

# Diabetic Retinopathy, Teleretinal Imaging & The Artificial Intelligence Future

## EXPANDING ACCESS TO DIABETIC RETINOPATHY EXAMS

11/12/2025

**Indian Health Service**

IHS-JVN National Teleophthalmology Program



# Diabetic Retinopathy

- The leading cause of significant vision loss and new blindness in adults
- True despite the effectiveness of timely diagnosis and treatment.

# Special Diabetes Program for Indians



In 1997, the IHS began implementing the **Special Diabetes Program for Indians** to prevent diabetes and reduce its complications

SDPI supported the development of the IHS-JVN Teleophthalmology Program in 2020



# Incidence and Prevalence

Coinciding with the expansion of diabetes programs and new medications, the prevalence of diabetic retinopathy in AI/AN imaged (2015-2019) declined compared to prevalence studies in the 1990s.

# Prevalence of DR – AI/AN

- **1990s:** prevalence rate for any DR - **42%**
- **2011-2016:** IHS/JVN conducted a retrospective study of 54,000 patients - prevalence rate for any DR - **26%**
- Prevalence highest for patients with:  
A1c  $\geq 8\%$ , Diabetes  $> 10$  years, on Insulin.

# Incidence and Progression in AI/AN

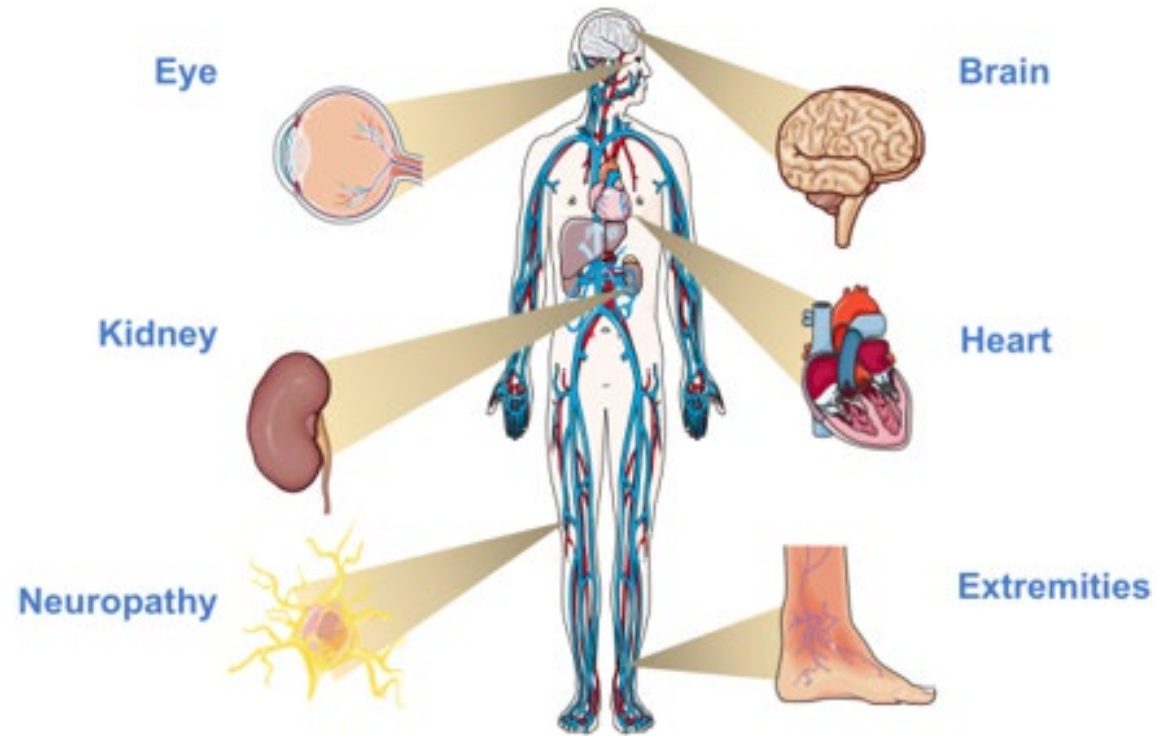
- The incidence and progression of DR in AI/AN was studied in **2015-2019**
- Of patients with no evidence of DR at baseline, 18.0% had some level of DR at follow-up (1280 of 7097 patients)
- For the patients who already had mild DR, 27% progressed, which is lower than previous reports

*JAMA Ophthalmology 2023 Mar 9*

# Major Complications of Diabetes

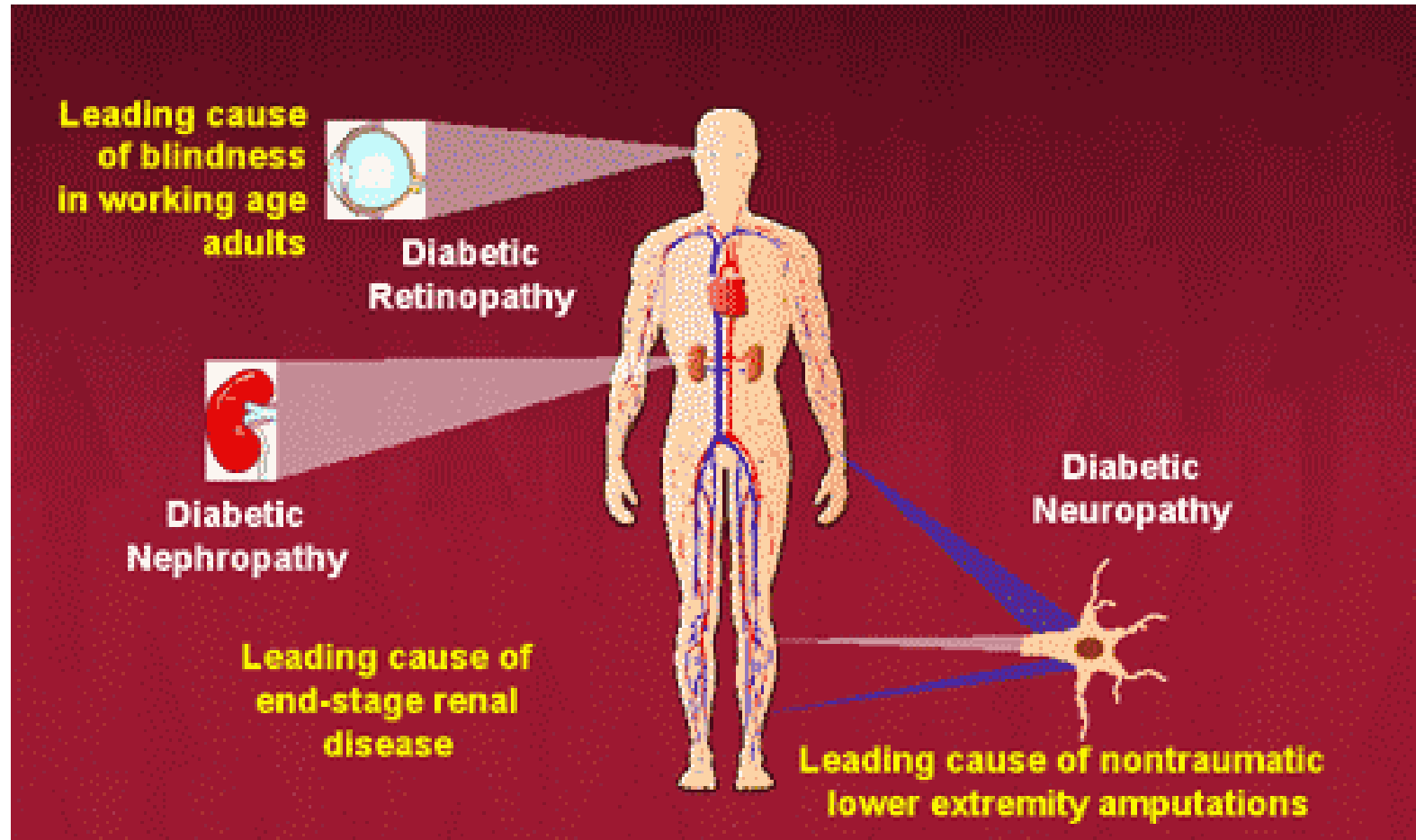
## Microvascular

## Macrovascular



Courtesy of Diabetes Institute, University of Florida

# Microvascular Complications: Diabetic Retinopathy is most common



Pathways Leading to Diabetic Microvascular Complications and the Latest Clinical Therapies

Authors: Chairperson: Bernard Zinman, MDCM, FRCPC, FACP et al. [https://www.medscape.org/viewarticle/460902\\_5](https://www.medscape.org/viewarticle/460902_5)



# RETINAL EXAMINATION

# These retinal exams require dilated pupils



<https://www.gov.uk/government/publications/diabetic-eye-screening-slit-lamp-examination/diabetic-eye-screening-slit-lamp-examination-html-version>



<https://entokey.com/diagnostic-techniques-2/>

# Other retinal examination techniques for diabetic patients

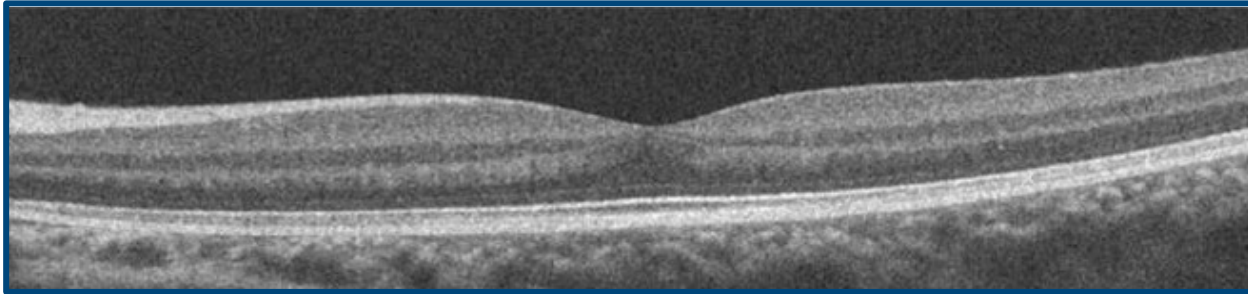


<https://www.rvscny.com/patient-eduction/ocular-imaging/fluorescein-angiography/>

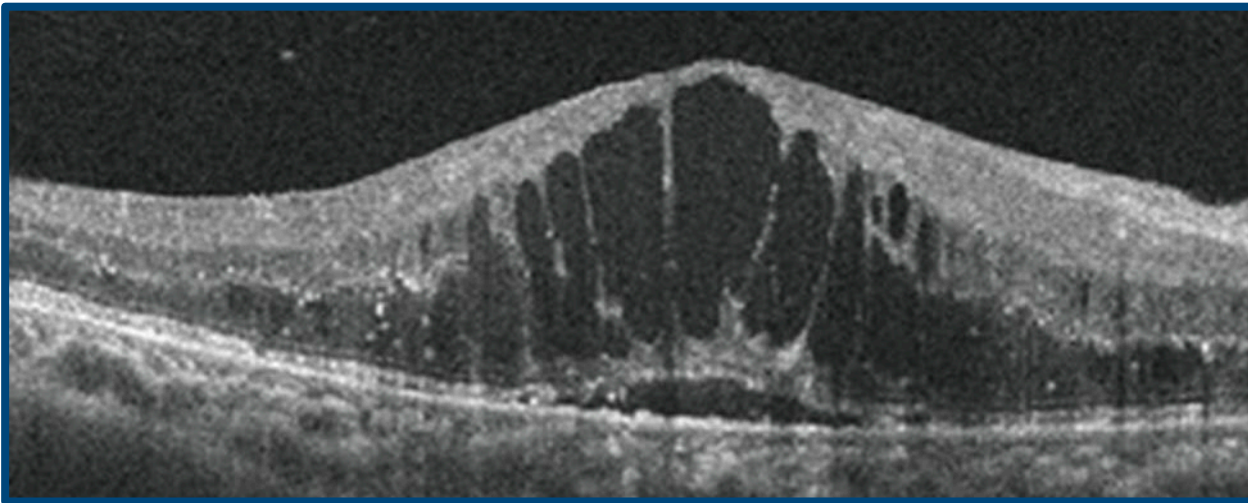


<https://sevenoe.com/product/zeiss-cirrus-400-hd-oct-quad-core-windows-7/>

# OCT – Diabetic Macular Edema



Normal retina



Diabetic Macular Edema

- fluid in the center of the retina
- An important cause of vision loss in diabetic patients

# Our JVN cameras – no dilation required



# 50 degree view of a Normal Retina



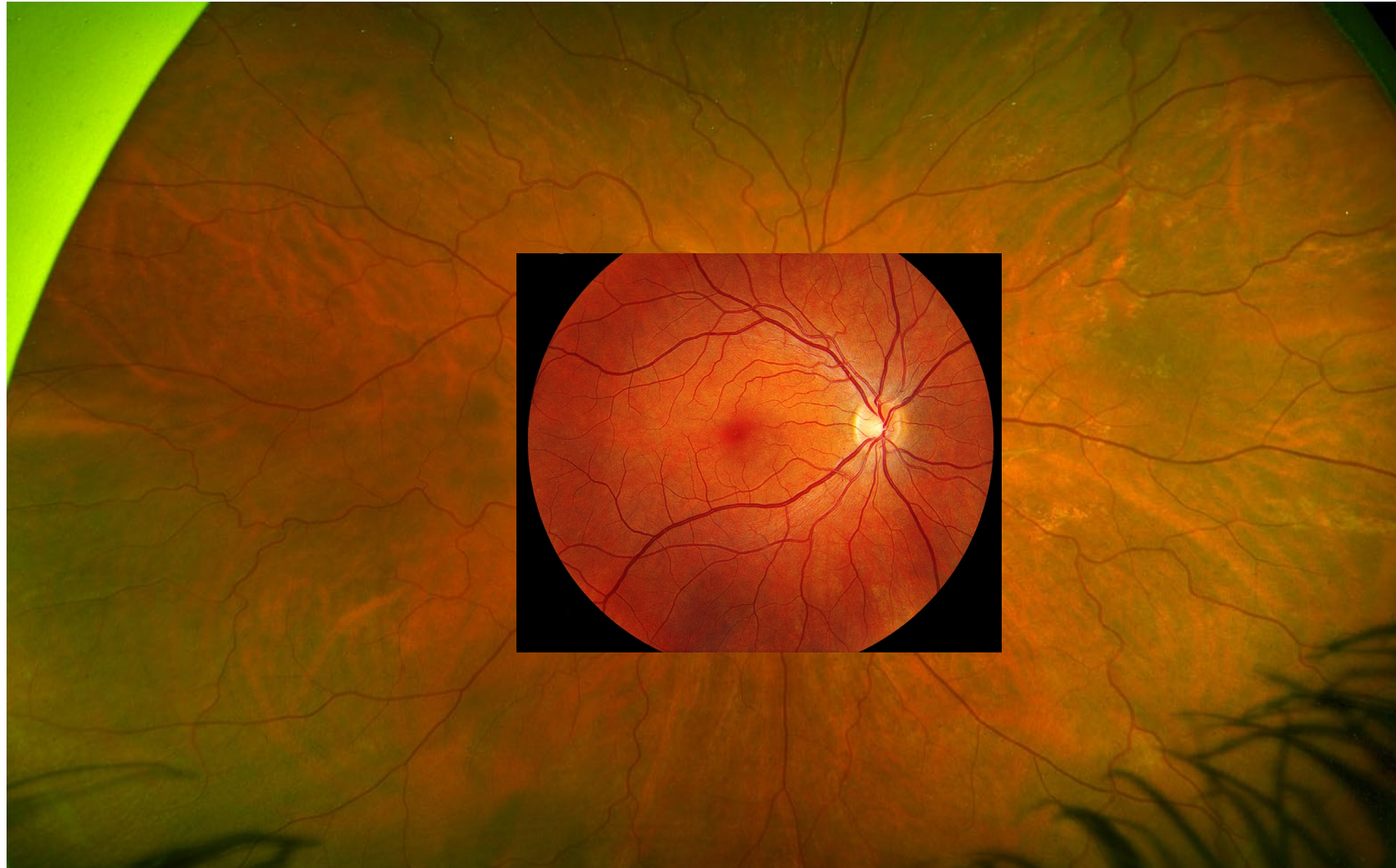
Image courtesy of Neoretina Eyecare Institute

