

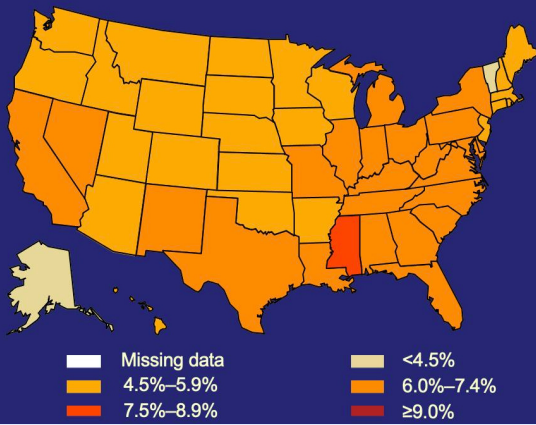
DIABETIC RETINOPATHY

Information for Providers

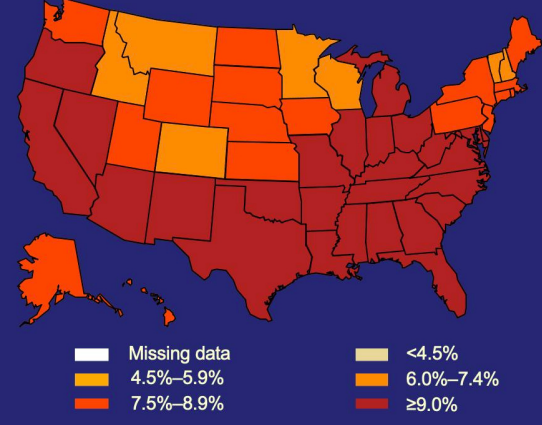
DIABETES IN THE U.S.

- More than 34 million people in the United States are currently living with diabetes, about 1 in 10 Americans¹
- An estimated 1.5 million Americans are diagnosed with diabetes each year, and this number continues to grow amidst the obesity epidemic
- The economic burden of diabetes complications for patients and the healthcare system is substantial - an estimated \$237 billion is spent each year on medical costs, with another \$90 billion on reduced productivity²

Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults
2000



Age-Adjusted Prevalence of Diagnosed Diabetes Among US Adults
2015

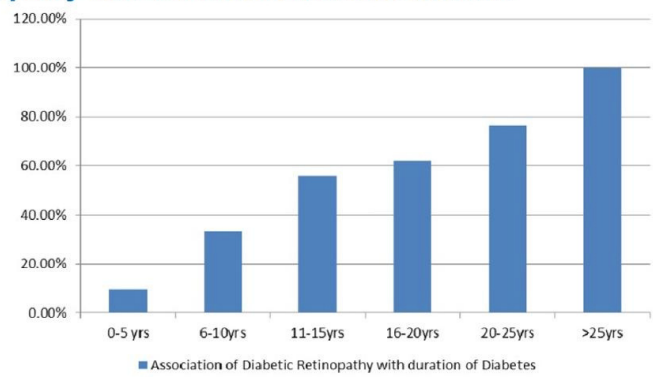


3. Centers for Disease Control and Prevention. https://www.cdc.gov/diabetes/statistics/slides/maps_diabetesobesity_trends.pdf

DIABETIC RETINOPATHY OVERVIEW

- Diabetic retinopathy (DR) is a microvascular complication of diabetes, and is the leading cause of blindness and vision loss in working age adults aged 20-65
- Risk factors for DR development include (but are not limited to):
 - Duration of diabetes
 - Poorly controlled blood sugars (high HbA1C)
 - Obesity
 - Hypertension
 - Dyslipidemia
 - Smoking

