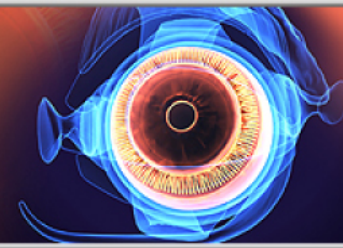


# SEEING EYE TO EYE:

An Ophthalmology-Primary Care Collaboration Emphasizing the Importance of Screening and Early Diagnosis of Retinopathy in Patients with Diabetes

## CLINICAL CONVERSATIONS EXCHANGE



Welcome to the pre-program component of ***Seeing Eye to Eye: An Ophthalmology-Primary Care Collaboration Emphasizing the Importance of Screening and Early Diagnosis of Retinopathy in Patients with Diabetes***. In this brief activity, you will be presented with Points to Ponder, dynamic animations investigating the role of vascular endothelial growth factor (VEGF) in the development and progression of DR as well as the potential impact that DR and related treatment can have on vision, and a clinical primer on foundational elements of retinopathy to prepare you for a dynamic, interactive clinical workshop experience.

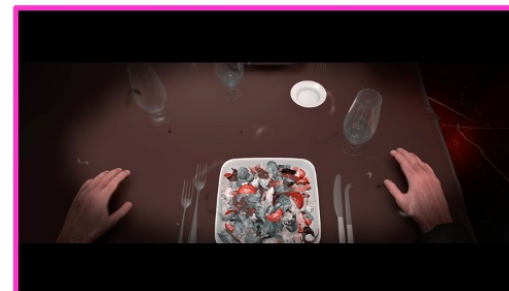
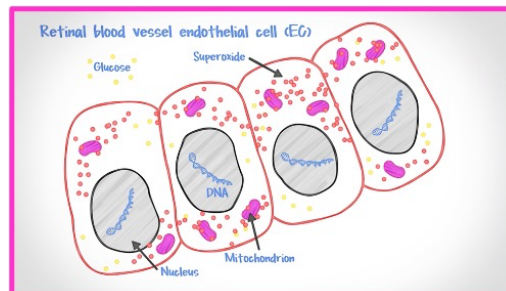
## POINTS TO PONDER

1. What systemic comorbidities can be risk factors for retinopathy development and progression?
2. Are you able to name some potential barriers to retinopathy screening that patients may have?
3. Can barriers to screening be overcome with technology?
4. What is the impact on vision with early detection and timely intervention of retinopathy?
5. How can Ophthalmology and Primary Care come together for comprehensive retinopathy management?

## ANIMATIONS

Click on each image to view

**Inflammatory and VEGF pathways leading to the development of DR**



**Visual experience of the diabetic retinopathy patient**



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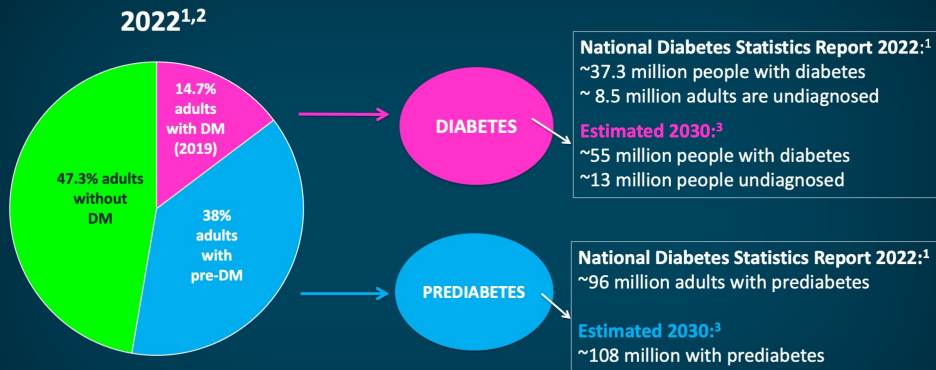
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# CLINICAL PRIMER