# Normal Retina – 200 degree view



Image courtesy of IHS-JVN, Phoenix

# 50 degree camera view vs. 200 degree



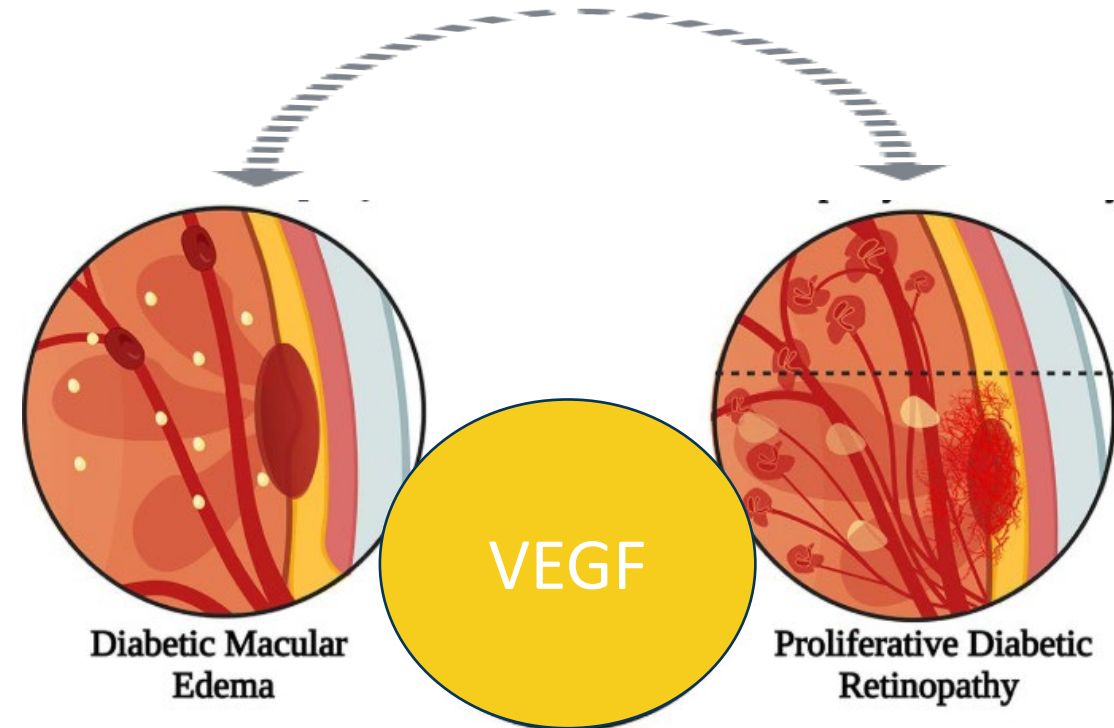
JVN cameras provide wide angle images

Image courtesy of Joslin Diabetes Center - JVN

# What causes Diabetic Retinopathy?

Very small vessels are damaged ➡ Lack of blood flow ➡ Factor release from vessels

- Released factors cause tiny abnormal blood vessels to grow and leak.
- Factors are released
- The most important released factor is called VEGF



Gased on the article: Beyond VEGF: Targeting Inflammation and Other Pathways for Treatment of Retinal Disease  
Muniyandi, Anbukkarasi et al. The Journal of Pharmacology and Experimental Therapeutics,  
Volume 386, Issue 1, 15 - 25

# Types of Diabetic Retinopathy



- Non-Proliferative
- Proliferative

# Non-proliferative - Mild

*Only microaneurysms*



Eyeguru.org

# Non-proliferative - Moderate

More than microaneurysms



Image courtesy of Joslin Diabetes Center - JVN

# Non-Proliferative - Severe

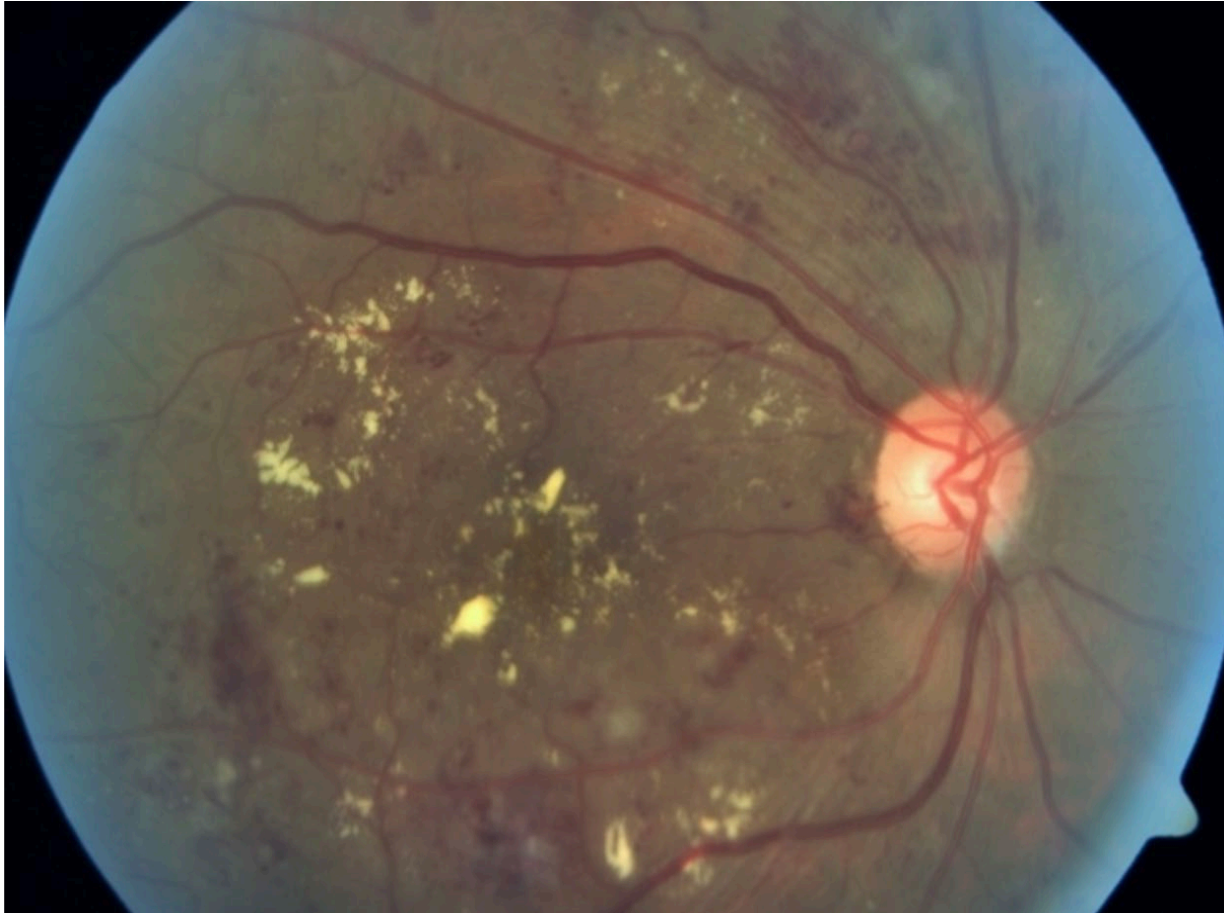


Image courtesy of Joslin Diabetes Center - JVN

# Treatment for Non-proliferative DR

- Lower A1C
- Lower blood pressure and lipids
- Repeat dilated eye examinations or JVN imaging (intervals based on severity)

# Macular Edema



Courtesy of Retina Image Bank

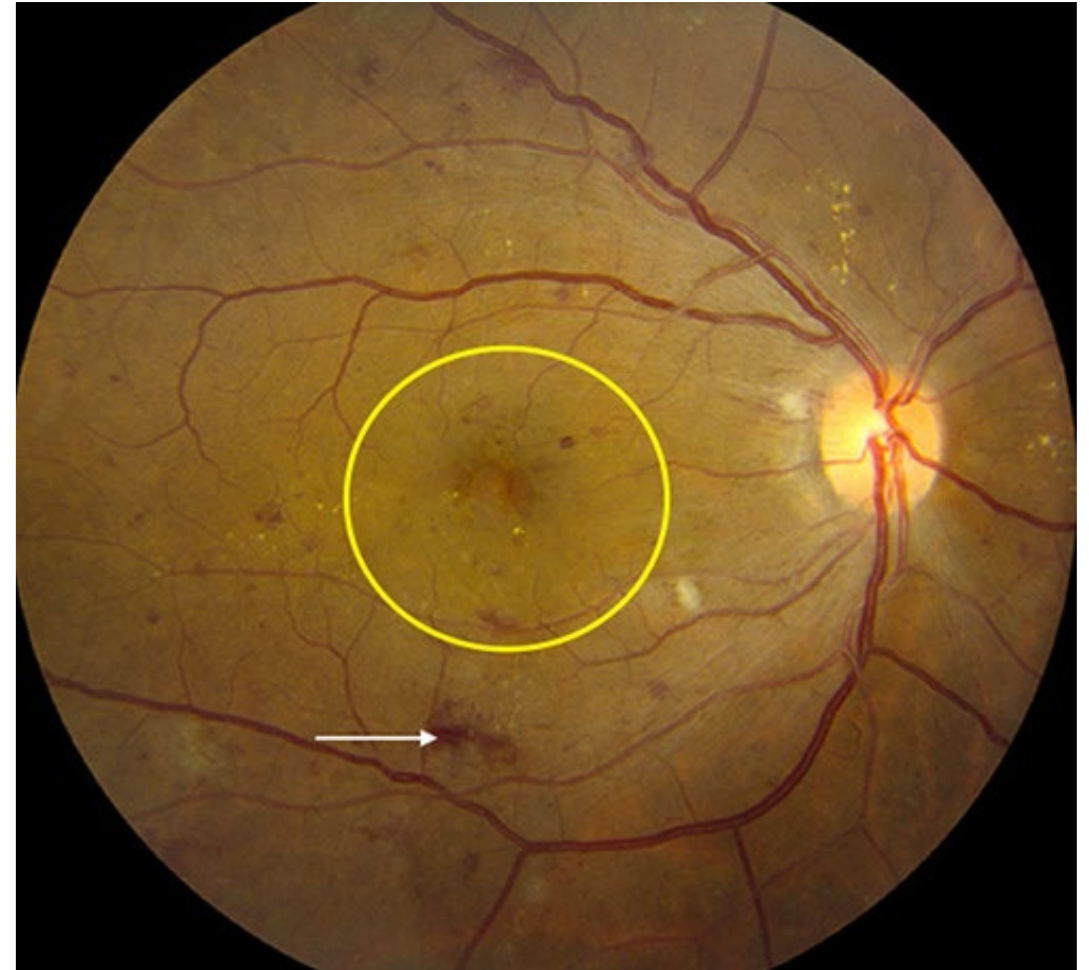


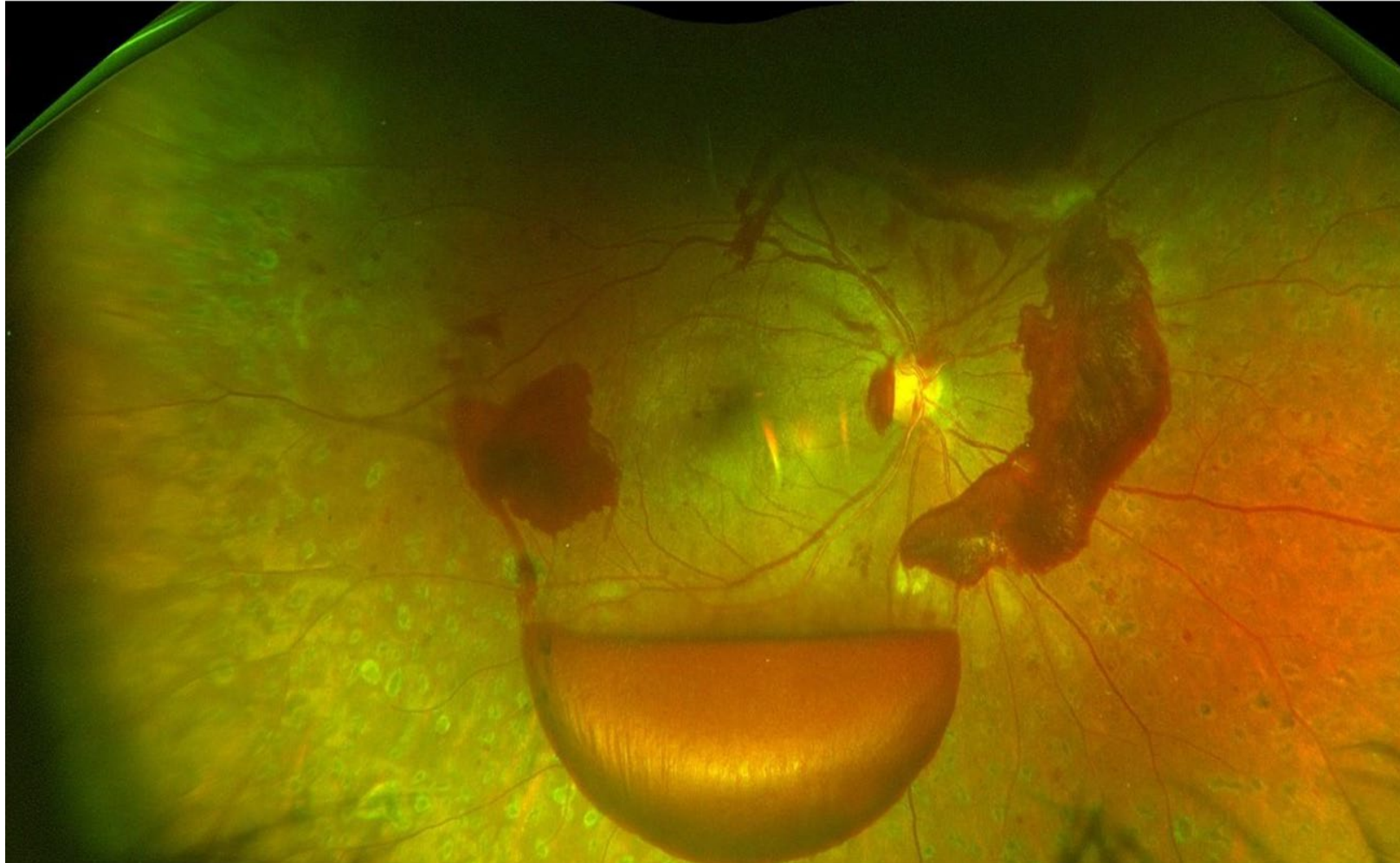
Image courtesy of Joslin Diabetes Center - JVN

