

# Ultraviolet Radiation and the Skin

*Year-round facial protection in the United Kingdom*

**Key message.** Ultraviolet (UV) exposure is cumulative. In the UK, the highest risk of sunburn is usually from spring to early autumn, but UVA remains present in daylight throughout winter. A broad-spectrum SPF 30–50 facial sunscreen with strong UVA protection is a sensible daily habit for people concerned about photoageing or pigmentation, and is especially important for high-risk or photosensitive individuals.

**Sunlight reaches the skin as ultraviolet, visible and infrared radiation.** The established causes of sunburn and most sunlight-related skin cancer are UVA and UVB. No sunscreen blocks every wavelength or provides complete protection, so it should be combined with shade, clothing and sensible timing outdoors.

## What the different types of UV do

| Wavelength | Where it acts                                                                         | Main effects                                                                                                                                                                               |
|------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 100–280 nm | Normally absorbed by the atmosphere; not a routine sunlight exposure at ground level. | Artificial UVC sources can burn skin and injure eyes; protective equipment is required.                                                                                                    |
| 280–315 nm | Mainly the epidermis (outer skin).                                                    | Direct DNA injury, sunburn, tanning, inflammation, actinic keratoses and skin cancer. It varies markedly season, time and latitude.                                                        |
| 315–400 nm | Reaches the epidermis and penetrates more deeply into the dermis.                     | Oxidative stress; collagen and elastin breakdown; wrinkles, loss of firmness, uneven pigmentation, immune effects and contribution to skin cancer. Some UVA passes through ordinary glass. |

## How repeated exposure changes the face and body

**Acute damage** appears as redness, pain, swelling and sometimes blistering. A tan is not evidence of health; it is a defensive response to UV-induced injury. Repeated exposure creates mutations and weakens local immune surveillance, allowing precancerous and cancerous cells to survive.

**Photoageing** is the premature ageing caused by light: fine and deep wrinkles, rough or leathery texture, enlarged surface blood vessels, mottled pigmentation, freckles and “age spots”, and reduced elasticity. The face, ears, scalp, neck, upper chest, forearms and backs of the hands accumulate the greatest exposure. UVA is particularly important because it reaches the dermis, where collagen and elastin provide strength and resilience.[1]

**Skin cancer** includes basal-cell carcinoma, squamous-cell carcinoma and melanoma. Risk reflects cumulative exposure, episodes of intense burning, skin type, age, genetics, immune status and use of sunbeds. Regular sunscreen use has reduced squamous-cell carcinoma and, in long-term trial follow-up, melanoma incidence.[2,3]

## The UK throughout the year

**In most of the UK, UV is commonly strong enough to damage or burn skin between mid-March and mid-October, especially around 11:00–15:00.** Cloud lowers UV exposure but does not reliably remove it. The UV Index (UVI) is the best practical guide: at 3 or above, use shade, clothing and sunscreen. Snow, water, pale paving and high altitude can increase exposure through reflection or reduced atmospheric filtering.

**During winter, the UVI is often 0–2, so the immediate risk of sunburn is usually low.** Nevertheless, UVA is not zero, and repeated short exposures to the face may contribute to long-term photoageing. Ordinary building and side-window glass blocks most UVB but may transmit substantial UVA; prolonged driving or sitting next to a bright window can therefore matter.[4]

## Effective prevention

- Check the Met Office UV forecast. When UVI is 3 or higher, seek shade, particularly from 11:00–15:00, and avoid deliberate tanning and sunbeds.
- Use clothing first: tightly woven sleeves, a broad-brimmed hat, and sunglasses labelled UV400 or offering 99–100% UVA/UVB protection.
- Choose a broad-spectrum facial sunscreen of at least SPF 30—SPF 50 is a useful practical margin—with 4–5 UVA stars and/or the “UVA” circle. SPF mainly describes UVB protection; the UVA mark or star rating addresses UVA.
- Apply generously as the final skincare step, covering the face, eyelids where tolerated, ears, hairline, neck and exposed scalp. About two finger-lengths is a useful guide for face and neck. Apply before exposure and reapply about every two hours outdoors, and after swimming, sweating or towelling.
- Do not use sunscreen to extend time in strong sun. Water-resistant products still require reapplication. Lips need an SPF lip balm.
- For melasma, persistent pigmentation or darker skin prone to visible-light pigmentation, consider a tinted broad-spectrum sunscreen containing iron oxides; conventional clear sunscreen does not reliably protect against visible light.[5]

## Should facial sunscreen be used every day, all year?

**The contemporary view is personalised rather than absolute.** A randomised trial found that daily sunscreen use slowed visible skin ageing over 4.5 years.[2] Modern photoprotection reviews therefore support routine daily broad-spectrum sunscreen for prevention of photoageing, particularly on the face.[6]

**For a healthy person spending a dark UK winter mostly indoors, daily sunscreen is not essential for preventing sunburn when the UVI remains below 3.** However, an all-year facial product is reasonable and low-burden when the goal is consistent anti-ageing or pigment control. It is more strongly advised for people with very fair skin, previous skin cancer, immunosuppression, melasma or other photosensitive disorders; those using retinoids or photosensitising medicines; outdoor workers; and people with prolonged window, snow, altitude or overseas exposure. A product that is affordable, comfortable and cosmetically acceptable is more protective in practice than an expensive product used sparingly.

## Selected evidence and UK guidance

1. Young AR, Claveau J, Rossi AB. Ultraviolet radiation and the skin: photobiology and sunscreen photoprotection. *J Am Acad Dermatol.* 2017;76(3 Suppl 1):S100–S109. doi:10.1016/j.jaad.2016.09.038. [Link](#)
2. Hughes MCB, Williams GM, Baker P, Green AC. Sunscreen and prevention of skin aging: a randomized trial. *Ann Intern Med.* 2013;158:781–790. doi:10.7326/0003-4819-158-11-201306040-00002. [Link](#)
3. Green AC, Williams GM, Logan V, Strutton GM. Reduced melanoma after regular sunscreen use: randomized trial follow-up. *J Clin Oncol.* 2011;29:257–263. doi:10.1200/JCO.2010.28.7078. [Link](#)
4. Duarte I, Rotter A, Malvestiti A, Silva M. The role of glass as a barrier against transmission of ultraviolet radiation. *Photodermatol Photoimmunol Photomed.* 2009;25:181–184. doi:10.1111/j.1600-0781.2009.00434.x. [Link](#)
5. Dumbuya H, Grimes PE, Lynch S, et al. Impact of iron-oxide formulations against visible-light-induced pigmentation. *J Drugs Dermatol.* 2020;19:712–717. doi:10.36849/JDD.2020.5032. [Link](#)
6. Krutmann J, Schalka S, Watson REB, Wei L, Morita A. Daily photoprotection to prevent photoaging. *Photodermatol Photoimmunol Photomed.* 2021;37:482–489. doi:10.1111/phpp.12688. [Link](#)

**UK guidance:** [NHS sunscreen and sun safety](#) • [Cancer Research UK sun safety](#) • [Met Office UV advice](#) •