

# Ultraviolet radiation and your eyes

Ultraviolet (UV) light is made up of invisible rays that are part of the sun's energy. UV light has a wavelength shorter than visible light and is more energetic than visible light, allowing it to penetrate more easily through obstacles. UV radiation not only causes skin damage but can also harm your eyes and lead to vision loss.



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It is important to remember that there are some benefits to UV exposure. UV rays assist our bodies in making Vitamin D, which is necessary for strengthening our bones and teeth. The level of UV radiation is highest in the spring and summer between the late morning and mid-afternoon hours. However, many of us can receive the benefits of UV radiation by spending a short amount of time in the sun. There are dangers to the skin and eyes with long-term, unprotected exposure.

## How your eyes absorb UV rays

There are three types of UV radiation: UVA, UVB and UVC. UVA and UVB radiation can damage your eyes. UVC is not problematic because it is absorbed by the ozone layer and doesn't reach the Earth's surface. With the depletion of the ozone layer, we could see an increase in ocular problems caused by UV radiation.

The lens of the eye acts as the primary filter of UV rays. As the lens is exposed to excessive UV radiation over many years, it loses its transparency. The cornea also filters UV radiation. Its UV-filtering ability decreases as the cornea becomes thinner, increasing the risks of UV damage. According to Prevent Blindness America, UVA rays can cause a decrease in central vision by damaging the macula and can lead to macular degeneration.<sup>1</sup> Long-term exposure to UVA radiation can also lead to skin cancer around the eyes.

## Conditions caused by overexposure

Two of the most common UV-related ocular conditions are pterygium and pinguecula. Both conditions involve an abnormal growth of tissue on the clear membrane that covers the white of the eye. This can cause the whites of the eye to appear yellow, which is a cosmetic concern for many patients. Long hours working outside or recreational activities at the beach or ski slopes, without proper eye protection, can lead to this condition.

Sunburn occurs when the skin absorbs too much energy from UV rays. If your eyes are exposed to excess sunlight and UV rays in a short period of time, you may develop "sunburn of the eye," which is an inflammation of the cornea and conjunctiva. You may experience the following symptoms:

- Pain
- Red eyes
- A gritty feeling or a sensation that there is something in your eye
- Sensitivity to light
- Tearing

You should visit your eye doctor for evaluation and treatment if you feel your eyes have been adversely exposed to the sun.

## Protecting your eyes

Many people think of sunglasses as a reflection of their fashion and style. But, they also provide an important and easy way to keep your eyes healthy. You should wear sunglasses and a wide brim hat to protect your eyes from the sun. According to the American Optometric Association, to provide protection to your eyes, your sunglasses should:

- Block out 99% to 100% of both UVA and UVB radiation.
- Screen out 75% to 90% of visible light.

UV rays can come from many directions. They radiate from the sun, but they are also reflected from the ground, water and snow. It is very important to protect your eyes while outside working or if you are participating in recreational activities such as boating, skiing, cycling, golf and tennis. New snow can reflect up to 80 percent of UV rays while normal ground surfaces and water reflect less than 10 percent. Beach sand is estimated to reflect between 15 and 25 percent of the UV rays. It is important to wear sunglasses even if it is not bright outside because UV rays can penetrate clouds and fog.

Teenagers and children should be educated about sunglasses because they usually spend more time outside than adults. The World Health Organization estimates that our eyes get 80 percent of their lifetime exposure to the sun's UV rays by age 18.<sup>2</sup> It is never too early for kids to wear good-quality sunglasses.

### **Choosing the right sunglasses**

Tinted eyeglass lenses or sunglasses filter out excessive light, while photochromic lenses automatically darken (or lighten) in proportion to the UV light. If you are in the sun, photochromics darken. If indoors, the lenses lighten. Photochromic lenses also provide 100 percent UV protection. Even clear lenses can have 100 percent UV protection. If lenses are plastic, 88 percent of UV light is absorbed. A UV coating can be applied to plastic and glass lenses so that 100 percent UV protection is achieved. Clear polycarbonate and hi-index plastic lenses absorb 100 percent UV radiation. Some contact lenses offer little to no UV protection, but there are also some that provide adequate UV protection. All contact lens patients should still wear sunglasses when outside to ensure 100 percent protection.

Be aware that not all over-the-counter sunglasses block 100 percent of UV rays. Many cheap sunglasses may only absorb 40 percent of UV rays. Sunglass lens colors are a personal preference. Some colors change the perception of color and some don't. Gray lenses will darken the world, but will not alter your color perceptions. Polarized sunglasses are the best because they enhance visibility and reduce glare under all conditions. They block out 100 percent of UVA and UVB rays, and they also filter out light coming from horizontal surfaces. They block light that reflects off water and snow, and reduce the glare coming from many surfaces. Your eye care professional can demonstrate how polarized lenses work.

### **Visit your eye doctor**

The damage that UV radiation can cause to the eyes should be taken seriously. Visiting your optometrist or ophthalmologist regularly is the simplest step you can take to care for your eyes. A thorough comprehensive eye exam can correct your eyesight and identify issues that could lead to future problems. It is very important for your doctor to discuss the types of lenses that are available and the importance of UV protection.

#### **Sources:**

1. <http://preventblindness.org/uv/uv.html>
2. <http://www.who.int/mediacentre/factsheets/fs261/en/>

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