Cumulative Effects of UV on the Eye
Chronic UV light exposure may contribute to ageing processes in the eye

Pinguecula
Raised, yellow-white fibrous growth; usually found nasally. While changes visible to the naked eye are seen using UV fluorescence photography as early as the mid-teens, early signs may be seen in children as young as nine years of age. More common in areas and activities with high UV exposure, and with environmental elements (wind, dust). Symptoms include dryness and discomfort – ocular lubricants can help with these.

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>White light image (visible signs)</th>
<th>UV fluorescence image (visible signs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-8 (n=27)</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>9-11 (n=23)</td>
<td>0%</td>
<td>29%</td>
</tr>
<tr>
<td>12-15 (n=21)</td>
<td>33%</td>
<td>81%</td>
</tr>
</tbody>
</table>

Pterygium
Triangular-shaped, vascularised growth onto cornea; more common nasally. Seen from 20’s and 30’s in high UV environments or activities (e.g. surfers, sailors, fishermen) and related to high UV exposure in youth and dry, windy climates. Ocular lubricants will help the symptoms of dryness and discomfort, but there are also cosmetic concerns. Vision can be affected.

Cortical cataract
Spoke-shaped cloudiness of internal lens; begins in 40’s – 50’s and highly related to UV exposure. Other key risk factors include age, smoking, diet, medication and general health. Symptoms include blurred vision, haloes and glare with night driving.

Macular pigment density
A higher level of macular pigment appears to have a protective effect against age-related macular degeneration, a major cause of reduced vision for people over age 55. Chronic UV light exposure contributes to the ageing processes in the eye, including macular changes. Young children are more at risk from ocular UV exposure when the crystalline lens has little ability to block UV light. Other key risk factors include age, hereditary, health, smoking and diet. Symptoms include blurred central vision and can lead to blindness.

Early detection techniques
- Patient symptoms
- Low contrast visual acuity
- Slit lamp examination
- Retinal imaging
- UV fluorescence photography
- Macular pigment optical density

This is offered as an educational tool that you may choose to use as part of your patients’ evaluations. These materials are not intended as, and do not constitute medical or optometric advice.
Help your patients protect their eyes

Eyes are exposed to harmful UV radiation and, as for skin, the UV effect on the eyes is cumulative

All year round, all day protection is needed

Environment – influenced by weather and surface reflectance

Exposure – at unlikely times and in unlikely locations

- Ocular UV exposure can be a significant risk all year round
- Not only can UV rays pierce cloud cover, they reflect off all surfaces at different – and often surprisingly high degrees

Solar angle – affected by time of day and location

<table>
<thead>
<tr>
<th>Angle of sun above horizon</th>
<th>&lt;35°</th>
<th>35 - 45°</th>
<th>&gt;45°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye exposure</td>
<td>Partially exposed</td>
<td>Fully illuminated</td>
<td>Fully shadowed</td>
</tr>
<tr>
<td>Sources of UV</td>
<td>Diffuse UV from surface reflections and scattered light</td>
<td>Direct UV, reflected and scattered light</td>
<td>Indirect UV from surface reflections and scattered light</td>
</tr>
<tr>
<td>Summer</td>
<td>Early morning, late afternoon in all latitudes</td>
<td>Mid morning, afternoon in low - mid latitudes</td>
<td>Midday in extreme latitudes</td>
</tr>
<tr>
<td>Winter</td>
<td>Near sunrise and sunset in all latitudes</td>
<td>Most of day in all but near - equatorial latitudes</td>
<td>Midday only in near-equatorial latitudes</td>
</tr>
</tbody>
</table>

Peripheral Light-Focussing Effect – sunglasses only provide partial protection

- Corneal optics focus and intensify rays entering from temporal periphery onto lens and nasal limbus. This is the Peripheral Light-Focussing Effect (PLF). Non-wrap-around UV-absorbing sunglasses are not fully protective as light ‘leaks’ around the lenses.

Sunglasses alone may not be enough

- Exposure to UV from peripheral sources is still possible even when wearing UV-blocking spectacle lenses.

Sunglasses plus UV-blocking contact lenses

- The use of a UV-blocking contact lens provides additional protection.

Who is vulnerable?

Young patients are especially vulnerable

- They have larger pupils
- They have clearer lenses
- They spend more time outdoors
- Few wear sunglasses or hats

All those doing outdoor occupations or hobbies

Management options

- Ask patients questions about their lifestyle, hobbies and occupation
- Look for early, pre-clinical signs with a range of techniques
- Advise all patients about the risks of UV radiation
- Recommend comprehensive ocular UV protection

Make UV protection part of your everyday professional eye health communication

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UV absorbing contact lenses are NOT substitutes for protective UV absorbing eyewear such as UV absorbing goggles or sunglasses because they do not completely cover the eye and surrounding area.