



Section 7: Eye Care

Concern	Care/Test	Frequency
Eye Care	<ul style="list-style-type: none"> Dilated eye exam by an ophthalmologist or optometrist 	<p>Type 1: If age \geq 10 yrs within 5 years of onset, then annually</p> <p>Type 2: At diagnosis, then annually; two exceptions exist</p>

MAIN TOPICS INCLUDED IN THIS SECTION:

- Annual Dilated Eye Exams
- Referral to an Ophthalmologist or Optometrist and Coordination of Care
- Treating Diabetic Retinopathy
- Additional Resources
- References

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Diabetes is the leading cause of new cases of blindness among adults ages 20-74. Studies show that early detection and proper treatment reduces the risk of diabetic retinopathy and blindness by 50-60%. Dilated eye exams are therefore essential for early detection of blinding diabetic eye disease. Proper glycemic control can also reduce the risk of progression of retinopathy by 34-76%. For each two unit decrease in A1C (e.g., A1C of 8.5% to 6.5%) there is a 50-75% reduction in complications. There is also preliminary evidence that effective treatment of dyslipidemia may augment the impact of proper glucose control in reducing the rate of progression of diabetic retinopathy. Retinal screening exams and early treatment can result in increased years of sight and also assist with cost savings. Diabetic retinopathy is preventable and optimal glycemic and blood pressure control can reduce its severity.

Annual Dilated Eye Exams

People with diabetes should usually receive yearly dilated eye exams from an ophthalmologist or optometrist fully trained in recognizing diabetic retinopathy (see exceptions below). Abnormal findings should result in either prompt treatment or timely referral for the management of diabetic retinopathy.

People with type 1 diabetes \geq 10 years of age should have an initial dilated eye exam within 5 years of onset of diabetes. After initial exam, they should be performed annually. People with type 2 diabetes should have their first dilated eye exam at diagnosis and then annually thereafter. **Note: a vision screening exam is not an acceptable substitute for the dilated eye exam.**

Two exceptions to the annual dilated eye exam are sometimes made at the discretion of the ophthalmologist or optometrist:

1. Annual screening is generally not indicated for people with type 1 diabetes within the first 5 years of diagnosis or before the age of ten years
2. People with type 2 diabetes may have a dilated exam **on alternate years** if **all** of the following requirements are met:
 - A1C levels are within one percent of normal (this assumes that A1C levels were measured within the last six months)
 - Consistent blood pressure control (< 130/80 mmHg) is achieved
 - A dilated eye exam within the last year revealed no retinopathy

Pregnancy may accelerate the progression of diabetic retinopathy. A baseline dilated comprehensive eye exam should be done as early as possible in the pregnancy and, if retinopathy is found, the exam be repeated as needed during the pregnancy. If the retinopathy is found to be rapidly progressive, laser treatment can be safely done even during pregnancy. The risk for retinopathy is present up to one year following childbirth.

In some regions of the state, digital photos of the eyes are taken and sent for review by ophthalmologists located elsewhere. This can be a helpful adjunct to diabetic eye care but should never be used as a permanent substitute for a comprehensive eye exam done by a qualified eye care doctor.

Referral to an Ophthalmologist or Optometrist and Coordination of Care

It is necessary that the ophthalmologist or optometrist communicate the results and recommendations of each eye exam to the primary care provider, in addition to the person with diabetes. It is beneficial if the primary care provider can provide the eye care specialist with the person's current A1C and blood pressure values. People with diabetes need to know the importance of reporting vision-threatening symptoms immediately (e.g., floaters, shadows, or persistent blurred vision). The "Dilated Retinal Eye Exam Communication Form" promotes communication between eye care specialists and other health care providers, allowing eye exam results to be shared. This form can be found in the Tools Section.

Treating Diabetic Retinopathy

Retinopathy does not require specific eye treatment until it results in:

- Macular edema: swelling of the retina within the macula
- Progresses to either a very severe non-proliferative stage or to a proliferative stage (growth of new blood vessels in the inner lining of the eye)
- Vitreous hemorrhage: bleeding into the central cavity of the eye

For macular edema, the traditional proven treatment has been the limited application of laser to the area of the macula. Recent studies have demonstrated that repeated intravitreal injections of anti-VEGF drug (Vascular Endothelial Growth Factor) with or without laser treatment can produce better results than laser treatment alone. The long-term consequence of this treatment remains to be seen. For very severe non-proliferative or some forms of proliferative retinopathy (growth of new blood vessels in the inner lining of the inner lining of the eye) so-called panretinal laser treatment has been proven beneficial though this too may be supplemented with intravitreal injections of anti-VEGF drugs. Panretinal laser treatment involves extensive applications of laser to the inner lining of the eye. For a vitreous hemorrhage, the initial treatment is typically to wait for spontaneous clearing since blood tends to disappear from the inside of the eye like a bruise clears from under the skin. If clearing does not begin to occur within a month or so, then surgical removal of the blood-containing vitreous, or vitrectomy, is considered.