# Proliferative Diabetic Retinopathy



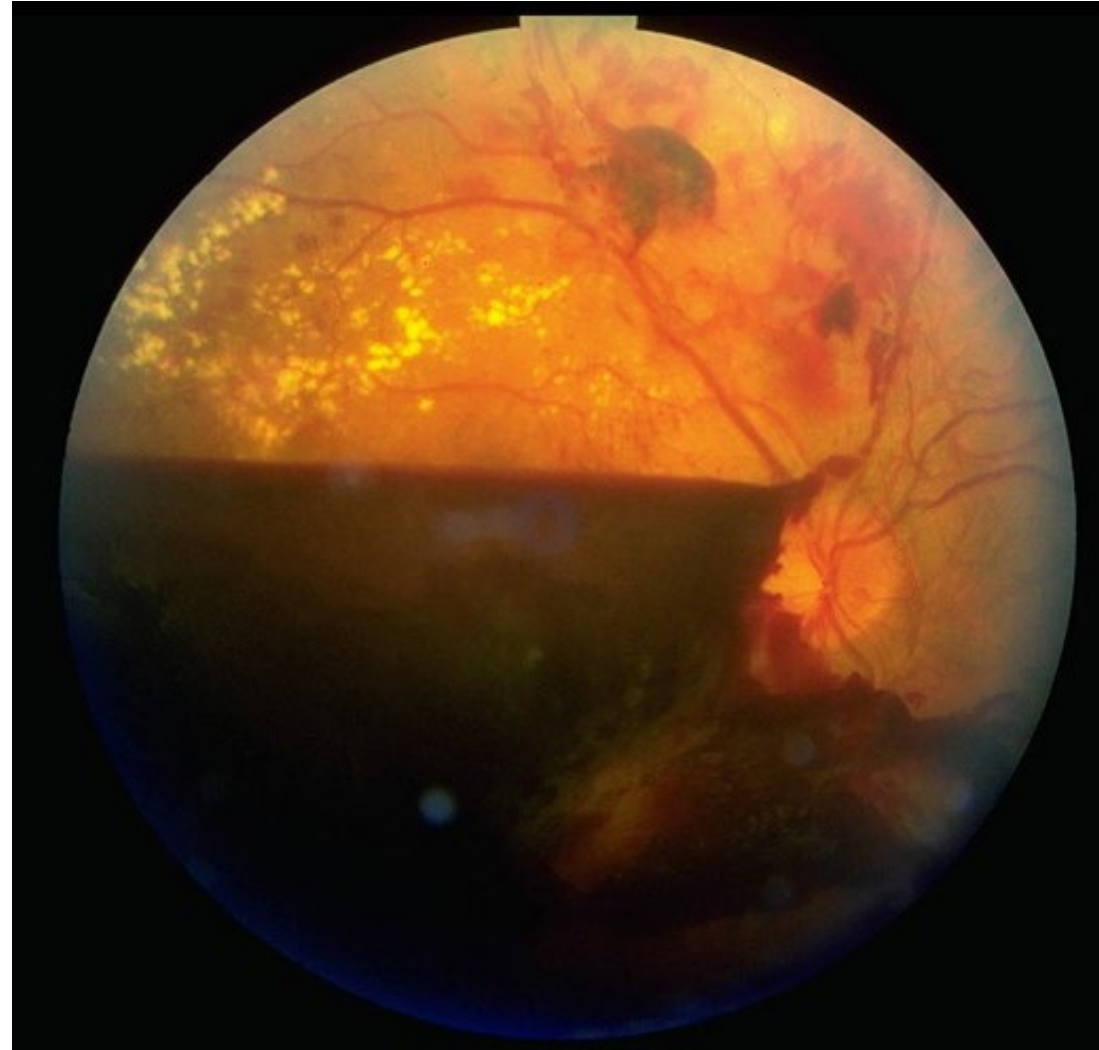
Courtesy of Keck School of Medicine, Department of Ophthalmology, Retina Service

# PDR – hemorrhages in front of the retina



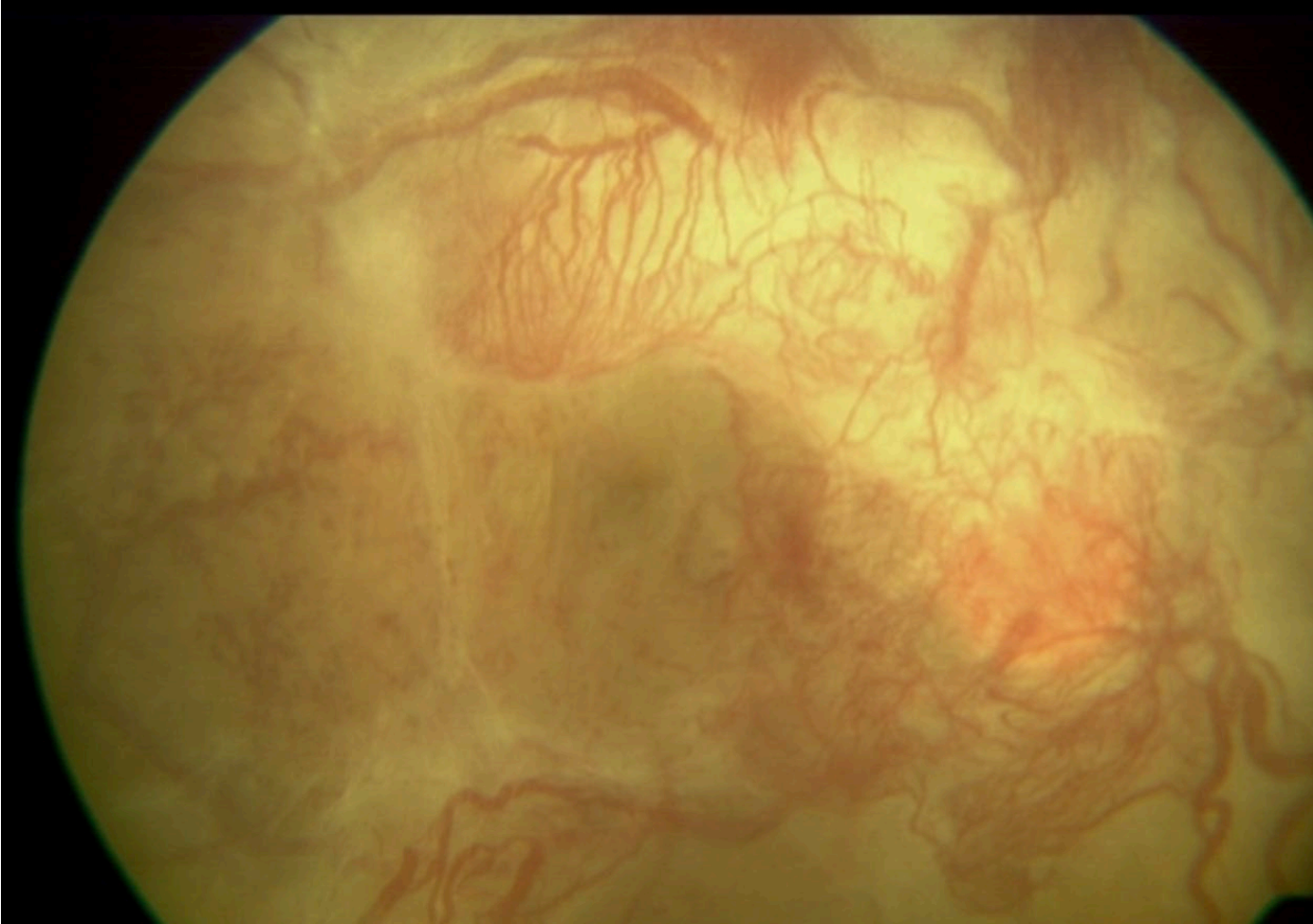
Rajalakshmi, R. *et al.* Review of retinal cameras for global coverage of diabetic retinopathy screening. *Eye* **35**, 162–172 (2021). <https://doi.org/10.1038/s41433-020-01262-7>

# PDR – Vitreous Hemorrhage



Courtesy of Keck School of Medicine, Department of Ophthalmology, Retina Service

# PDR – with scarring of the retina

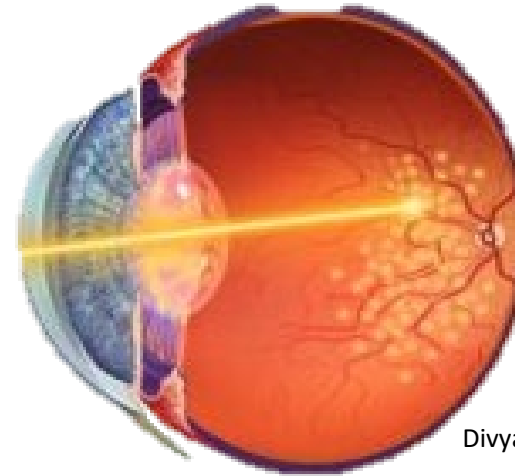


Courtesy of the Retina Image Bank

# Treatment for Proliferative DR

- **Laser**

Diabetic Retinopathy Study (DRS) showed laser reduces risk of severe vision loss



Divyajyotieyehospital.com

- **Anti-Vegf injections**

Several available (Avastin, Eylea, Lucentis) to treat proliferative DR and macular edema



<https://www.palmetto retina.com/blog/what-are-anti-vegf-medications>

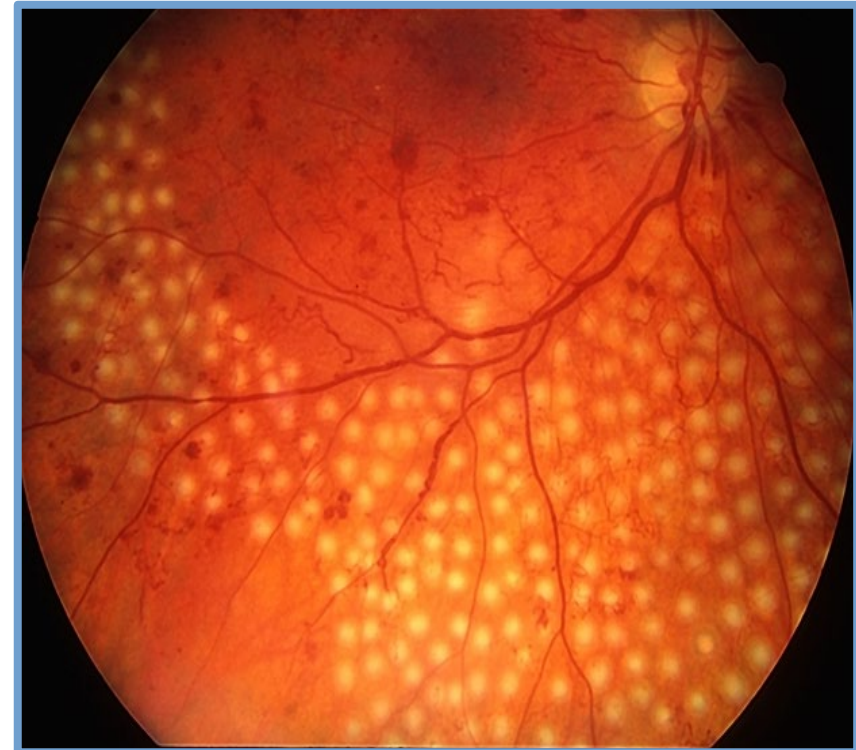
# Treatment for PDR – Reduce VEGF load



*Laser – the mainstay of treatment*



<https://birlaeyehospital.com/retinal-laser-photocoagulation>



<https://educate.choroida.com/2021/08/22/diabetic-retinopathy/>

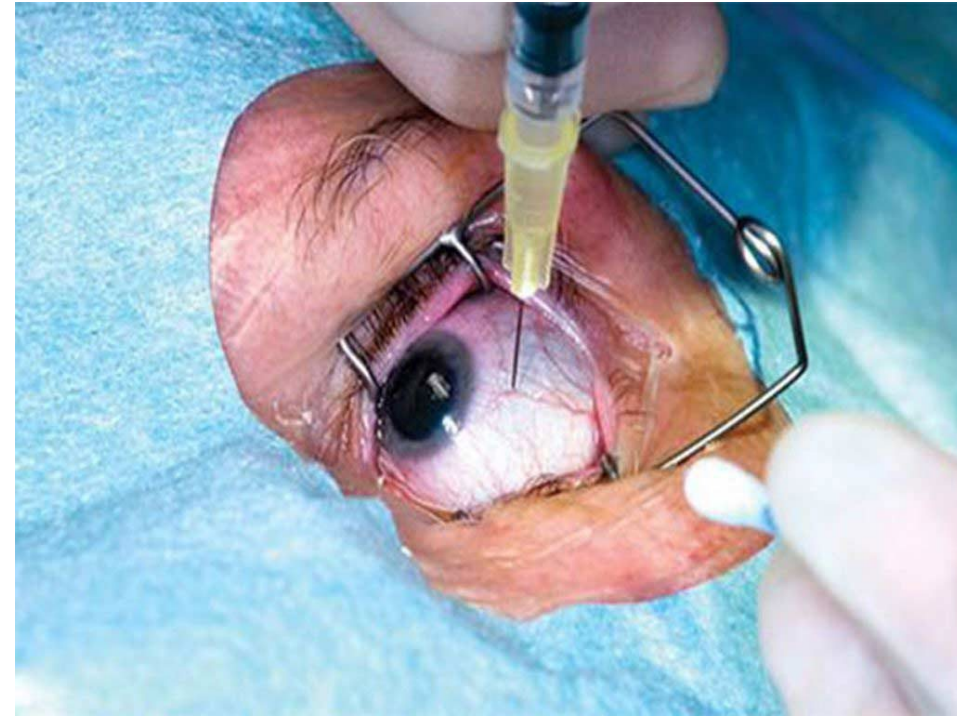
# Treatment for Diabetic Macular Edema and PDR

