

PERSONAL HEALTH

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Growing Older, and Adjusting to the Dark

How well do you see at night? If you're over 50, probably not as well as you think, no matter how many carrots you eat. The typical 50-year-old driver needs twice as much light to see as well after dark as a 30-year-old. Yet few of us compensate adequately for the reduction in nighttime acuity that occurs in the aging eye.

Changes in driving habits are crucial, and so are adjustments at home to prevent the all-too-common accidents that land older folks in the hospital.

Night and the Aging Eye

In a normal healthy eye, light enters through the pupil and passes through the lens, which focuses it and directs it to the retina on the back of the eye, where images form.

The retina contains two kinds of photoreceptors: cones and rods. Cones enable us to see when it is light. They give us color vision and allow us to see details like the words on this page. Rods are very sensitive, especially to motion. They provide only black-and-white images and thus are critically important for night vision.

If only we had the eyes of a cat.

Compared with the human eye, a cat's eyes have more rods than cones, which helps the cat see in the dark. Cats also have elliptical pupils that open and close faster and can become larger than our round ones. In addition, cats and some other nocturnal animals have a mirrorlike membrane, the tapetum, on the back of their eyes, which reflects the light passing through the rods back through them in the opposite direction. This "double exposure" allows cats to see well in near darkness.

The human eye changes gradually with age, but the changes are critical, as the Harvard Health Letter described in its March 2006 issue.

In dim light or darkness, eyes adapt by widening the pupils to let in as much light as possible. The iris (the colored part of the eye surrounding the pupil) contains tiny muscles that control the size of the pupil. As you get older, these muscles (like most in the body) weaken and do not respond as well to the need to let in more light. The result is a small pupil when you try to see in poor light. It's as if your eyes were still young but you were wearing sunglasses at night.

There is also evidence that as we age we lose more rods than cones. In the young eye, rods outnumber cones by nine to one in the part of the retina called the macula. But an autopsy study of older adults found that while the cones remained intact, almost a third of the rods in the macula had been lost.

The less responsive muscles in the iris also affect the eye's ability to adjust when the intensity of light changes, such as when a car with its headlights on approaches and then passes.

In older eyes, this phenomenon, called dark adaptation, takes longer, which means you see



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less well in the dark after being in the light, and vice versa. The diminished number of rods may be a factor, but in addition, the light-sensitive pigment in the rods regenerates more slowly in older eyes.

Another common change in older eyes is a gradual clouding of the lens — the formation of cataracts — which makes the lens less transparent and reduces the amount of light reaching the retina. Cloudy lenses also scatter light. This can cause temporarily blinding glare from, for example, the headlights of an approaching vehicle at night.

Behind the Wheel

Traffic deaths are three times greater at night than during the day, though only 20 percent of driving is done after dark. Fatigue and alcohol are two important causes, but experts say the biggest factor is darkness. Ninety percent of a driver's reaction depends on vision, and we were just not engineered to see very well in the dark.

The American Automobile Association and the National Safety Council, among others, have published critically important suggestions for improving vision when driving at night, however old you are.

The No. 1 recommendation is to protect your eyes during the day by wearing sunglasses (neutral-gray lenses are best) and a hat with a brim when the sun is shining. Bright sunlight bleaches the photoreceptors and lengthens the time it takes for your eyes to adjust to the dark. While it normally takes half an hour for full adaptation to

the dark, being in bright sunlight for two or three hours can delay this adaptation by hours.

"The longer you stay in the sun, the worse your night vision gets," the association warned.

Another recommendation: Clean the windshield of your vehicle, inside and out, at least weekly. As with a cloudy lens, a grimy windshield scatters light and intensifies glare. (You may be surprised by how dirty the inside of the windshield gets.)

Clean the headlights as well; just a thin layer of grime can reduce the light they cast by about 90 percent, which in turn reduces how well a driver can see. And make sure the headlights are properly aligned.

Most new cars these days have rear-view mirrors that adjust automatically at night to eliminate the reflected glare of headlights behind you. If not, make sure to adjust the mirror manually to night setting. But keep in mind that this makes the vehicle behind you appear farther away than it really is.

If you wear glasses, make sure they are clean. Grimy glasses, like a grimy windshield, scatter light. When getting a new prescription, make sure the lenses have an antireflective coating. Though I don't legally need glasses to drive, my ophthalmologist suggested I wear them, especially when driving at night, to enhance my distance vision.

Avoid looking directly at approaching vehicles at night, even when their lights are dimmed. Instead, direct your eyes about 20 degrees to the right, toward the white line on the right side of the road, and use your peripheral vision to see ahead for those few moments.

Reduce your speed at night and increase the distance between you and the vehicle ahead of you. You should be able to stop inside the area illuminated by your headlights. If you overdrive your headlights, you create a blind crash area in front of your vehicle.

Staying Safe at Home

If I had a dollar for every time someone broke a bone tripping over something in the dark, I'd be rich.

Night lights — the kind that plug into wall outlets — are inexpensive and highly preventive, especially for older people who make nighttime trips to the bathroom.

In unfamiliar surroundings, such as a hotel or friend's home, leave a light on in the bathroom all night and close the door partway. Or travel with a night light.

Keep paths and stairways clear of objects, including slippers. Loose rugs are accidents waiting to happen. Get rid of them or fasten them securely to the floor with carpet tape.

Finally, have your eyes checked at least once a year. If you have cataracts, have them removed sooner rather than later, and see how much brighter the world can be.