Additional Resources

1. An educational DVD titled "Protect Your Vision: The Dilated Eye Exam," was created by the Wisconsin Diabetes Prevention and Control Program, the Wisconsin Lions Foundation, and other partners. This seven-minute DVD (English and Spanish are available on the same DVD) provides a simple educational message to persons with diabetes and can be played in waiting rooms or exam rooms as persons are waiting to be seen by providers. This DVD can be viewed on the Wisconsin Lions Foundation website: http://wlf.info/index.php?option=com_content&view=article&id=39&Itemid=42. Order DVDs through the Wisconsin Lions Foundation, using the order form titled "Eye DVD Order Form" in the Tools Section. A second DVD titled "Diabetic Retinopathy: A Potential Consequence of Uncontrolled Diabetes" is also available using this order form.

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2. The Diabetes Sight website exists to educate diabetics and their families about diabetic eye diseases/disorders: <http://www.diabetes-sight.org/>.
3. Prevent Blindness Wisconsin serves the state by promoting healthy vision and eye safety through eye screenings, information and referral services, and public and professional education: <http://www.preventblindness.org/wi/>.
4. National Eye Institute: Conducts and supports research, training, health information dissemination, and other programs with respect to blinding eye diseases: <http://www.nei.nih.gov/>.
5. American Academy of Ophthalmology: Providing authoritative information about eye care for the public and members: <http://www.aao.org/>.
6. American Optometric Association: Sets professional standards, lobbies government, and provides research and education to provide the public with quality vision and eye care: <http://www.aoa.org/>.

References

- American Diabetes Association. (2001). Implications of the Diabetes Control and Complications Trial. *Diabetes Care*, 24, S25-S27.
- American Diabetes Association. (2012). Standards of Medical Care in Diabetes - 2012. *Diabetes Care*, 2012 35 (supp 1), S11-S63.
- Chew, E. Y., Ambrosius, W. T., Davis, M. D., et al. for the ACCORD Study Group and ACCORD Eye Study Group. (2010). Effects of Medical Therapies on Retinopathy Progression in Type 2 Diabetes. *NEJM*, 363(3), 233-244.
- Chew, E. Y., Mills, J. L., Metzger, B. E., et al., for the National Institute of Child Health and Human Development Diabetes in Early Pregnancy Study. (1995). Metabolic Control and Progression of Retinopathy. *Diabetes Care*, 18, 631-637.
- Diabetes Control and Complications Trial Research Group. (1993). The Effect of Intensive Treatment of Diabetes on the Development and Progression of Long-Term Complications in Insulin-Dependent Diabetes Mellitus. *NEJM*, 329, 977-986.
- Diabetes Control and Complications Trial Research Group. (2000). Effect of Pregnancy on Microvascular Complications in the Diabetes Control and Complications Trial. *Diabetes Care*, 23, 1084-1091.
- Early Treatment Diabetic Retinopathy Study Research Group. (1985). Photocoagulation for Diabetic Macular Edema. Early Treatment Diabetic Retinopathy Study Report Number 1. *Arch Ophthalmol*, 103, 1796-1806.
- Elman, M. J., Aiello, L. P., et al. for Diabetic Retinopathy Clinical Research Network. (2010). Randomized Trial Evaluating Ranibizumab Plus Prompt or Deferred Laser or Triamcinolone Plus Prompt Laser for Diabetic Macular Edema. *Ophthalmol*, 117, 1064-1077.
- Ferris, F. L. 3rd, Chew, E. Y., & Hoogwerf, B. J., for the Early Treatment Diabetic Retinopathy Study Research Group. (1996). Serum Lipids and Diabetic Retinopathy. *Diabetes Care*, 19, 1291-1293.
- Fong, D. S., Aiello, L., Gardner, T. W., et al. for the American Diabetes Association. (2004). Retinopathy in Diabetes. *Diabetes Care*, 27, S84-S87.
- Genuth, S., Eastman, R., Kahn, R., et al., for the American Diabetes Association. (2001). Implications of the United Kingdom Prospective Diabetes Study. *Diabetes Care*, 24, S28-S32.
- Javitt, J. C., & Aiello, L. P. (1996). Cost-Effectiveness of Detecting and Treating Diabetic Retinopathy. *Ann Intern Med*, 124, 164-169.
- Klein, R. (2002). Prevention of Visual Loss from Diabetic Retinopathy. *Survey of Ophthalmology*, 47(2), S246-S252.
- Klonoff, D. C., & Schwartz, D. M. (2000). An Economic Analysis of Interventions for Diabetes. *Diabetes Care*, 23, 390-404.
- Scanlon, P. H., Malhotra, R., Thomas, G., et al. (2003). The Effectiveness of Screening for Diabetic Retinopathy by Digital Imaging Photography and Technician Ophthalmoscopy. *Diabetes Med*, 20, 467-474.
- Schachat, A. P. (2010). A New Approach to the Management of Diabetic Macular Edema. *Ophthalmol* 117, 1059-1060.
- UKPDS Group. (1998). Intensive Blood-Glucose Control with Sulphonylureas or Insulin Compared with Conventional Treatment and Risk of Complications in Patients with Type 2 Diabetes (UKPDS 33). *Lancet*, 352, 837-853.