## *Injections*

- Anti-Vegf injected into the vitreous
- Multiple injections are needed at monthly intervals
- Improves vision
- Anti-Vegf injections may also be used to treat other forms of diabetic retinopathy

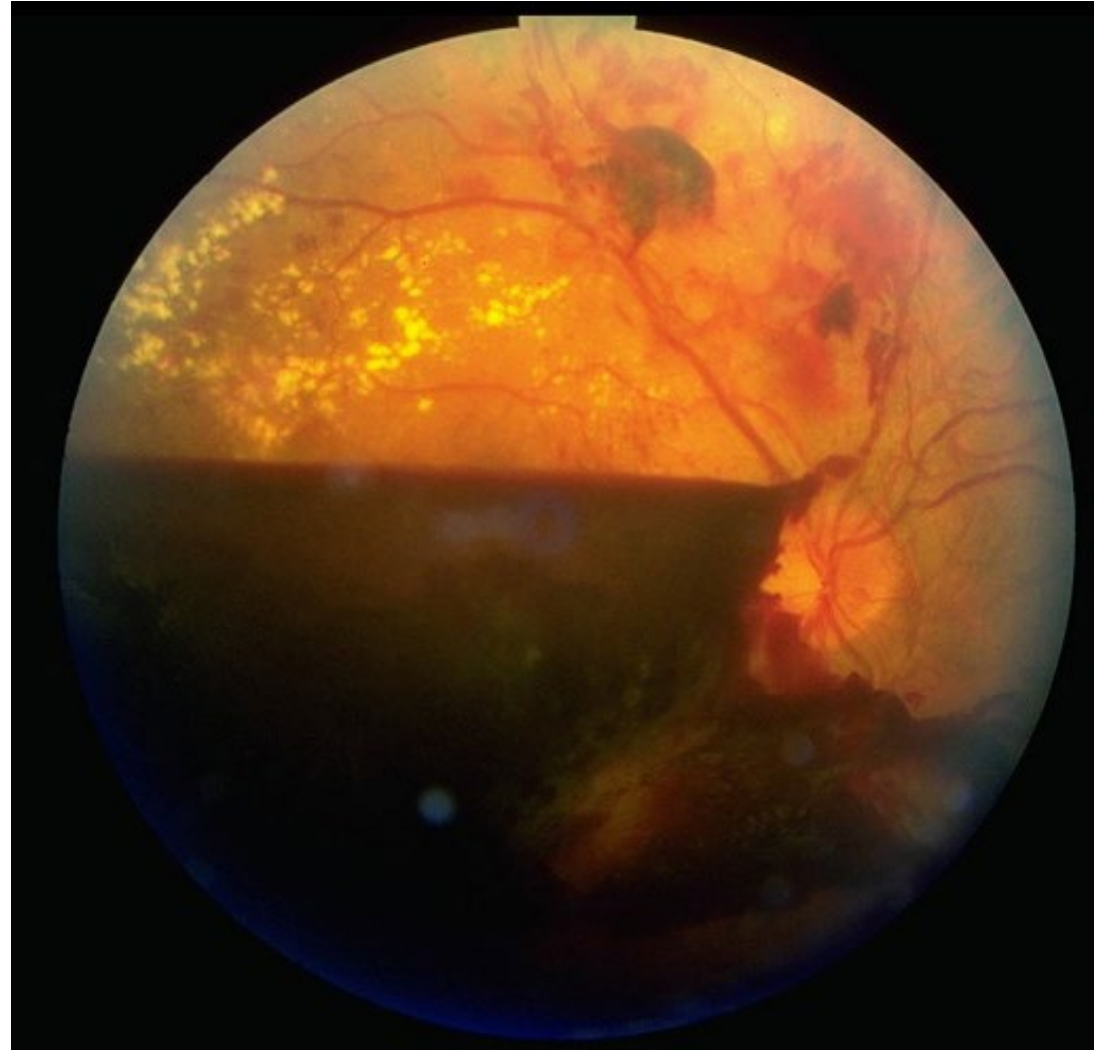


[Vrmny.com/procedure/intravitreal-injection/](https://Vrmny.com/procedure/intravitreal-injection/)



<https://shaneretina.com/ophthalmology/intravitreal-injections/>

# Vitreous hemorrhage



<https://morancore.utah.edu/section-04-ophthalmic-pathology/retina/>

# Diabetic detachment

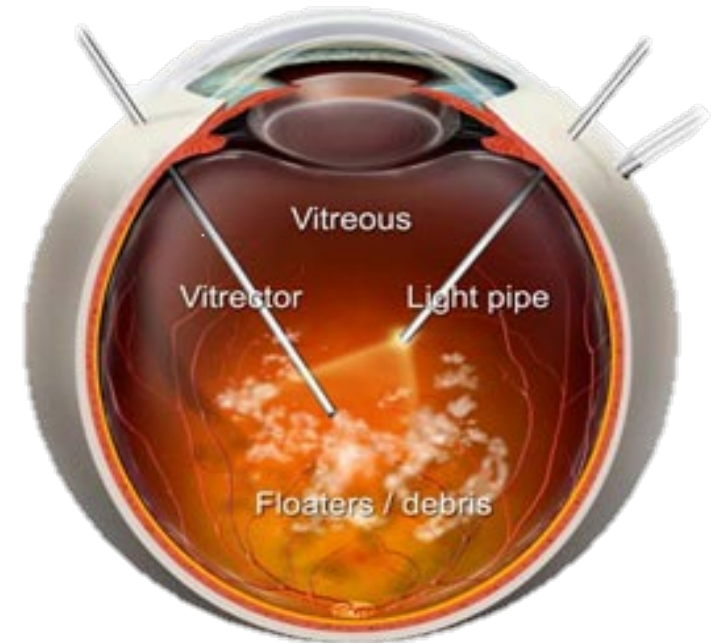


[bascompalmerlearn.org](http://bascompalmerlearn.org)

# Surgical Treatment



<https://www.medicalnewstoday.com/articles/319677#what-is-vitreotomy-surgery>



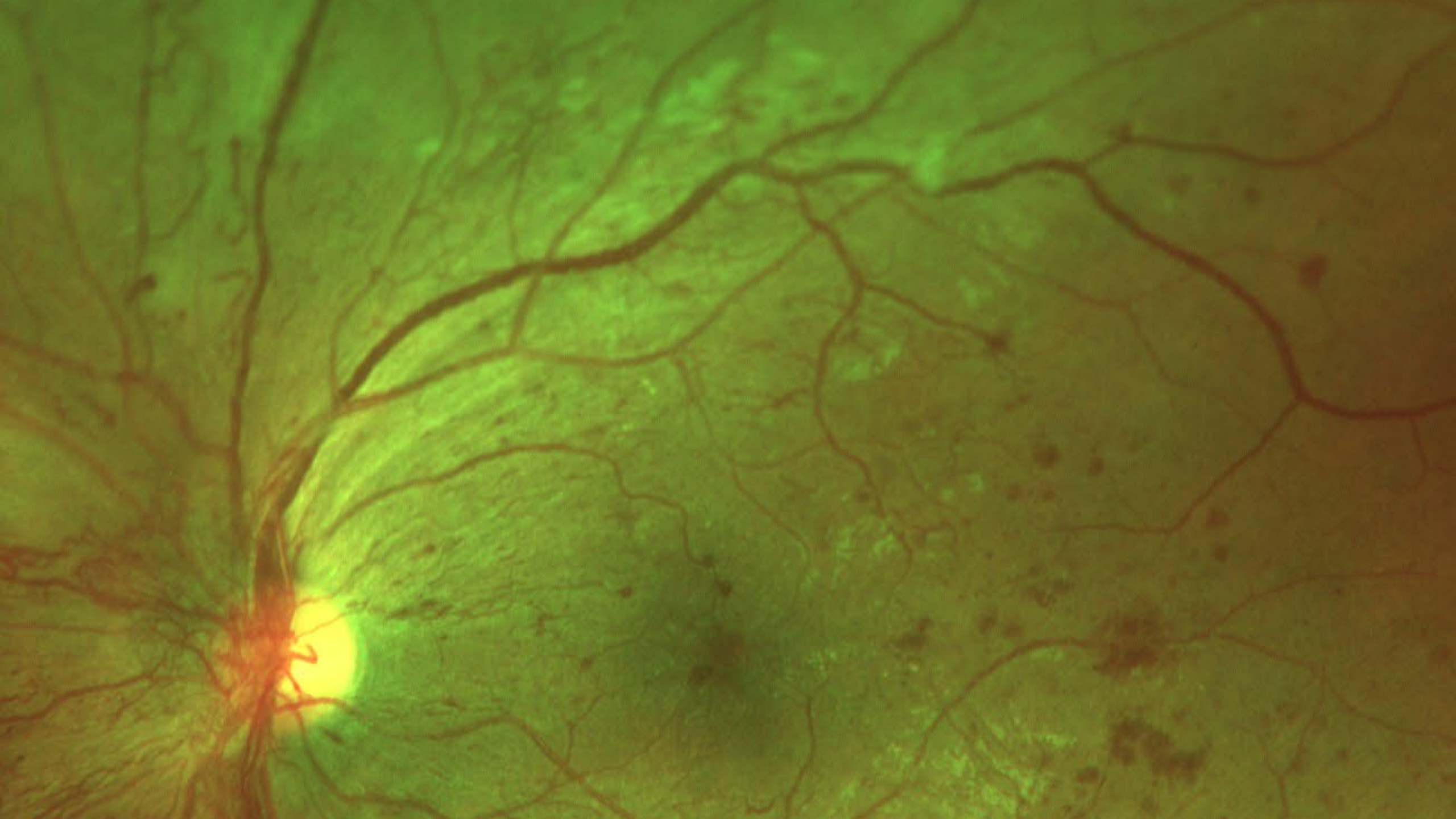
[Craigbergermd.com/patient-information/eye-conditions/](http://Craigbergermd.com/patient-information/eye-conditions/)

# 22 YEAR OLD Native American Male

Presented with cough, malaise, **no vision complaints\***

\*The following two images are courtesy of the IHS-JVN Teleophthalmology program







# IHS-JVN program

- Founded in collaboration with the Joslin Vision Network (Joslin Diabetes Center, Harvard)
- All ophthalmologists and optometry readers are trained and certified at Joslin Diabetes Center
- Ongoing relationship – education, research and development