Retinopathy and duration of diabetes mellitus

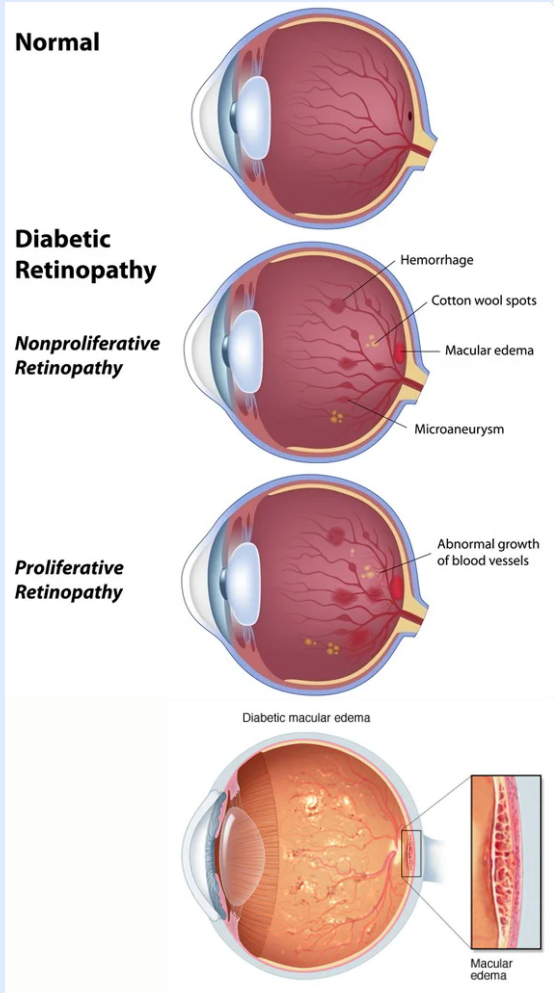


Cleveland Clinic

National Eye Institute

Pathophysiology of DR

- DR occurs when high blood sugars causes formation of advanced glycosylation end products (AGEs) in the body
- AGEs are known to accumulate in retinal pericytes, structural cells that support retinal vasculature, and induce oxidative stress and inflammation. This results in pericyte apoptosis and eventual breakdown of the blood-retinal-barrier (BRB).
- BRB compromise leads to blood vessel leakage, capillary closure, and subsequent hypoxia of the retina - the tissue in the back of the eye necessary for good vision.
- With prolonged hypoxia, this increases production of vascular endothelial growth factor (VEGF) that promotes abnormal blood vessel growth of the retina or vitreous (the gel that fills the eye).
- These new, fragile vessels are prone to leak and bleed, causing even poorer vision and promotes the growth of scar tissue that can lead to further complications
- DR can be classified into early stages of disease (**nonproliferative DR**) and late stages (**proliferative DR**).



4, 5

Nonproliferative diabetic retinopathy (NPDR)

- Occurs when there is swelling and leakage of damaged vessels onto the retina
- Classified according to stage:
 - Mild NPDR
 - Moderate NPDR
 - Severe NPDR
- Symptoms are typically **mild** or **nonexistent** in early stages, which is dangerous since disease can progress to advanced stages where vision changes may be irreversible

Proliferative diabetic retinopathy (PDR)

- Occurs when new, fragile blood vessels grow onto the retina that leak and bleed easily
- New vessel growth also causes scar tissue formation, that may pull on the retina and lead to a **tractional retinal detachment**
- Considered the most advanced stage of disease since abnormal vessel growth and scar tissue formation can cause **long-term vision loss** and **blindness**

Diabetic macular edema (DME) is a complication of DR that can occur at any stage, and is the most common cause of vision loss in DR.

- DME is swelling of the macula, the part of the retina responsible for central, fine vision, that occurs due to accumulation of fluid caused by damage to the BRB.

SYMPTOMS OF DIABETIC RETINOPATHY

- In early stages of disease, the patient may be **ASYMPTOMATIC** with no reported vision changes - this is dangerous because DR can insidiously progress until a point where vision changes are irreversible
- Visual symptoms often occurring in advanced stages of retinopathy include:
 - Blurriness
 - Floaters
 - Altered color vision
 - Loss of vision
 - *If the patient reports a sudden loss of vision, or the appearance of a "curtain falling down" in their field of vision, this may be a sign of retinal detachment



6. Spectrum EyeCare. <https://spectrumeyecareofop.com/blog/81219-how-do-you-see-when-you-have-advanced-diabetic-retinopathy>

SCREENING & DIAGNOSIS

- The American Diabetic Association recommends that all patients with diabetes should receive **dilated eye exams each year**, to screen for DR, check for vision changes, and to assess overall eye health⁷
 - Those with Type 2 diabetes should have their first dilated eye exam **when they are diagnosed**
 - Those with Type 1 diabetes should have their first dilated eye exam **within 3-5 years of diagnosis**
- Detecting early signs of DR and DME through annual dilated eye exams are crucial due to the asymptomatic nature of disease
- However, **only 50%** of patients meet this annual screening requirement, with even lower rates in low income communities

WHAT ARE POTENTIAL BARRIERS TO SCREENING?

Patient Barriers:

- Perceived financial costs/ lack of insurance
- Lack of time
- Tedious to follow-up
- Absence of symptoms in early DR
- Limited understanding of DR and its complications

Provider Barriers:

- Lack of time/ work pressures
- Absence of symptoms in early DR, and silent progression of disease for patients
- Difficult communicating need for screening to less health literate patients

More patient & provider barriers found here: https://www.cdc.gov/pcd/issues/2016/16_0193.htm

TREATMENT OPTIONS

- While there is no cure for diabetic retinopathy, scientific advancements have led to treatments that help prevent, and potentially improve, vision loss.
- The eye doctor will assess each patient regarding their severity of disease, age, control of diabetes/ hypertension/ dyslipidemia, and other factors to decide which option is optimal
- Treatment options include:
 - **Observation:** usually for patients with early disease. The doctor may recommend more frequent eye exam visits (every 2-6 months).
 - **Laser therapy:** lasers can be used to shrink leaking blood vessels and prevent vessel growth
 - **Injections:** anti-VEGF injections (aflibercept, ranibizumab, bevacizumab) have been revolutionary in helping slow down and prevent vessel growth associated with DR
 - anti-VEGF are first line for resolving **DME**, in which retinal fluid accumulation can obscure the view necessary to perform laser therapy
 - Can also administer steroid injections to reduce inflammation associated with DR
 - **Vitrectomy:** surgery can be done to clear the vitreous (the gel that fills the eye) and any blood and scar tissue build up caused by DR

