



# Diabetes and your eyes

Understand the impact of diabetes on your vision and overall eye health.

**A**s Americans live longer, the number of people with major eye diseases will increase. A study sponsored by the National Eye Institute, through the National Institutes of Health, identifies age-related macular degeneration, glaucoma, cataracts and diabetic retinopathy as the most common eye diseases in Americans 40 and older.<sup>1</sup> This study emphasizes the importance of annual comprehensive eye examinations in preventing, delaying and treating eye diseases.

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## Diabetes: consequences for the whole body

According to the American Diabetes Association, 23.6 million children and adults, 8% of Americans, have diabetes. Of those people, 17.9 million people have been diagnosed with diabetes and 5.7 million people have the disease but have not been diagnosed. To make matters worse, 57 million people have pre-diabetes.<sup>2</sup>

Diabetes is the sixth-deadliest disease in the United States.<sup>3</sup> Diabetes is marked by high levels of blood glucose resulting from defects in insulin production, insulin action, or both. Diabetes is a chronic disease in which there is no cure. Many people are unaware that they have diabetes until they develop one of its serious complications, such as:

- High blood pressure
- Heart disease
- Stroke
- Kidney disease
- Nervous system damage
- Vision complications or blindness

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There are two types of diabetes. Type 1 diabetes develops when the body's immune system destroys the pancreatic beta cells that make insulin. Insulin regulates blood glucose. These patients require insulin delivered by injection or a pump. Type 1 diabetes accounts for 5 to 10 percent of all cases and usually affects children and young adults.<sup>4</sup> Type 2 diabetes accounts for 90 to 95 percent of all cases and is associated with older age and obesity.<sup>5</sup> It begins when the body does not use insulin properly. Most of these patients can control their diabetes by following a healthy diet, exercising, losing weight and taking oral medication.

### Warning signs of diabetes are:

- Frequent urination
- Unusual thirst
- Extreme hunger
- Blurred vision
- Slow-healing cuts and bruises
- Tingling or numbness in hands or feet

### Seeing the effects

The risk of developing diabetic eye problems increases with the age of the person and with the duration of the disease. One of the first warning signs of diabetes is blurred vision. Sudden shifts in the blood sugar concentration cause changes in the lens of the eye which leads to fluctuations in a person's eyeglass or contact lens prescription. Diabetes should be suspected when there are unexplained fluctuations in the vision. Many patients don't realize they have diabetes until the optometrist or ophthalmologist explains to them that their prescription change is due to diabetes.

Cataracts, a clouding of the eye's lens, develop at an earlier age in people with diabetes. Glaucoma occurs when the fluid pressure inside the eye increases and leads to optic nerve and nerve fiber damage. A person with diabetes has a higher risk of developing glaucoma.

### Diabetic retinopathy: What is it?

Diabetic retinopathy is a complication of diabetes and is the leading cause of blindness in the U.S. in people ages 20 to 74 years old.<sup>6</sup> It occurs when diabetes damages the tiny blood vessels that nourish the retina. The blood vessels weaken and begin to leak fluid. This causes two major problems:

- **Diabetic macular edema**, or retinal swelling of the area that allows us to see fine details clearly.
- **Retinal neovascularization**, or the growth of new abnormal blood vessels. These vessels are very fragile, tend to hemorrhage and don't supply the retina with normal blood flow. These fragile new vessels may bleed into the vitreous, the clear jelly-like substance that fills the center of the eye.

These conditions are progressive and usually affect both eyes. All diabetics, types 1 and 2, are at risk. According to the National Eye Institute, between 40 and 45 percent of Americans diagnosed with diabetes have some stage of diabetic retinopathy.<sup>7</sup> All patients with newly diagnosed diabetes should receive a comprehensive dilated eye exam. Diabetic retinopathy has no warning signs until there is a loss of vision.