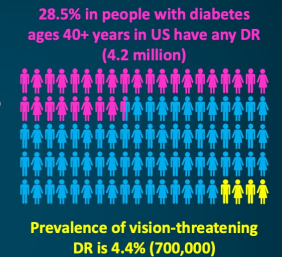
## US Diabetes Statistics



US = United States; DM = diabetes mellitus.  
 1. Centers for Disease Control and Prevention (CDC). National Diabetes Statistics Report website: estimates of diabetes and its burden in the United States (updated 6/29/2022) [https://www.cdc.gov/diabetes/data/statistics-report/index.html]. 2. CDC. National Diabetes Statistics Report website: prevalence of both diagnosed and undiagnosed diabetes (last reviewed 9/30/2022) [https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-undiagnosed-diabetes.html]. 3. Rowley WR, et al. *Popul Health Manag.* 2017;20(1):6-12. URLs accessed 1.30.2023.

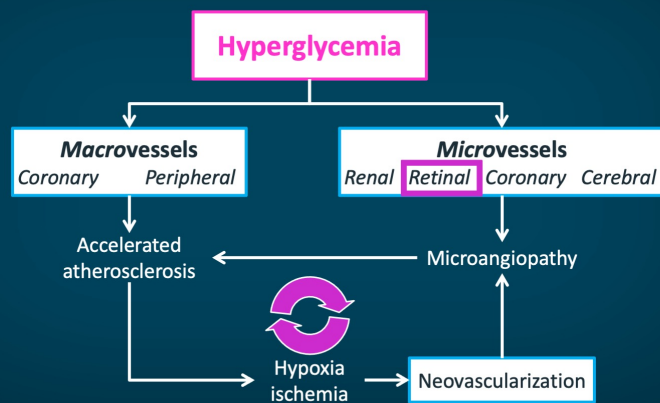
## Overview and Prevalence of DR

- Most frequent cause of new blindness among adults in developed countries
- 28.5% in people with diabetes ages 40+ years in the US have any DR (4.2 million)
- Prevalence of vision-threatening DR is 4.4% (700,000)
  - T1DM is associated with more frequent/more severe ocular complications
  - But people with **T2DM account for the majority of disease burden with visual impairment** because of the prevalence of T2DM
- Diabetes develops earlier and carries a higher incidence of complications in people from racial and ethnic minority groups



T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus.  
 American Diabetes Association (ADA). *Diabetes Care.* 2021;44(suppl 1):S151-S167. Flaxel CJ, et al. *Ophthalmology.* 2020;127(1):P66-P145.

## How Hyperglycemia Affects Vasculature

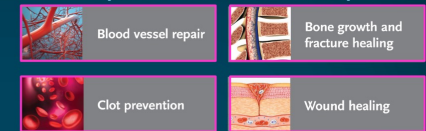


Orszanu G, Plutzky J. *J Am Coll Cardiol.* 2009; 53:535-542.

## Role of VEGF in the Body and in DR

The **VEGF protein** plays important roles in **angiogenesis and vascular repair**.<sup>1-5</sup>

Key roles of VEGF in the adult body<sup>1,3,4</sup>



With ischemia, there is **overproduction of VEGF, resulting in vascular permeability, neovascularization, and vascular anomalies**.<sup>3,5</sup>



DR = diabetic retinopathy; VEGF = vascular endothelial growth factor.  
 1. Chen HX, et al. *Nat Rev Clin Oncol.* 2009;6(8):465-477. 2. Carmeliet P, Jain RK. *Nature.* 2011;473(7347):298-307. 3. Wirotsko B, et al. *Prog Retin Eye Res.* 2008;27(6):608-621. 4. Descevol V, et al. *Chir Organi Mov.* 2008;92(3):161-168. 5. Amadio M, et al. *Pharmacol Res.* 2016;103:253-269.