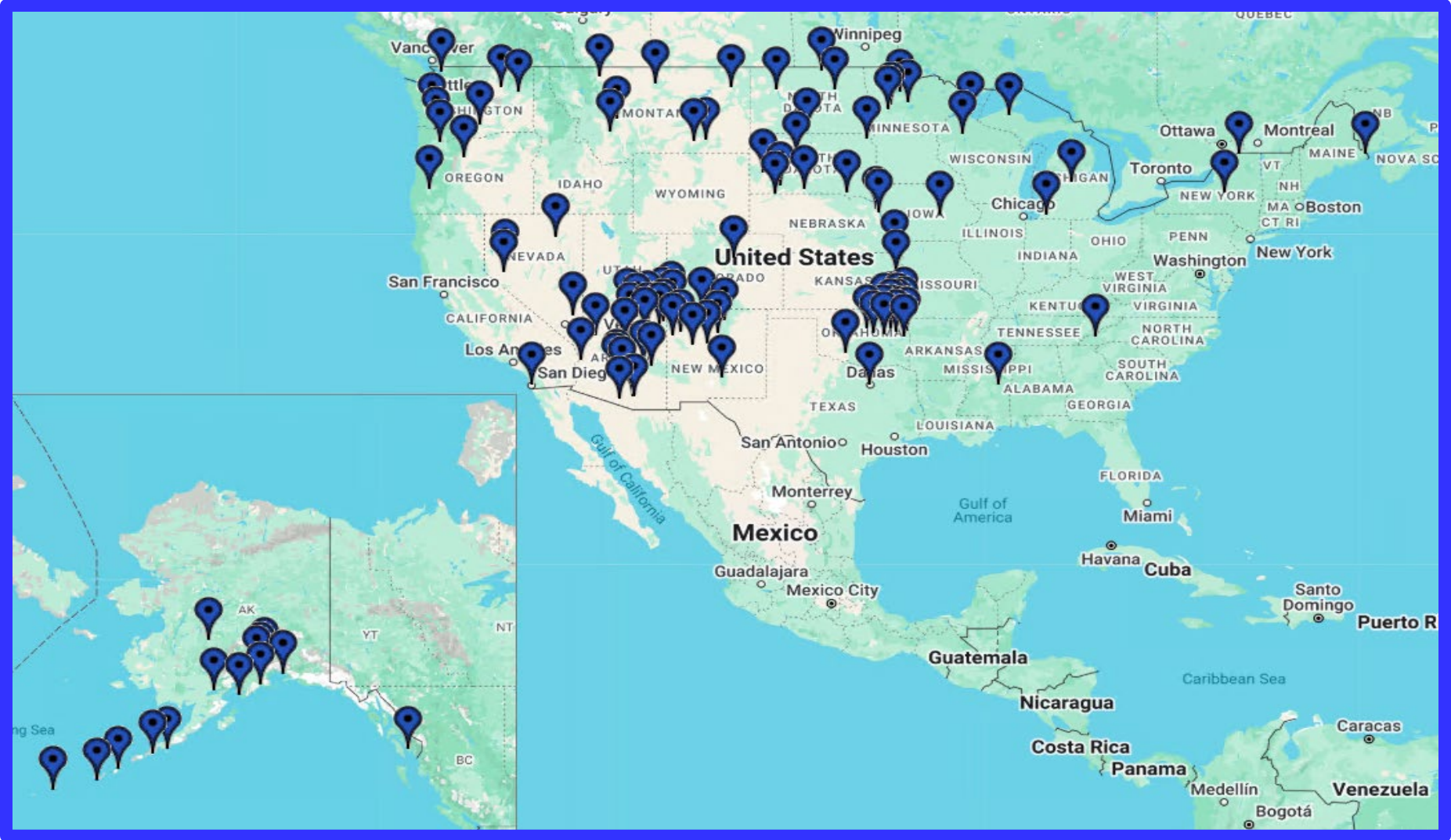


# Diabetic Retinopathy Surveillance

## 120 Physical Sites in 27 States

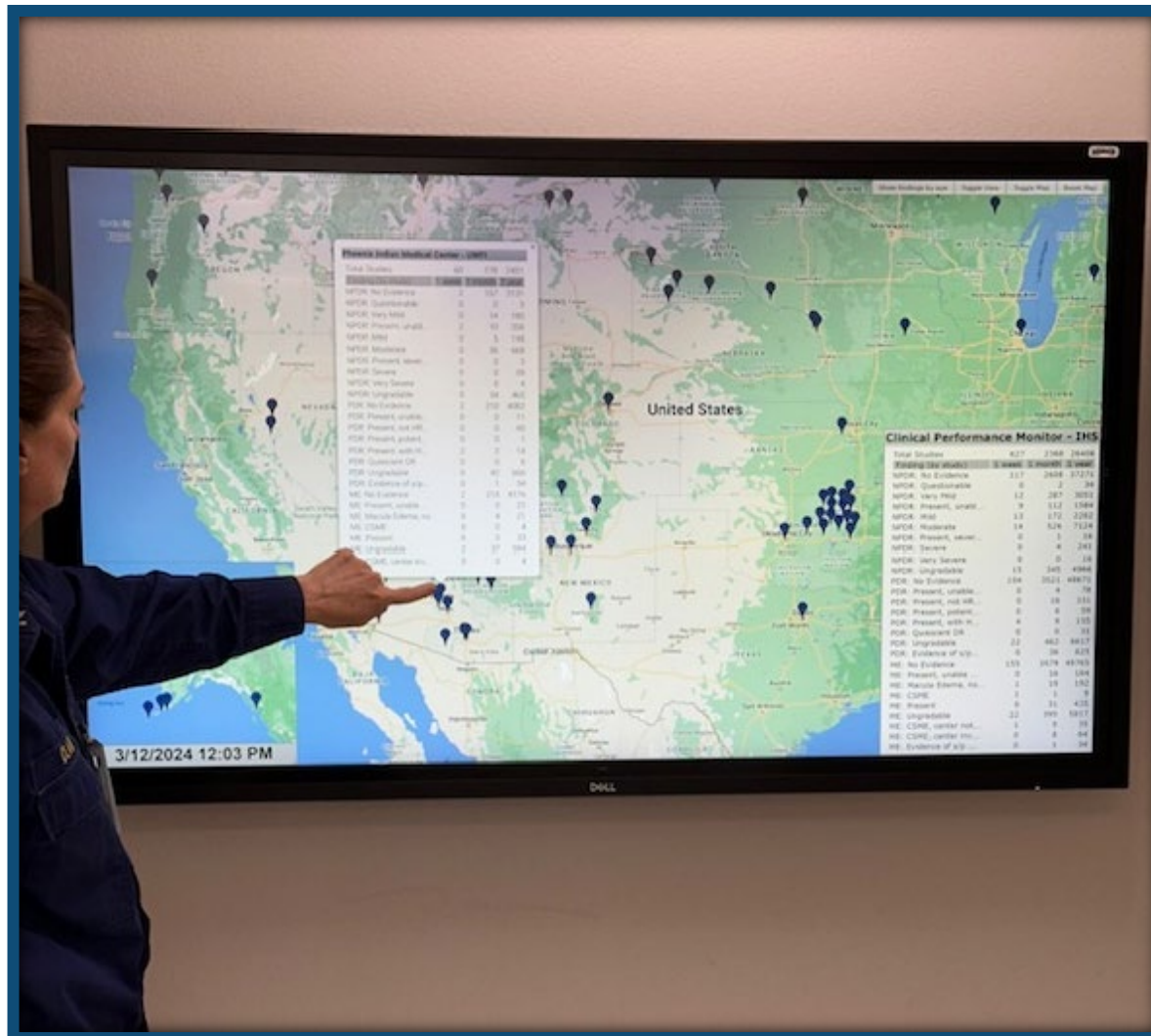
- Aleutian Islands, AK
- Ketchikan, AK
- Chugachmiut, AK
- Southcentral, AK
- Chinle, AZ
- Four Corners, AZ
- Hopi, AZ
- Hu Hu Kam, AZ
- Flagstaff, AZ
- Inscription House, AZ
- Kayenta, AZ
- Komatke, AZ
- LeChee, AZ
- Moapa, AZ
- Parker, AZ
- Pascua Yaqui, AZ
- Peach Springs, AZ
- Phoenix, AZ
- Pinon, AZ
- San Xavier, AZ
- Sells, AZ
- Tsaile, AZ
- Tuba City, AZ
- Whiteriver, AZ
- Fort Yuma, AZ
- Tucson, AZ
- Whiteriver, AZ
- Fort Yuma, CA
- San Diego, CA
- Denver, CO
- Ute Mountain, CO
- Meskwaki, IA
- Chicago, IL
- Haskel, KS
- White Cloud, KS
- St. Regis, ME
- Keweenaw Bay, MI
- Pokagon, MI
- Nimkee, MI
- Cass Lake, MN
- Minneapolis, MN
- Ogema, MN
- Red Lake, MN
- White Earth, MN
- Choctaw, MS
- Blackfeet, MT
- Butte, MT
- Crow/, MT
- Helena, MT
- Cheyenne, MT
- Rocky Boy, MT
- Verne Gibbs, MT
- Cherokee, NC
- Elbowoods, ND
- Quentin Burdick, ND
- Spirit Lake, ND
- Standing Rock, ND
- Carl Curtis, NE
- Winnebago, NE
- Albuquerque, NM
- ACL, NM
- Albuquerque, NM
- Crownpoint, NM
- Gallup, NM
- Jicarilla, NM
- Laguna, NM
- Mescalero, NM
- Northern Navajo, NM
- Santa Fe, NM
- Shiprock, NM
- Taos, NM
- Fallon, NV
- Moapa, NV
- Southern Bands, NV
- Walker River, NV
- Oneida Nation, NY
- Saint Regis, NY
- A-Mo, OK
- Black Hawk, OK
- Tahlequah, OK
- Claremore, OK
- Cooweescoowee, OK
- Eufaula, OK
- Koweta, OK
- Northeastern, OK
- Oklahoma City, OK
- Okmulgee, OK
- Redbird, OK
- Sam Hider, OK
- Sapulpa, OK
- Three Rivers, OK
- Vinita, OK
- Will Rogers, OK
- W.P. Mankiller, OK
- Cow Creek, OR
- NARA, OR
- Warm Springs, OR
- Yellowhawk, OR
- Rock Hill, SC
- Eagle Butte, SD
- Kyle, SD
- Oyate, SD
- Pine Ridge, SD
- Rosebud, SD
- Keeble, SD
- Wagner, SD
- Dallas, TX
- Fort Duchesne, UT
- Chehalis, WA
- Colville, WA
- Cowlitz, WA
- Wellpinit, WA
- Lummi, WA
- Yakama, WA
- Hayward, WI
- Red Cliff, WI
- Sokaogon, WI
- Fort Washakie, WY
- Wind River, WY

# Interactive Site Map



Site map located at and created by the IHS-JVN National Reading Center, photograph courtesy of Dr. Dara Shahn

# Interactive Site Map



Interactive Site Map located at the IHS-JVN National Reading Center, photo courtesy of Dr. Dara Shahon

# JVN Image Acquisition



- Standardized Training for Imager certification
- Imagers learn features of severe/proliferative retinopathy – immediate reads

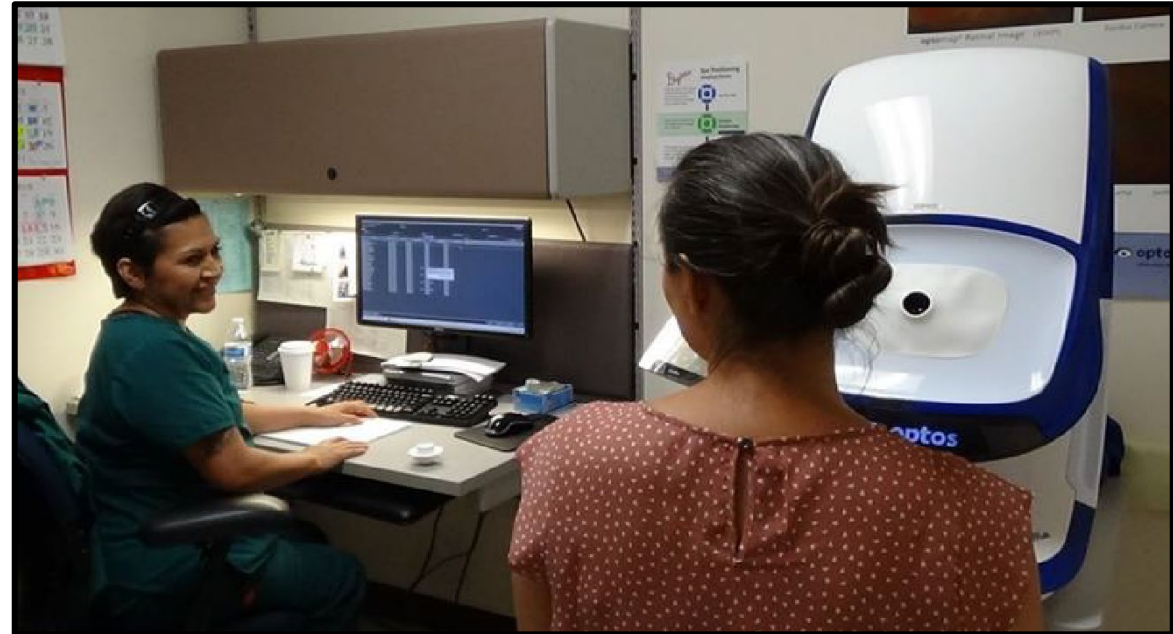


Photo taken by Dr. Dara Shahon and courtesy of IHS-JVN Teleophthalmology program

- Images and medical Information transmitted to readers: A1C, HTN and Lipid status

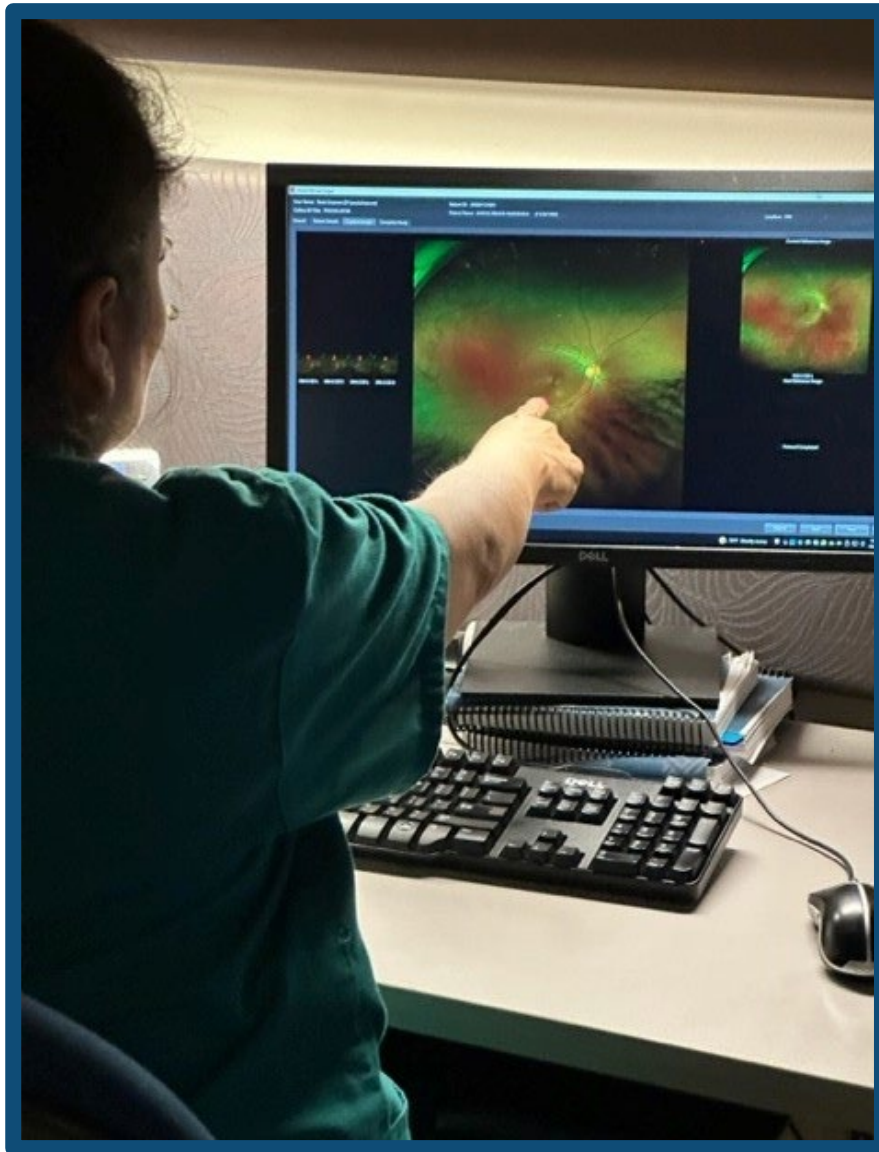
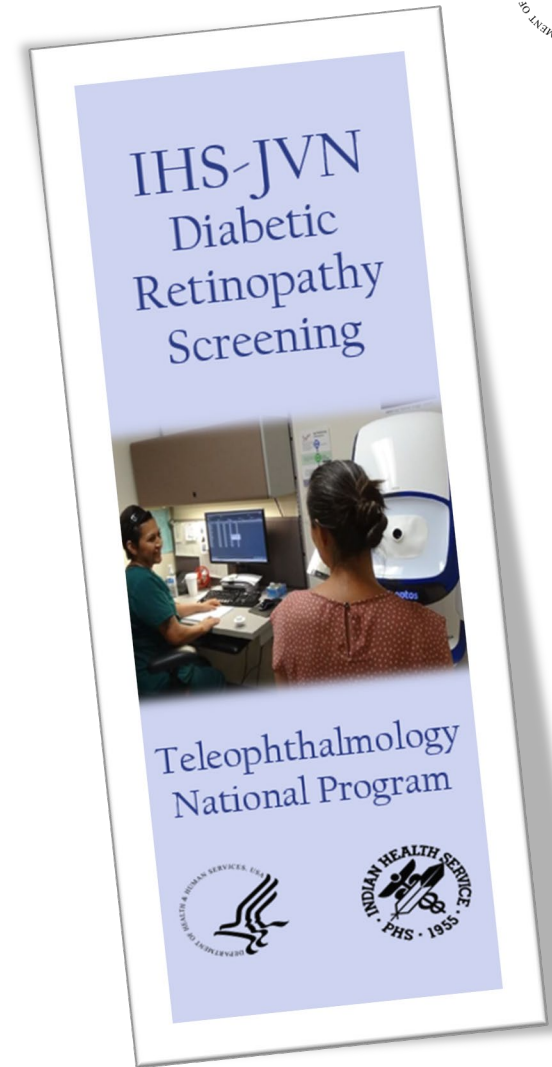


