 people in the United Kingdom (UK) were diagnosed with NMSC in 2010, with 638 UK deaths reported in 2012 [7]. NMSC can be painful and disfiguring. They are usually found on parts of the body more exposed to the sun: arms, ears, face and neck.

Basal cell carcinoma is the most common form, accounting for 80% of all cases [8]. It most commonly

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occurs in elderly men, but cases in young women are increasing [9]. Basal cell carcinoma rarely spreads to other parts of the body (metastasise) but can cause disfigurement [8]. It presents as slow growing pearly papules or nodules and often has a rolled edge [8].

Squamous cell carcinoma is less common, but potentially more serious than basal cell carcinoma. This tumour typically presents as a firm, slightly tender, persistent nodule on sun-damaged skin.

## Melanomas

Malignant melanomas are the most serious form of skin cancer. 13,348 people in the UK were diagnosed with malignant melanoma skin cancer in 2011, with 2,148 deaths reported in the UK in 2012 [7]. Malignant melanoma is less common than NMSC [7].

The link between sun exposure and melanoma is less clearly understood. Melanomas can occur on areas of the body not usually exposed to sun, including the palms of the hand and soles of the feet [10]. Intermittent exposure to strong sunlight causing sunburn is thought to be a risk factor [11]. Treatment is surgery to remove the lesion and chemotherapy or radiotherapy if the cancer has spread to other parts of the body.

Using sunbeds is also a risk for the development of both types of skin cancer [12, 13]. First exposure to sunbeds under the age of 35 years significantly increases risk of melanoma [12].

## Photosensitivity

Some people may have an abnormal skin reaction to UV radiation, known as photosensitivity. Symptoms include a red, itchy rash and blistering. This can also be caused by certain creams or gels applied to the skin or tablets, injections or intravenous infusions. Photosensitivity reactions can occur within minutes of sun exposure and typically appear, usually as a rash on the face, back of the neck and upper chest. Drugs that may cause photosensitivity include acetazolamide (sometimes taken for altitude illness), some antibiotics, including the malaria prevention tablet doxycycline, and non-steroidal anti-inflammatory drugs [2].

## Eye problems (photokeratitis and photoconjunctivitis)

Photokeratitis is inflammation of the cornea, whilst photoconjunctivitis is inflammation of the conjunctiva. Both conditions are comparable to sunburn of the tissues of the eye. They are very painful, but are reversible and are not associated with long-term damage.

An extreme form of photokeratitis, called snow blindness, can occur in skiers and climbers exposed to extreme UV radiation levels due to high altitude and strong sun reflection from snow. Blindness is a result of inflammation of the conjunctiva and cornea. These damaged tissues usually renew quickly and sight returns in a few days. However, very severe snow blindness can result in chronic irritation [5].

## Before travel

Travellers should check the strength of the sun at their destination prior to travel and ensure they have the appropriate sun protection factor (SPF) sun cream, protective clothing and sun glasses.

The best way to avoid risk associated with UV radiation is by reducing sun exposure. It is still possible to enjoy the sun, but extra precautions should be taken.

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Topical sunscreens are one of the most common ways to protect skin against the damaging effects of the sun. They contain chemicals that absorb various wavelengths of UV radiation. Sunscreens are rated by their SPF. This is the relative protection against sunburn received after applying the sunscreen, compared to not using it. So, the higher the SPF rating the better the protection.

As an example: if it takes 10 minutes for a person to burn, applying an SPF 15 sun cream means that it will take 15 times as long (150 minutes) for them to burn.

Broad spectrum sunscreens block UVA radiation as well as UVB. The 'star' system used in the UK determines the amount of UVA protection a sunscreen offers: 0 being the lowest and five the highest. Physical sunscreens containing titanium oxide or zinc oxide also reflect both UVA and UVB rays.

## During travel

### Travellers should:

Avoid sun exposure when the sun is at its highest point in the sky (10 am – 3pm).

Always use a broad spectrum sunscreen with a high SPF (usually 15 or higher) which blocks both UVA and UVB radiation, even on cloudy days.

Always apply the correct amount of sunscreen: too little reduces the effectiveness. About 2 tablespoons of sunscreen will be needed to protect an average adult. Manufacturer's instructions should be followed.

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 exercise.

Protect lips with sun block.

Wear a wide-brimmed hat to protect the head and face.

Cover as much skin as possible with sun-protective clothing, especially if exposure during peak times is unavoidable.

Children are particularly vulnerable to the damaging effects of sunlight. Babies under six months of age should never be placed in direct sunlight and young children should always have a high SPF applied.

Sunglasses, or goggles for skiing and climbing, help protect the eyes from sun damage and glare. Staring directly at the sun is dangerous and should be avoided.

### Current NHS recommendations for treating mild sunburn

Have a cold bath/shower or sponge affected areas with cold water.

Drink plenty of fluids.

Apply a water-based emollient or petroleum jelly to keep skin cool and moist.

Take painkillers such as [paracetamol](#) – aspirin should not be given to children under 16 years.

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Seek urgent medical advice for swollen or blistered skin, chills, a high temperature, dizziness, [headaches](#) and feeling sick.

## After travel

Travellers should seek urgent medical advice if they notice changes to moles, such as increasing size, itchiness, bleeding or oozing, or if a new mole develops very quickly, as these could be potential signs of cancer.

## Resources

[British Association of Dermatologists: Skin Cancer](#)

[Cancer Research: SunSmart](#)

[NHS Choices: Sunburn](#)

[Public Health England: Ultraviolet radiation and sunscreen](#)

[World Health Organization: Global Solar UV Index](#)

[World Health Organization: Sun protection](#)

First Published : 29 Jun 2015

Last Updated : 08 Oct 2015