Protecting Your Eyes

You can help protect your eyes from UV exposure by wearing protective sunglasses. Optometrists recommend making sure that your sunglasses do the following:

- block out 99-100 percent of both UVA and UVB radiation
- screen out 75-90 percent of visible light

Wrap-around glasses are preferable because of their ability to block all UV rays from reaching the human eye. Specialized sunglasses include those with polarizing lenses that reduce glare reflected from water or pavement. Polarizing lenses are particularly useful for driving and boating.

Wearing a wide-brimmed hat offers additional eye protection, but remember, a hat or sunglasses are only effective if you wear them - keeping them in a purse, pocket, or on the dashboard of your car doesn't count.

The National Park Service and U.S. Environmental Protection Agency: Partners in Monitoring UV

In 1996, the National Park Service and the U.S. Enviromental Protection Agency established the Park Research and Intensive Monitoring of Ecosystems Network (PRIMENet). PRIMENet provides long-term monitoring of visibility, ground-level ozone, atmospheric particulates, UV radiation, and meteorological conditions.

PRIMENet stations have been set up at 14 national parks, including Acadia, Big Bend, Canyonlands, Everglades, Denali, Glacier, Great Smoky Mountains, Hawaii Volcanoes, Olympic, Rocky Mountain, Sequoia-Kings Canyon, Shenandoah, Theodore Roosevelt, and Virgin Islands. These parks are home to many major ecosystems and have also been designated as Class-1 air quality parks. The U.S. Congress established this air quality classification to aid in maintaining and improving air quality in these areas.

PRIMENet measurements are shared with the U.S. Geological Survey, the U.S. Department of Agriculture, and several universities for use in tying atmospheric changes to ecosystem responses. Changes in human health, plants, aquatic ecosystems, and other species have already been documented and may be directly related to changes in UV. Monitoring these amounts, in coordination with studies of the affected ecosystems, can help scientists better understand the ecosystems' response to changing UV levels.

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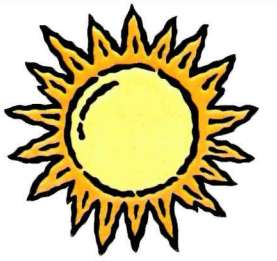

UV Radiation and the Eye

Produced by the University of Colorado and NOAA's Air Resources Laboratory in collaboration with the National Park Service and PRIMENet.

UV Radiation and Ozone

Ultraviolet (UV) radiation is a part of sunlight. In small doses, UV radiation from the sun initiates the production of vitamin D to build and maintain our bones. In larger doses, UV can have very negative impacts. Exposure to UV radiation has been linked to skin cancer, eye damage, and immune suppression in humans.

Stratospheric ozone, located in a layer of the atmosphere about 10-50 kilometers above the earth's surface, absorbs much of the UV radiation reaching earth. In recent decades, the amount of stratospheric ozone has been decreasing. This reduction in ozone is responsible for the "ozone hole" discovered above Antarctica in the early 1980s, and is due largely to chemical reactions of human-made substances called chlorofluorocarbons (CFCs) in the stratosphere.

In recent years, ozone losses have also been observed over large parts of Europe, Asia, Canada, and the U.S. Between 1979 and 1998, ozone levels over these locations showed decreases on the order of 6 to 8%. In the Arctic, ozone amounts have been as much as 25 to 40% below the values reported in the 1960s and early 1970s.

UV and Eye Damage

UV radiation in sunlight can damage the tissues of the eye and cause snowblindness, cataracts, and other eye disorders. The longer wavelengths of UV radiation, known as UVA and UVB, are absorbed by the cornea and other parts of the eye. Excessive exposure to intense UV radiation can burn the surface of the eye, similar to a sunburn on the skin. The risk of such exposure is highest in environments where snowy or other light-colored surfaces reflect much of the incoming UV. The resulting condition, known as snowblindness or welder's flash, can be very painful, but usually lasts only one to two days.

Because UV exposure is cumulative, too much sun today can lead to eye problems tomorrow. At its worst, long-term exposure to UVA and UVB can contribute to benign growths such as pterygium on the eye's surface or to cancer of the eyelids and skin around the eyes.

UV also affects the eyes of rabbits, mice, beavers, and other animals. Cataracts, for example, are a common problem in sled dogs. Eye problems are particularly detrimental for most animal species, as keen eyesight is critical to their survival. Also, unlike humans, animals have no sunglasses or other options for protecting their eyes.

UV and Cataracts

UV-related eye problems, such as the formation of cataracts, can cause serious visual impairment. Cataracts are cloudy or opaque areas in the normally transparent lens of the eye. As these areas thicken, they can prevent light rays from passing through the lens and focusing on the retina, the light sensitive tissue lining the back of the eye. As cataracts progress, they can lead to blurred vision, sensitivity to light and glare, increased nearsightedness, or distorted images in either eye. Cataracts usually develop slowly but can eventually result in significant loss of vision.

Cataracts affect 20 million people globally. Cataract surgery is the most common surgical procedure performed on Americans aged 65 and older, resulting in an estimated $3.4 billion in Medicare payments in each year. Cataracts are responsible for one-half of the 35 million cases of blindness worldwide.