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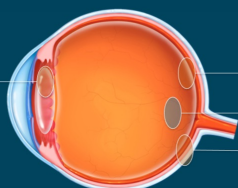
# CLINICAL PRIMER

## Impact of Diabetes on Eye Health and Vision

Ocular complications of diabetes include:

Cataract and ocular surface disorders<sup>1,4</sup>

60% increased risk in patients with diabetes



Diabetic macular edema (DME)<sup>2</sup>

~4%

1 of every 25 persons ≥40 years of age with diabetes has DME in at least 1 eye

Glaucoma<sup>1,4</sup>

40%

increased risk in patients with diabetes

Diabetic retinopathy (DR)<sup>3</sup>

28.5%

of adults (aged ≥40 years) with diabetes have DR

1. ADA. Diabetes overview: eye complications (<http://www.diabetes.org/living-with-diabetes/complications/eye-complications/>). 2. Verma R, et al. 2012 Joint Meeting of the American Academy of Ophthalmology (AAO) and Asia-Pacific Academy of Ophthalmology; Poster P0252. 3. Zhang X, et al. JAMA. 2010;304:549-556. 4. Alaska Health Status Indicators. Dilated eye exams for adults with diabetes. 2011 [[http://dhs.alaska.gov/dph/Documents/HA2010/ip\\_diabeteseyeexam.pdf](http://dhs.alaska.gov/dph/Documents/HA2010/ip_diabeteseyeexam.pdf)]. URLs accessed 1.30.2023.

## Awareness of DR Among Patients With Diabetes in Ongoing Eye Care

- N = 2,795 sequential patients attending Joslin Vision Network Evaluation
- **Only 17% of patients with DR and 22% with vision-threatening DR are aware of their DR**, despite 72% and 73% reporting an eye exam within the past year, respectively
- ~ 60% of patients seen by retina specialists are aware of DR, while 21% seen by comprehensive ophthalmologists and 16% seen by optometrists aware of their DR ( $P < .0001$ )
- Efforts to increase patient education from providers to patients are urgently needed

Sollman AZ, et al. Association for Research in Vision and Ophthalmology Annual Meeting, April 2011; Abstract (<https://iovs.arvojournal.org/article.aspx?articleid=2351935>). Accessed 1/31/2023.

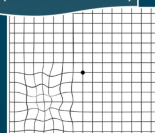
## Common Symptoms Associated With Diabetic Retinopathy

- The most common symptom is...
  - FEW or NO SYMPTOMS WHATSOEVER and may have good VA
- With disease progression, patients may develop

Vitreous floaters (RBCs, vitreopathy)



Visual distortion (DME or retinal traction)



Scotomata



Sudden changes in vision



Diminished color perception



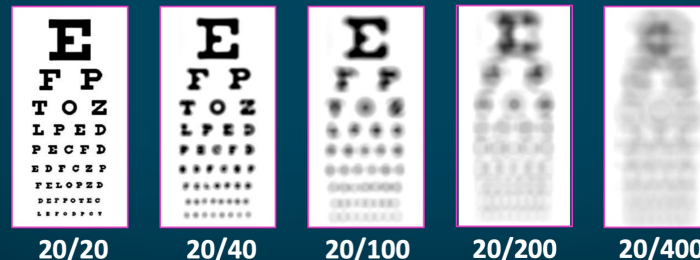
– 40% of patients with diabetes and no ophthalmoscopic DR have abnormal, typically asymptomatic color perception using threshold color-contrast sensitivity testing

VA = visual acuity; RBCs = red blood cells.

Fong DS, et al. Diabetes Care. 2004;27(suppl 1):S84-S87. Gella L, et al. PLoS One. 2015;10:e0129391. Matsui R, et al. Invest Ophthalmol Vis Sci. 2015;56:6007-6018. Eichenbaum DA. Retinal Physician. 2019;16:6-9. Images from morancure.utah.edu, maculardegeneration.net, allaboutvision.com, louisvillediabeticeyedoctor.com, and funnyjunk.com.

## Vision and Quality of Life

- **Visual impairment is defined as 20/40 vision or worse**, even with glasses
- For driver's licenses, *most states in the US* have a minimum requirement of best-corrected vision of 20/40 in the better eye
- Legal blindness is defined as 20/200 or worse



American Academy of Ophthalmology (AAO). Eye disease statistics. 2014 (<https://www.aao.org/clinical-statement/eye-disease-statistics-21>). Steinkuller PG. AMA J Ethics. 2010;338-940 (<https://journalofethics.ama-assn.org/sites/journalofethics.ama-assn.org/files/2018-05/vm-1012.pdf>). Billauer.co. Simulating visual acuity (<http://www.billauer.co.il/simulator.html>). URLs accessed 1.30.2023.