Photo taken by Dr. Dara Shahon and courtesy of IHS-JVN Teleophthalmology program

**Patient  
Education  
occurs in  
real time**

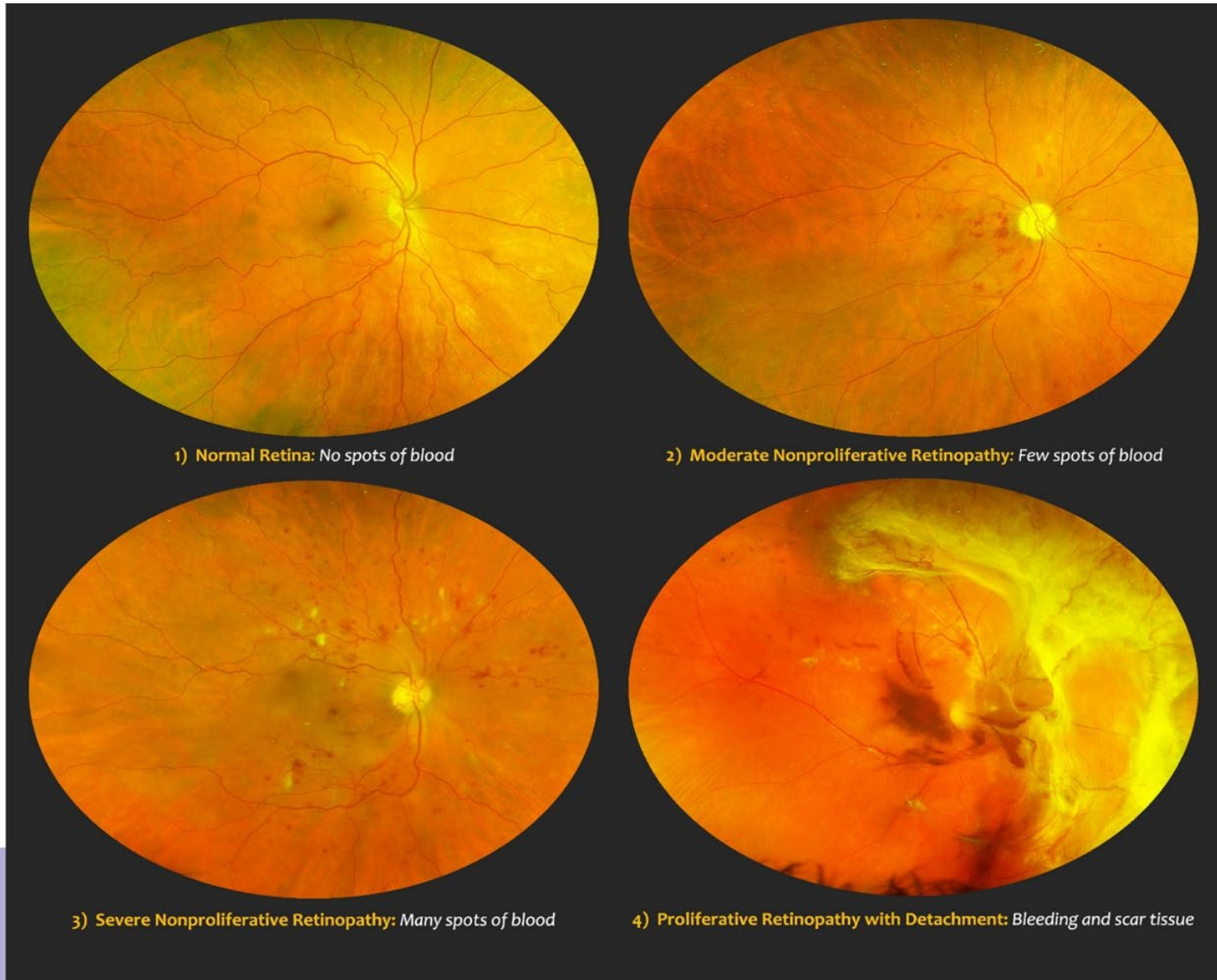




## Stages of Diabetic Retinopathy

High blood sugar damages blood vessels in the back of the eyes

Poster developed by the Phoenix Indian Medical Center Department of Ophthalmology and the Office of Community Relations



# IHS-JVN Imaging Systems

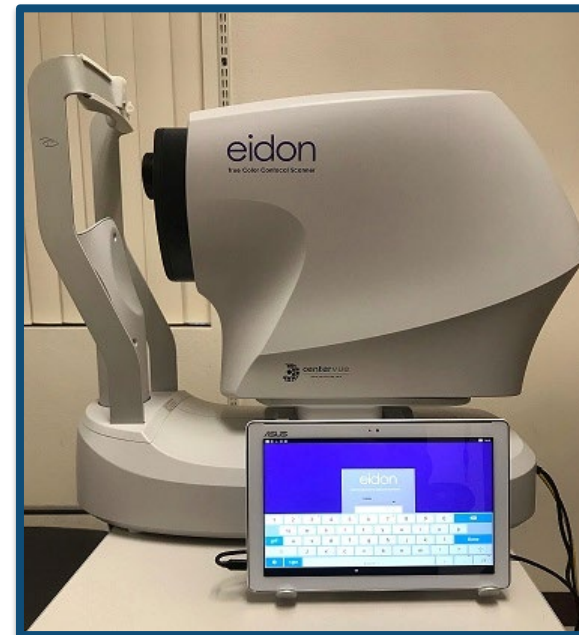


Non-mydriatic

Validated vs retinal exams and ETDRS photos



Optos - 90%



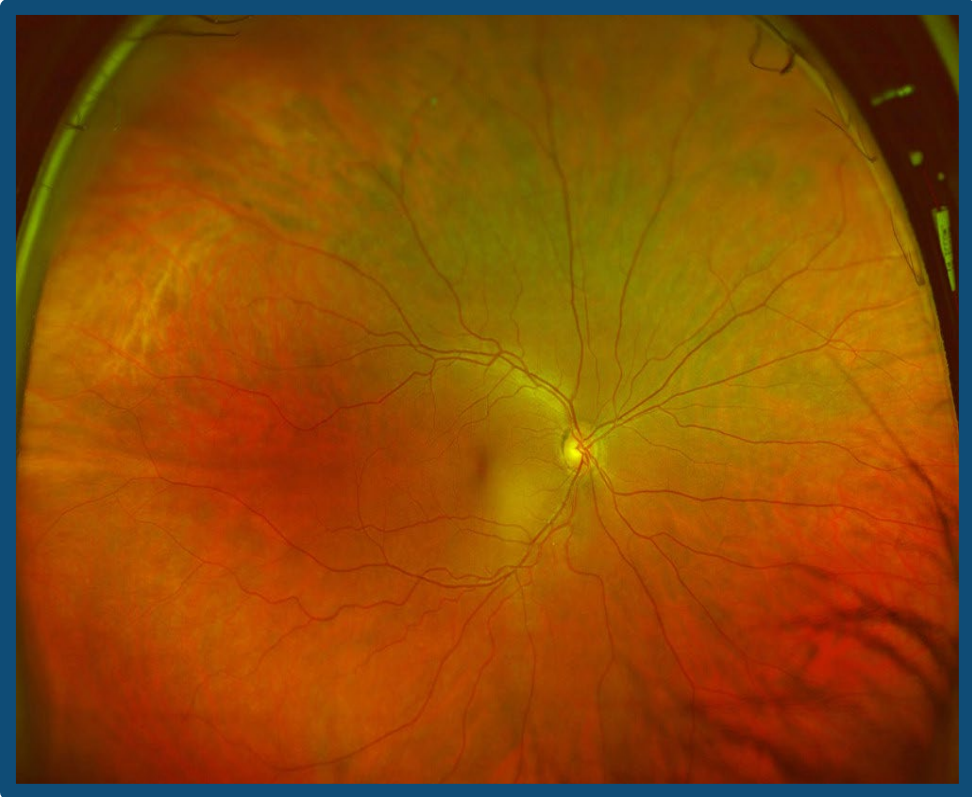
Eidon – mobile sites

Photos taken by Dr. Dara Shahon and courtesy of IHS-JVN Teleophthalmology program

# Comparison - Fields of View

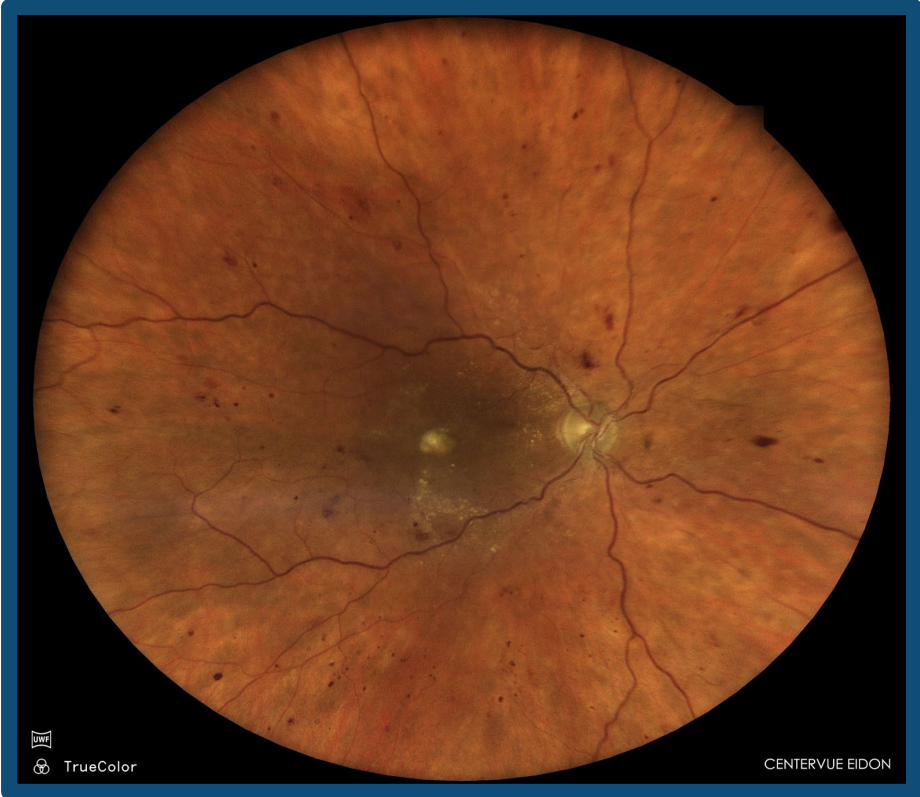


OPTOS DAYTONA – 200



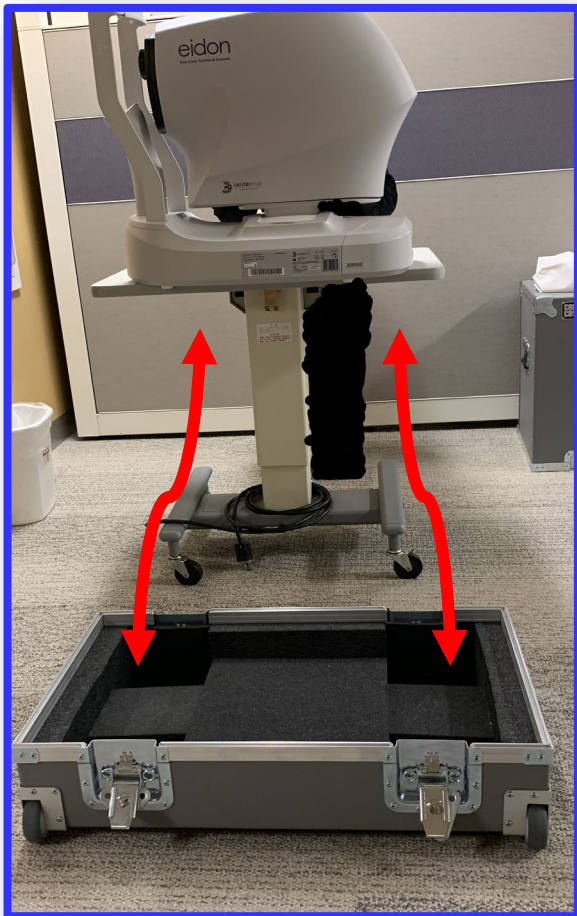
Optos photo courtesy of the IHS-JVN Teleophthalmology Program

EIDON – 120 (UWF lens)



Retina-eidon.com

# Moving the Eidon Camera



Photos taken by Dr. Dara Shahon and courtesy of the IHS-JVN Teleophthalmology program

# IHS/JVN: A Primary Care Tool

- Imaging stations are located in PC clinics
- Scheduled or Walk-ins



# IHS/JVN: Who should be imaged?

- Type 1 Diabetics – five years after diagnosis
- Type 2 Diabetics – at the time of diagnosis, then annually
- We do not image gestational diabetics
- Diabetic patients who become pregnant should be imaged in the first, second, and third trimesters
- All DM patients w/o a retinal exam in the past 12 months are eligible

# Imaging Station – Primary Care Clinics



Photos taken by Dr. Dara Shahon, courtesy of IHS-JVN Teleophthalmology program

**Imager retrieves report  
Follow-up arranged**



<https://studentaffairs.lehigh.edu/content/making-appointment-0>

# JVN Server – Phoenix Area



Illustration courtesy IHS-JVN  
Teleophthalmology program and  
Estenda solutions