REFERENCES

1. National Diabetes Statistics Report 2020: Estimates of Diabetes and Its Burden in the United States. Centers for Disease Control and Prevention; 2020. <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>.
2. American Diabetes Association. Economic costs of diabetes in the US in 2017. Diabetes Care. 2018;41:917-928.
3. Centers for Disease Control and Prevention. https://www.cdc.gov/diabetes/statistics/slides/maps_diabetesobesity_trends.pdf
4. Retina Boston. <https://www.neec.com/retinal-macular-diseases-boston/diabetic-retinopathy/>
5. Diabetic Macular Edema. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/diabetic-retinopathy/multimedia/diabetic-macular-edema/img-20124558>
6. Spectrum EyeCare. <https://spectrumeyecareofop.com/blog/81219-how-do-you-see-when-you-have-advanced-diabetic-retinopathy>
7. Sharon D. Solomon, Emily Chew, Elia J. Duh, Lucia Sobrin, Jennifer K. Sun, Brian L. VanderBeek, Charles C. Wykoff, Thomas W. Gardner; Diabetic Retinopathy: A Position Statement by the American Diabetes Association. Diabetes Care 1 March 2017; 40 (3): 412-418.

PROVIDER TIPS TO IMPROVE DIABETIC RETINOPATHY SCREENING RATES

- As first line providers who regularly monitor and manage patients with diabetes, you play a crucial role in helping patients become aware of the risks of diabetic retinopathy and how to prevent it
- **Patient Education:** inform your patients on what diabetic retinopathy is, especially for those who have never received a dilated eye exam.
 - Explain the anatomy of how the retina works, and how diabetes damages blood vessels in the eye, leading to DR and associated complications
 - Discuss how even if they have perfect vision, diabetic retinopathy is often asymptomatic and can silently progress to more advanced stages where the damage may be irreversible
 - Stress the value of annual, dilated eye exams, since they are a way to screen for early signs of DR and DME
 - Printable handouts for patients to learn more about DR can be found here; <http://intranet.ccf.org/peis/peis2/health-info/docs/3000/3062.asp?index=8591>
- **Track patients' last dilated vision exam:** aim to regularly ask and document in your notes when your patients' last dilated eye exam was, and with whom.
 - Ensure to specifically ask about their **last dilated exam**, since some refractive exams (i.e. for glasses/ contacts prescription) may not require dilation.
 - You may have to explain to the patient what warrants a dilated exam, and how it is necessary to view the retina in the back of the eye.
 - Example of what to write in notes:
 - "Last dilated eye exam: - list date, name of provider seen, if they are UTD with annual screening requirement, and if there were signs of retinopathy noted on exam"
- **Ask about any changes in vision since their prior visit:** while the majority of DR are asymptomatic, changes in vision such as blurriness, floaters, loss of color vision, or loss of vision may be symptoms of DR. Make referral to eye doctor if needed.
 - If the patient reports sudden loss of vision or the appearance of a "curtain falling over the eye," this may be a sign of retinal detachment and may require urgent referral to the ED and/ or an eye doctor
- **For patients who see eye specialists outside of Cleveland Clinic:** you can request the patient to provide their most recent eye exam results to you. Scanning these (and subsequent visit documents) into the EMR is beneficial for tracking continuity and for catching when an eye exam is due.
- **Place referrals when needed:** if patient's annual vision exam is overdue or soon to be due, you can refer them to an eye specialist at Cole Eye Institute or an outside provider for a dilated eye exam.
 - Can also have your office scheduler call the patient after your appointment to help them schedule a dilated eye exam
 - If they refuse even after you discuss the need for one, you can provide them information on how to set up an appointment if they change their mind.
- **Patient Prevention:** many risk factors for DR development or progression are modifiable. Thus, working with the patient to achieve certain health behavior goals can significantly reduce this risk.
 - Keeping blood sugars, hypertension, and/ or dyslipidemia under good control (medication adherence)
 - Provide patient information handouts and resources on the topic of DR
 - Encourage healthy dietary choices and physical activity
 - Counseling on smoking cessation
 - Regularly checking if they have received an annual dilated eye exam, and setting up referrals when needed
- **Provider Education:**
 - The diagnosis and management of DR is an ever-changing field. Provider resources to learn more about this disease and changes to the field can be found through these resources:
 - <https://www.asrs.org/patients/retinal-diseases/3/diabetic-retinopathy>
 - <https://www.uptodate.com/contents/diabetic-retinopathy-prevention-and-treatment>
 - <https://www.noweyesee.com/resources>