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# CLINICAL PRIMER

## Initial Management Recommendations for Patients With Diabetes

### Diabetic Retinopathy Preferred Practice Pattern®

Severity of retinopathy	Presence of macular edema	Follow-up (months)	Panretinal photocoagulation (scatter) laser	Focal and/or grid laser*	Intravitreal anti-VEGF therapy
Normal or minimal NPDR	No	12	No	No	No
Mild NPDR	No	12	No	No	No
	NCI-DME	3-6	No	Sometimes	No
	CI-DME	1	No	Rarely	Usually
Moderate NPDR	No	6-12	No	No	No
	NCI-DME	3-6	No	Sometimes	Rarely
	CI-DME	1	No	Rarely	Usually
Severe NPDR	No	3-4	Sometimes	No	Sometimes
	NCI-DME	2-4	Sometimes	Sometimes	Sometimes
	CI-DME	1	Sometimes	Rarely	Usually
Non-high-risk PDR	No	3-4	Sometimes	No	Sometimes
	NCI-DME	2-4	Sometimes	Sometimes	Sometimes
	CI-DME	1	Sometimes	Sometimes	Usually
High-risk PDR	No	2-4	Recommended	No	Sometimes
	NCI-DME	2-4	Recommended	Sometimes	Sometimes
	CI-DME	1	Recommended	Sometimes	Usually

NPDR = nonproliferative diabetic retinopathy; PDR = proliferative diabetic retinopathy; NCI-DME = non-center-involved diabetic macular edema; CI-DME = center-involved diabetic macular edema. Frazee CJ, et al. *Ophthalmology*. 2020;127(1):P66-P145.

## Improving Patient Care

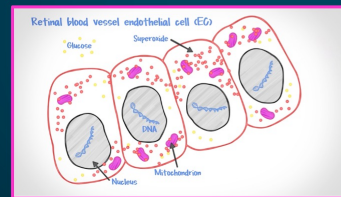
Educate	Identify	Focus	Help
<p>Educate patients about the largely asymptomatic nature of DR</p> <ul style="list-style-type: none"> <li>Symptomatic disease = more severe disease</li> <li>Earlier intervention = lower risk of VTC and irreparable vision loss</li> </ul>	<p>Identify patients who would benefit from treatment intensification</p> <ul style="list-style-type: none"> <li>No or early NPDR with poor metabolic control</li> <li>Patients with rapidly progressing DR, moderate+ NPDR, PDR, and/or DME</li> </ul>	<p>Focus treatment decisions on preserving QoL</p> <ul style="list-style-type: none"> <li>DR is associated with limitations of activity, especially in low light environments; concerns about vision loss and problems coping with uncertainty are prevalent</li> </ul>	<p>Help facilitate adherence to DR surveillance, referral, and treatment</p>

VTC = vision threatening complications; QoL = quality of life. Fenwick EK, et al. *Qual Life Res*. 2012;21(10):1771-1782.

## Visual Learning in DR

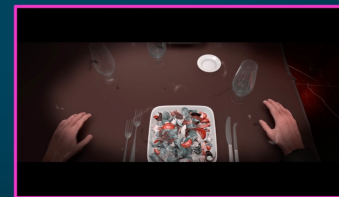
- Click the links below to watch animations investigating the role of inflammation and vascular endothelial growth factor (VEGF) in the pathophysiology of DR, as well as how vision can be affected by DR and its treatment

### Inflammatory and VEGF pathways leading to the development of DR



Watch the animation [here](#)

### Visual experience of the patient with DR



Watch the animation [here](#)



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Do you have a question or case you would like to share with our experts in advance of the Clinical Conversations Program?



DRconvo@medlearninggroup.com

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Vision Protection & Blindness Prevention in Diabetes



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