# National Reading Center Phoenix, Arizona



Photos taken by Dr. Dara Shahon, courtesy of IHS-JVN  
Teleophthalmology program

JVN	
<b>Intermittent Surveillance Report</b> IHS/JVN National Reading Center 2020-21 National Reading Center 4222 N. 19th St., Phoenix, AZ 85018	
<b>Patient:</b> MSK 1778387	<b>Referring Physician:</b>
<b>Medical Record #:</b> 1590	<b>Physician Center Code:</b>
<b>Gender:</b> Male	
<b>Date of Birth:</b> 05/01/1991	<b>Imaging Date:</b> 06/08/2020
<b>Age:</b> 29 years	<b>Imaging Location:</b> King City Clinic
<b>Referral Number:</b> CARR-748A	<b>Date View Received:</b> 06/08/2020 10:40 AM EDT
<b>Patient's Medical Risk Factors for Chronic Retinopathy (CR)</b> Information Provided by Referring Physician	
<b>Duration of Diabetes:</b> 11 years	<b>Last Eye Exam:</b> 09/2019
<b>Diagnosis:</b>	<b>Last Number:</b>
<b>Hypertension Level:</b> Unilateral/Double/None	<b>Last/Current/None:</b> 120/80
<b>Smoker Status:</b>	<b>Weight/Height:</b> 170/5
<b>Imaging Results</b>	
<b>Level of Neuro-retinal DR:</b> 00000000000000000000	<b>Level of CR:</b> 00000000000000000000
<b>Level of Proliferative DR:</b> No Evidence	<b>Macula:</b> No Evidence
<b>Level of Macular Edema:</b> Moderate/Severe/No Evidence/No Evidence of Fluid or gel layer	<b>Optic Disc:</b> Evidence of CR/Fluid or gel layer
<b>Additional Findings:</b> No signs	<b>Other notes:</b> No signs
<b>Comments:</b> Right fundal laser marking in mac (CR) and macular gel (CR) refer to mac (CR)	
<b>Treatment Plan/Outcomes</b>	
<p><b>Monitor:</b> Monitor the clinical course of progression of diabetic retinopathy and related biomarkers. Optimization of the patient's overall health is recommended as a medically appropriate to the patient's particular circumstances.</p> <p><b>Diagnosis:</b> Monitor the clinical course of CR. CR should be monitored for the development of CR. Optimization of CR should be recommended as medically appropriate to the patient's particular circumstances.</p> <p><b>CR:</b> CR should be monitored for CR. CR should be monitored for CR.</p> <p><b>CR:</b> CR should be monitored for CR. CR should be monitored for CR.</p> <p><b>CR:</b> CR should be monitored for CR. CR should be monitored for CR.</p>	
<p><small>IHS/JVN Program Administrator: Neil B. Myers, MD, PhD IHS/JVN Program Manager: Richard Beck, MD Page 1 of 1   06/08/2020 10:40 AM EDT IHS/JVN Program Manager: Neil B. Myers, MD, PhD   IHS/JVN Program Manager: Richard Beck, MD Page 1 of 1   06/08/2020 10:40 AM EDT</small></p>	

Demo report courtesy of IHS-JVN  
Teleophthalmology program





# IHS-JVN Recommendations



## Reading Center

JVN retinal images taken

Level of retinopathy diagnosed

**Follow-up and Referrals  
Recommended**

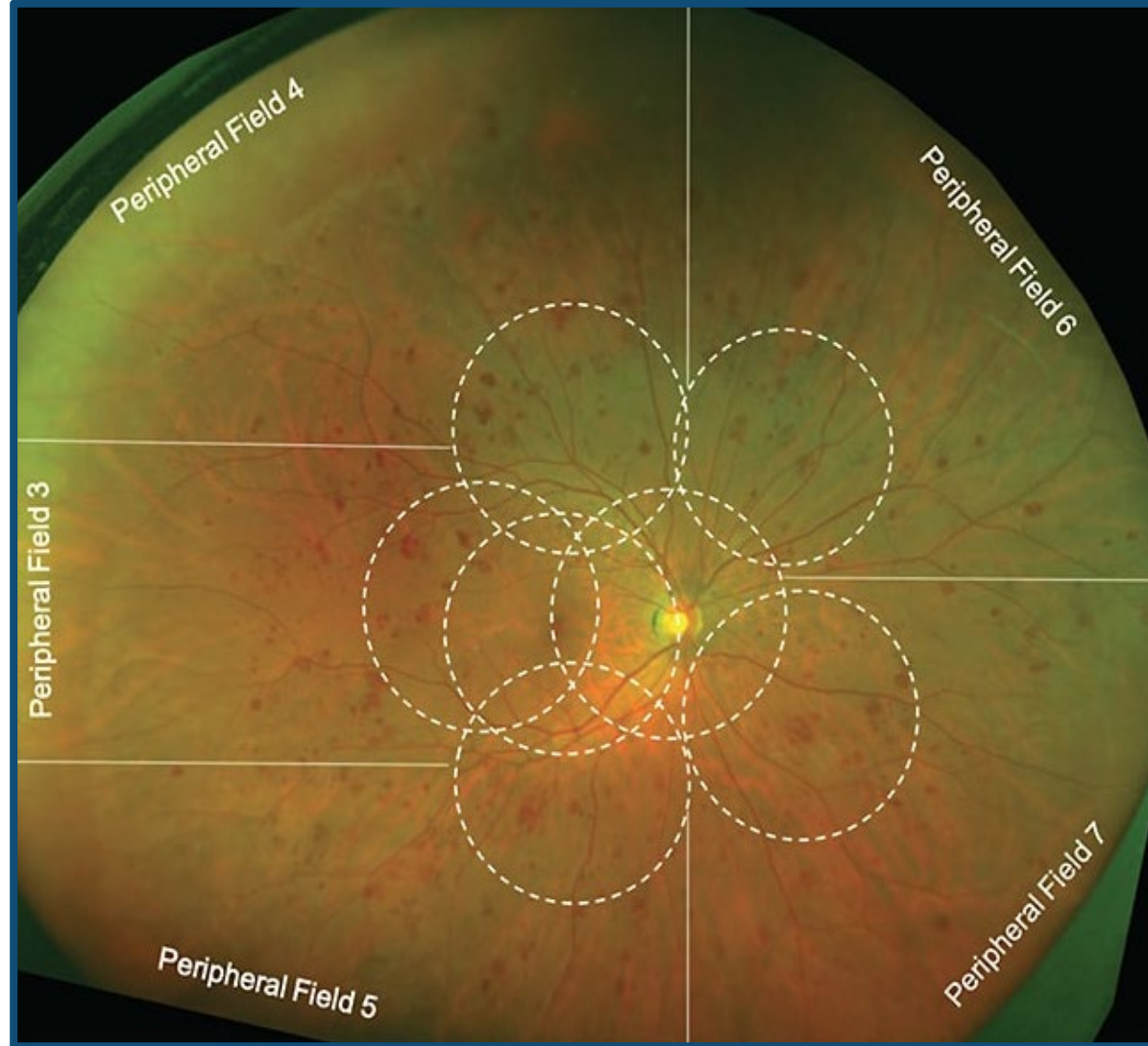
**75% continue with IHS-JVN\***

Specific time frame recommended  
(typically 1 year)

**25% referred\***

To Optometry or Ophthalmology

\*Percentages averaged over time period 2016-2023



# ETDRS Standard Images:

## How we grade for Diabetic Retinopathy





**Teleretinal Surveillance Report**  
**IHS/JVN National Reading Center**  
 IHS/JVN National Reading Center  
 4212 N. 16<sup>th</sup> Street, Phoenix, AZ 85016




<b>Patient:</b>	Demo 1 Demo	<b>Referring Provider</b>	Demo, Dr.
<b>Medical Record#:</b>	1000000000000	<b>Provider Contact Info:</b>	
<b>Gender:</b>	Female		
<b>Date of Birth:</b>	10/01/1920	<b>Imaging Date:</b>	10/13/2023
<b>Age:</b>	103 years	<b>Imaging Location:</b>	Phoenix Indian Medical Center
<b>Imager Name:</b>	Giles, Erin	<b>Date, Time Received:</b>	10/13/2023 09:26 AM

Patient's Medical Risk Factors for Diabetic Retinopathy (DR) Information Provided by Referring Practice		
<b>Duration of Diabetes</b>	11 Years	<b>Last Eye Exam:</b>
		<b>Lab Studies:</b>
		A1C: 9%

Image Results		
	<b>RIGHT EYE (OD)</b>	<b>LEFT EYE (OS)</b>
<b>Level of Nonproliferative DR:</b>	Moderate	Moderate
<b>Level of Proliferative DR:</b>	No Evidence	No Evidence
<b>Level of Macular Edema:</b>	No Evidence	No Evidence
<b>Additional Findings:</b>	Cotton wool spots	Cotton wool spots
<b>Comments:</b>		
Moderate Nonproliferative Diabetic Retinopathy noted in both eyes. Mild vessel tortuosity and A/V crossing changes noted in both eyes suggestive of hypertension.		

**\* Treatment Plan Guidance**

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HbA1C >= 7.0% < 10.0%, Hypertension, Dyslipidemia:

Elevated HbA1C (>=7%) blood pressure (>=130/80) and lipids have been shown to increase risk of development and progression of diabetic retinopathy, and presence and severity of hard exudates, respectively. Reducing HbA1C >= 7.0% or as low as a medically appropriate to this patient's particular circumstances is recommended as is optimization of lipids and hypertension, also as medically appropriate to this patient's particular circumstances.

Diabetic Retinopathy evident by JVN examination; please see Imaging Results.

Refer to Eye Clinic Based on the above findings, we recommend follow up with an optometrist/ophthalmologist for dilated retinal examination within one month.

# Return times and Referrals

DR Level	Plan
No DR, Mild NPDR	Re-image - 12 months
Moderate NPDR, ci-DME, Severe NPDR	Refer for a clinic retinal exam
PDR	Refer immediately to Retina

**60% of all images had no DR (2016-2023)**

# Diabetic Retinopathy - Clinical Management



Primary Care imaging

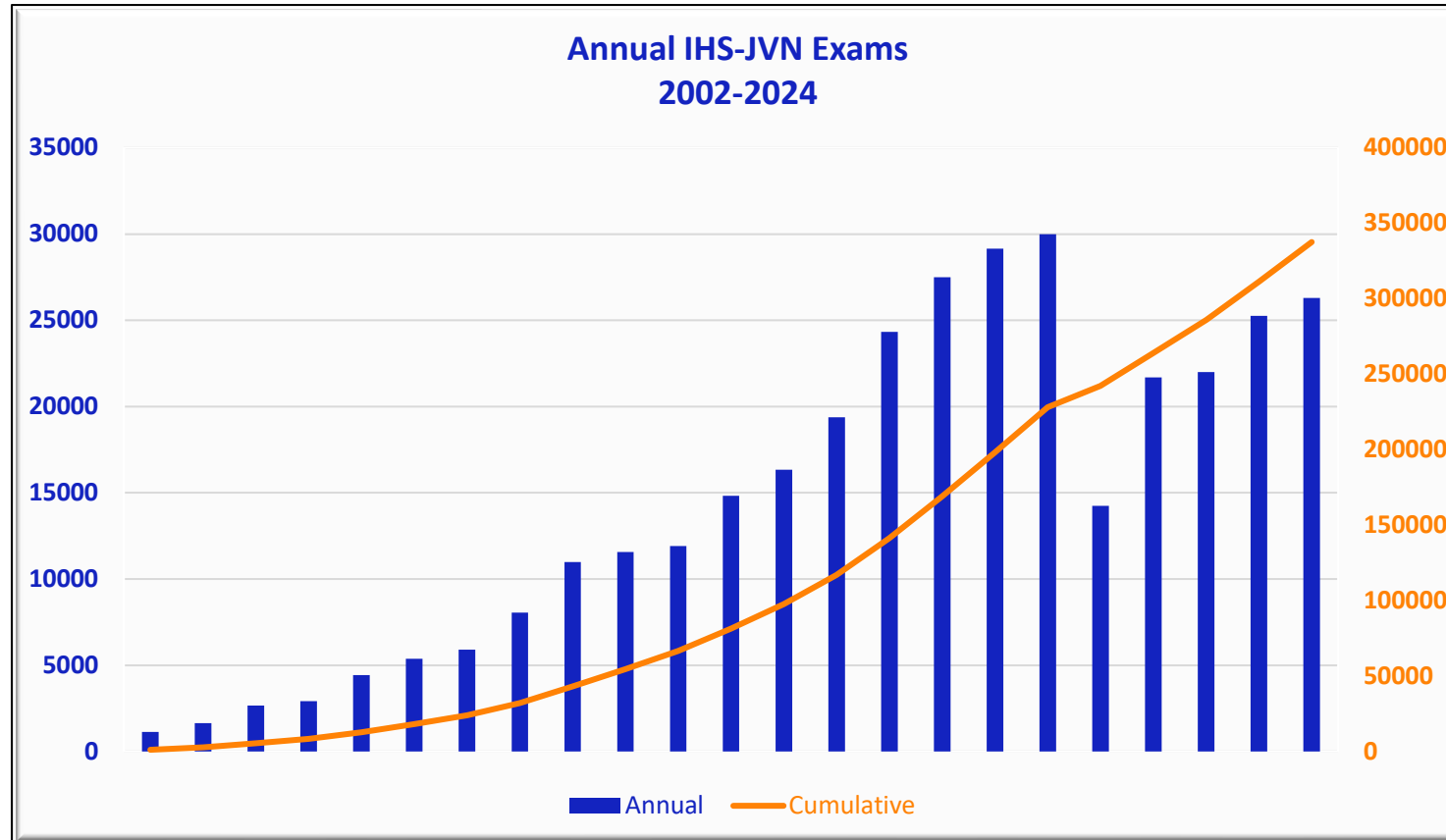
Ophthalmologist / Optometrist / Primary care team