According to the National Eye Institute, approximately 4.1 million U.S. adults 40 years and older have diabetic retinopathy. Of this group, one out of every 12 persons has advanced vision-threatening retinopathy.<sup>8</sup> A research study of the Mexican-American population over the age of 40, by the National Institutes of Health, found that the rate of diabetes in this age group is 20 percent, almost twice that of Caucasians. The study estimated that 33 percent of Mexican-Americans with diabetic retinopathy could have prevented eye complications with early detection and control of diabetes.<sup>9</sup>

## What can you do to avoid it?

The only way to prevent or slow the progression of diabetic eye problems is to:

- Have a dilated eye exam at least once per year.
- Discuss all vision changes with your doctor.
- Follow your diabetic diet and exercise plan. Better control of blood sugar slows the onset and progression or diabetic retinopathy.
- Take your medicine and check your sugar.
- Stop smoking — smoking is associated with diabetic retinopathy.

## Discovering diabetes clues — with your eye doctor

It is the responsibility of optometrists and ophthalmologists to look for signs of ocular and systemic diseases in addition to evaluating people for eyeglasses and contact lenses. Evidence of systemic health disorders may be discovered in the eye before they manifest elsewhere in the body. Many patients are unaware they have a medical problem until their eye care provider discovers it during a routine eye exam.

The retina offers early clues into the onset of diabetes. By viewing the retina of the eye through an ophthalmoscope, your optometrist or ophthalmologist can directly examine blood vessels, the optic nerve and the retinal nerve fiber layer. Your eye doctor can check the eye for early signs of the disease, including leaking retinal blood vessels, macular edema, early onset of cataracts and fluctuating vision.

Diabetic retinopathy is usually progressive so early detection and treatment is important. Your eye care provider can provide education concerning the risk of vision loss if your blood sugar isn't controlled by diet, medication or lifestyle changes.

If during a routine eye exam it is determined that you have the beginnings of diabetic retinopathy, your eye doctor may refer you for additional testing. New technologies and automated diagnostic techniques can help in the detection of retinal problems.



## Exploring treatment options

Digital retinal cameras, fluorescein angiography and retinal scanning laser imaging devices are used to detect and monitor retinal changes. There are advanced computerized retinal scanning laser systems that provide precise determination of retinal blood vessel leakage. This makes treatment more exact and effective. If retinopathy only occurs in the peripheral retina, it may only be necessary to monitor the condition. When retinopathy affects the central retina, laser treatment is necessary. Lasers can be used to treat areas of blood vessel abnormality to shrink the vessels and reduce swelling.

These treatments may not halt the disease but may reduce or delay further vision complications. These treatments are usually done on an outpatient basis. Sometimes injections are used to decrease inflammation and to decrease the formation of new abnormal blood vessels. If bleeding is severe, a vitrectomy may be necessary to remove blood from the eye.

If you have already lost some of your vision, your eye doctor can discuss low vision services that are available in your area. Low-vision aides will help you get the most out of your remaining vision.

### Sources:

<sup>1</sup> <http://www.nei.nih.gov/news/pressreleases/041204.asp>

<sup>2</sup> <http://www.diabetes.org/diabetes-basics/diabetes-statistics/>

<sup>3</sup> <http://www.cdc.gov/nchs/fastats/diabetes.htm>

<sup>4</sup> <http://www.diabetes.org/diabetes-basics/type-1/>

<sup>5</sup> <http://www.diabetes.org/diabetes-basics/type-2/>

<sup>6</sup> <http://www.diabetes.org/diabetes-basics/diabetes-statistics/>

<sup>7</sup> <http://www.nei.nih.gov/health/diabetic/retinopathy.asp#1b>

<sup>8</sup> <http://www.nei.nih.gov/eyedata/pbd3.asp>

<sup>9</sup> <http://www.nei.nih.gov/news/pressreleases/062201.asp>

More information is also available at: <http://www.cdc.gov/visionhealth/>

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