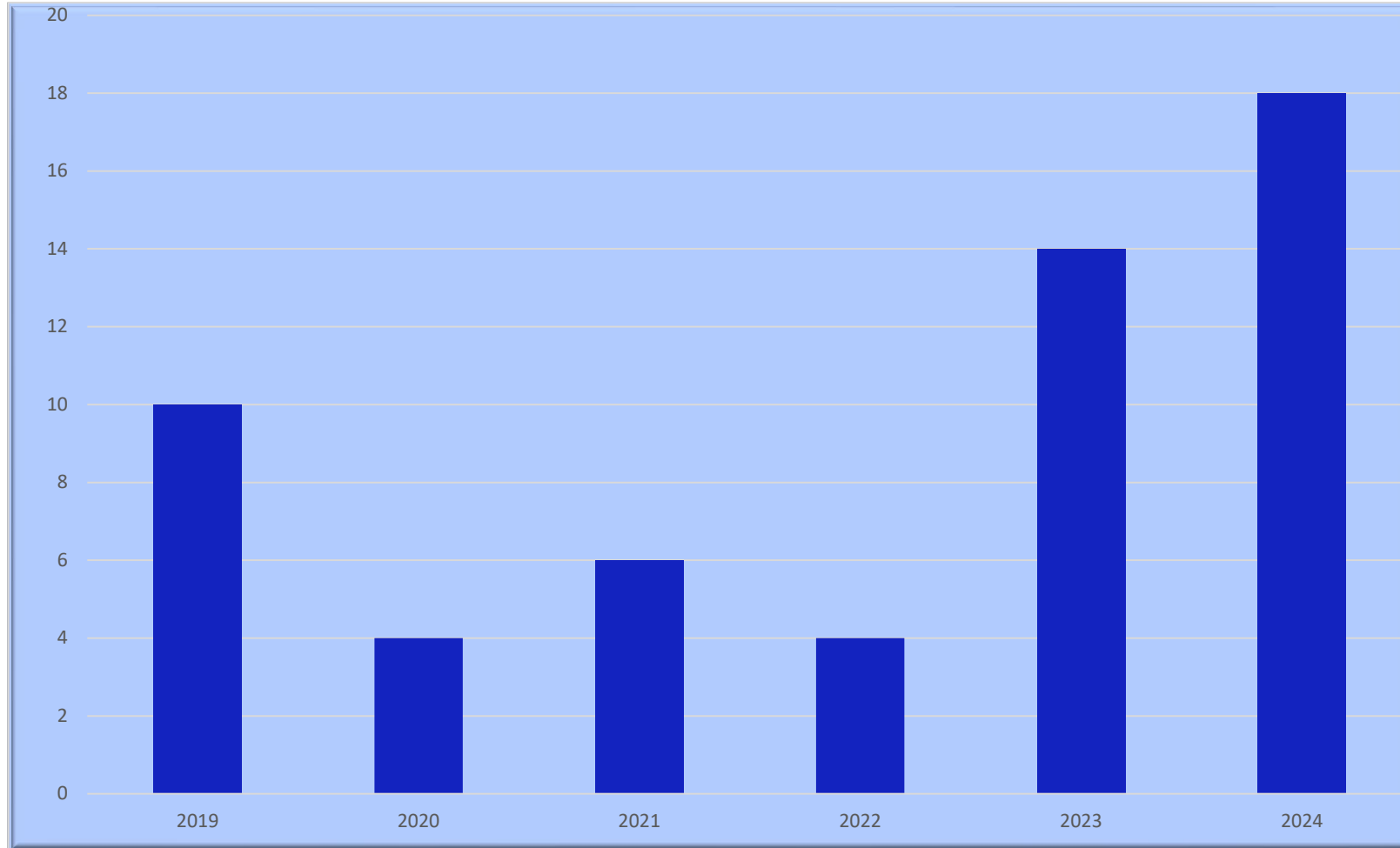
- GOALS:
- Timely diagnosis
  - Early treatment
  - Control of DM-HTN-lipids

# Annual IHS-JVN Exams

## 365,120 images to date



# IHS-JVN CAMERAS DEPLOYED



# Access to Care – Facility and Providers



Photo courtesy of Megan Woehr, Operations Planner, PIMC

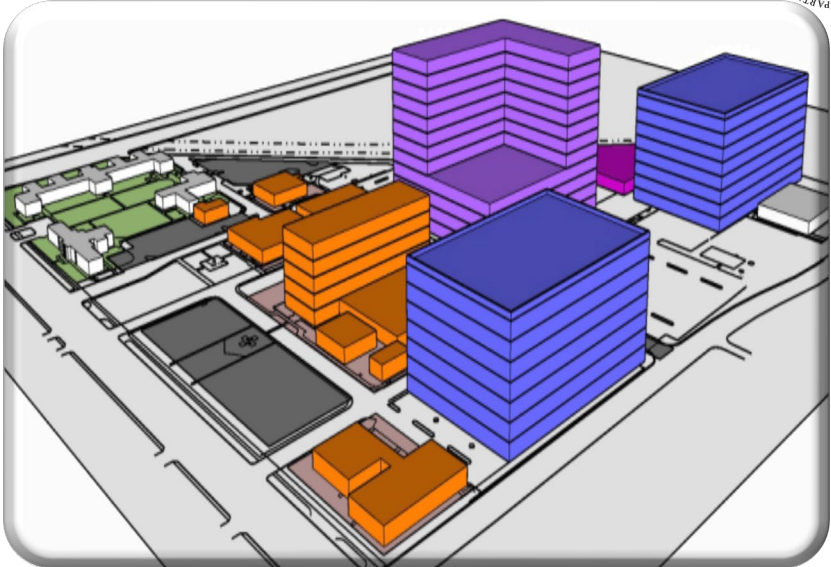


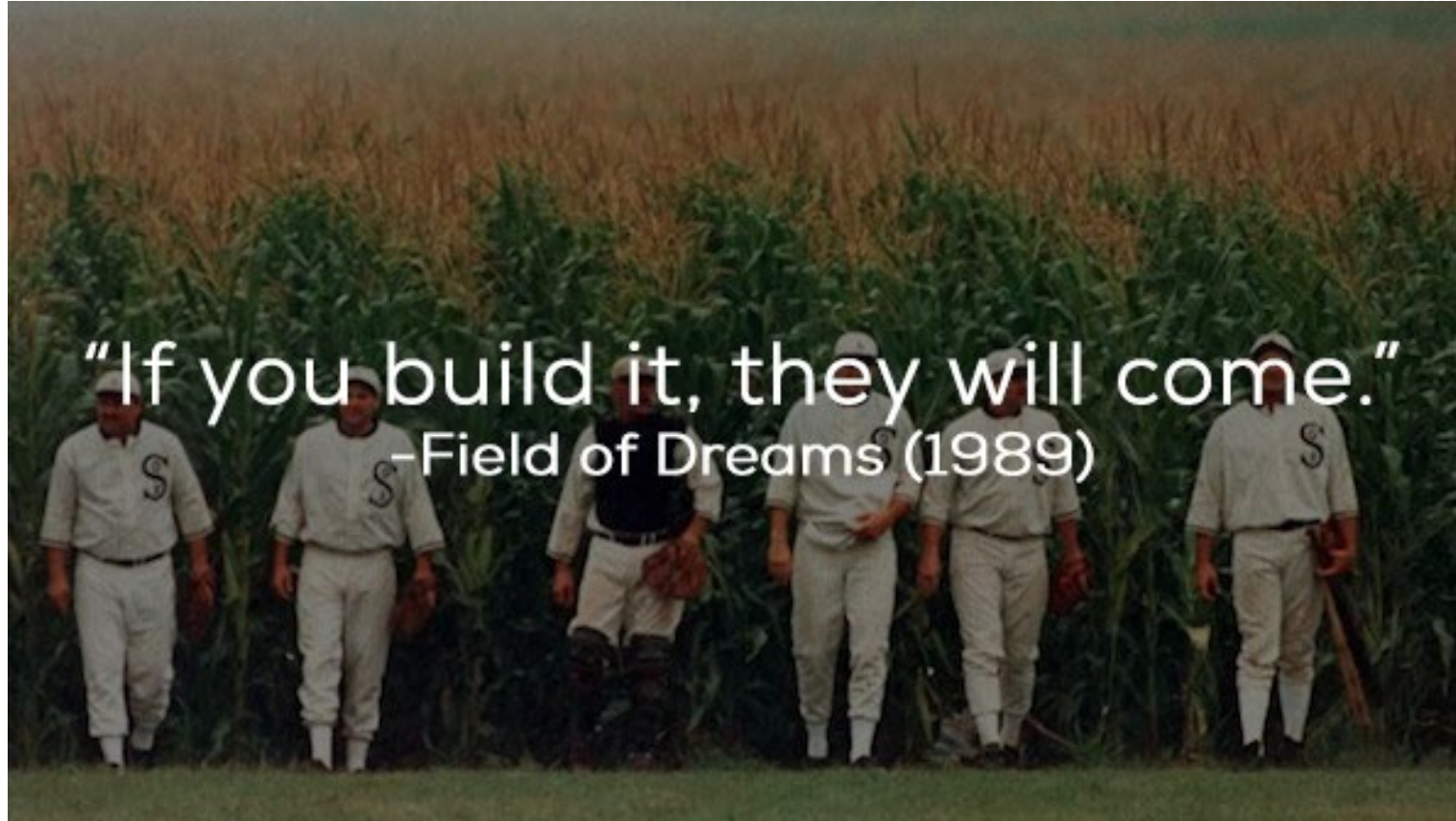
Photo courtesy of Megan Woehr, Operations Planner, PIMC



<https://www.valleychildrens.org/healthcare-professionals/childnet>



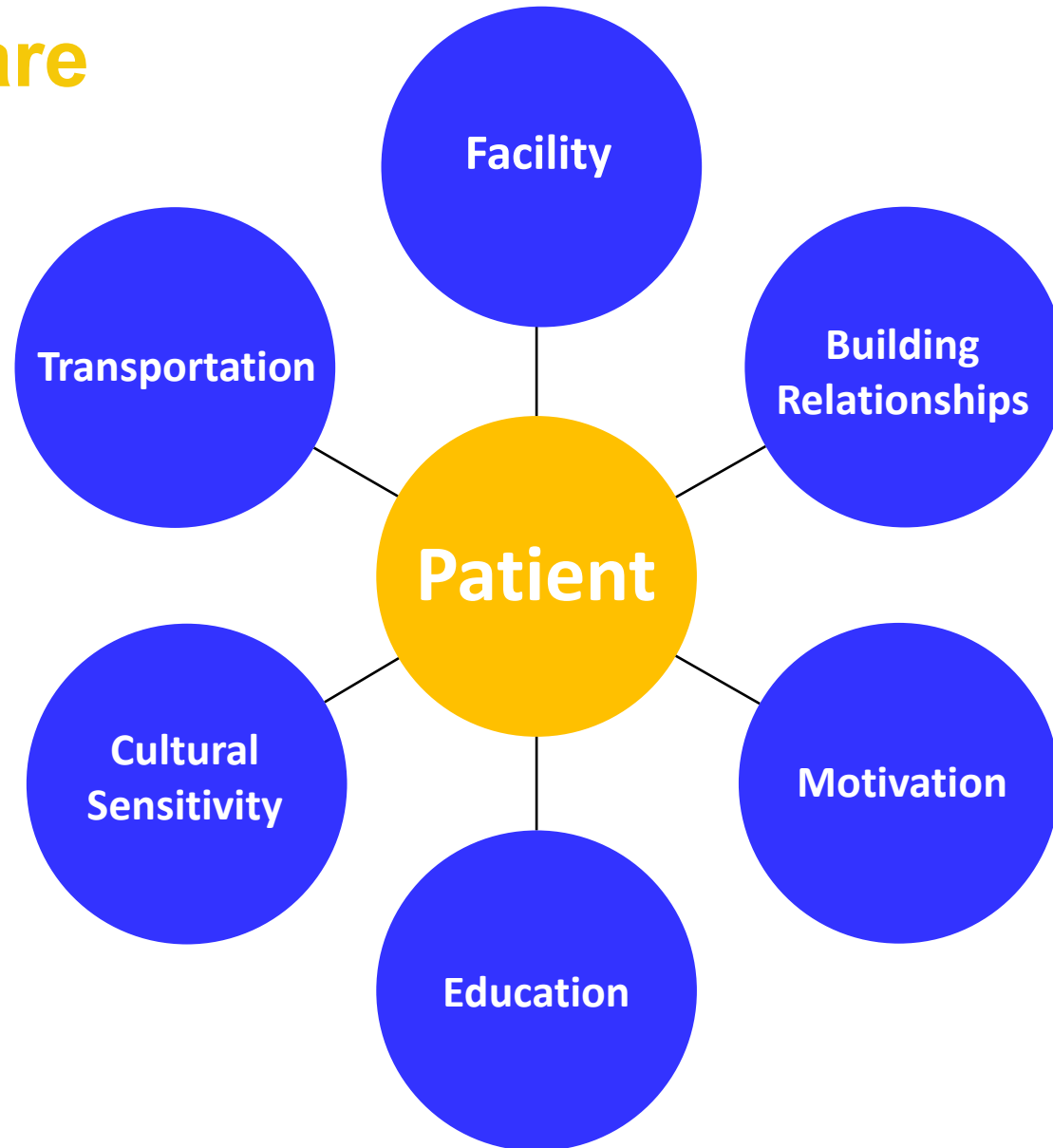
<https://www.erg.com/project/promoting-hospital-worker-safety>



<https://leadinginlimbo.weebly.com/leading-in-limbo/if-you-build-it>

Not necessarily...

# Access to Care





**Teleretinal Surveillance Report**  
**IHS/JVN National Reading Center**  
 IHS/JVN National Reading Center  
 4212 N. 16<sup>th</sup> Street, Phoenix, AZ 85016



<b>Patient:</b>	Demo 1 Demo	<b>Referring Provider:</b>	Demo, Dr.
<b>Medical Record#:</b>	1000000000000	<b>Provider Contact Info:</b>	
<b>Gender:</b>	Female		
<b>Date of Birth:</b>	10/01/1920	<b>Imaging Date:</b>	10/13/2023
<b>Age:</b>	103 years	<b>Imaging Location:</b>	Phoenix Indian Medical Center
<b>Imager Name:</b>	Giles, Erin	<b>Date, Time Received:</b>	10/13/2023 09:26 AM

**Patient's Medical Risk Factors for Diabetic Retinopathy (DR)**  
*Information Provided by Referring Practice*

<b>Duration of Diabetes</b>	11 Years	<b>Last Eye Exam:</b>
		<b>Lab Studies:</b>
		A1C: 9%

**Image Results**

	<b>RIGHT EYE (OD)</b>	<b>LEFT EYE (OS)</b>
Level of Nonproliferative DR:	Moderate	Moderate
Level of Proliferative DR:	No Evidence	No Evidence
Level of Macular Edema:	No Evidence	No Evidence
Additional Findings:	Cotton wool spots	Cotton wool spots
Comments:		

Moderate Nonproliferative Diabetic Retinopathy noted in both eyes. Mild vessel tortuosity and A/V crossing changes noted in both eyes suggestive of hypertension.

**\* Treatment Plan Guidance**



HbA1C >= 7.0% < 10.0%, Hypertension, Dyslipidemia:

Elevated HbA1C (>=7%) blood pressure (>=130/80) and lipids have been shown to increase risk of development and progression of diabetic retinopathy, and presence and severity of hard exudates, respectively. Reducing HbA1C >= 7.0% or as low as a medically appropriate to this patient's particular circumstances is recommended as is optimization of lipids and hypertension, also as medically appropriate to this patient's particular circumstances.

Diabetic Retinopathy evident by JVN examination; please see Imaging Results.

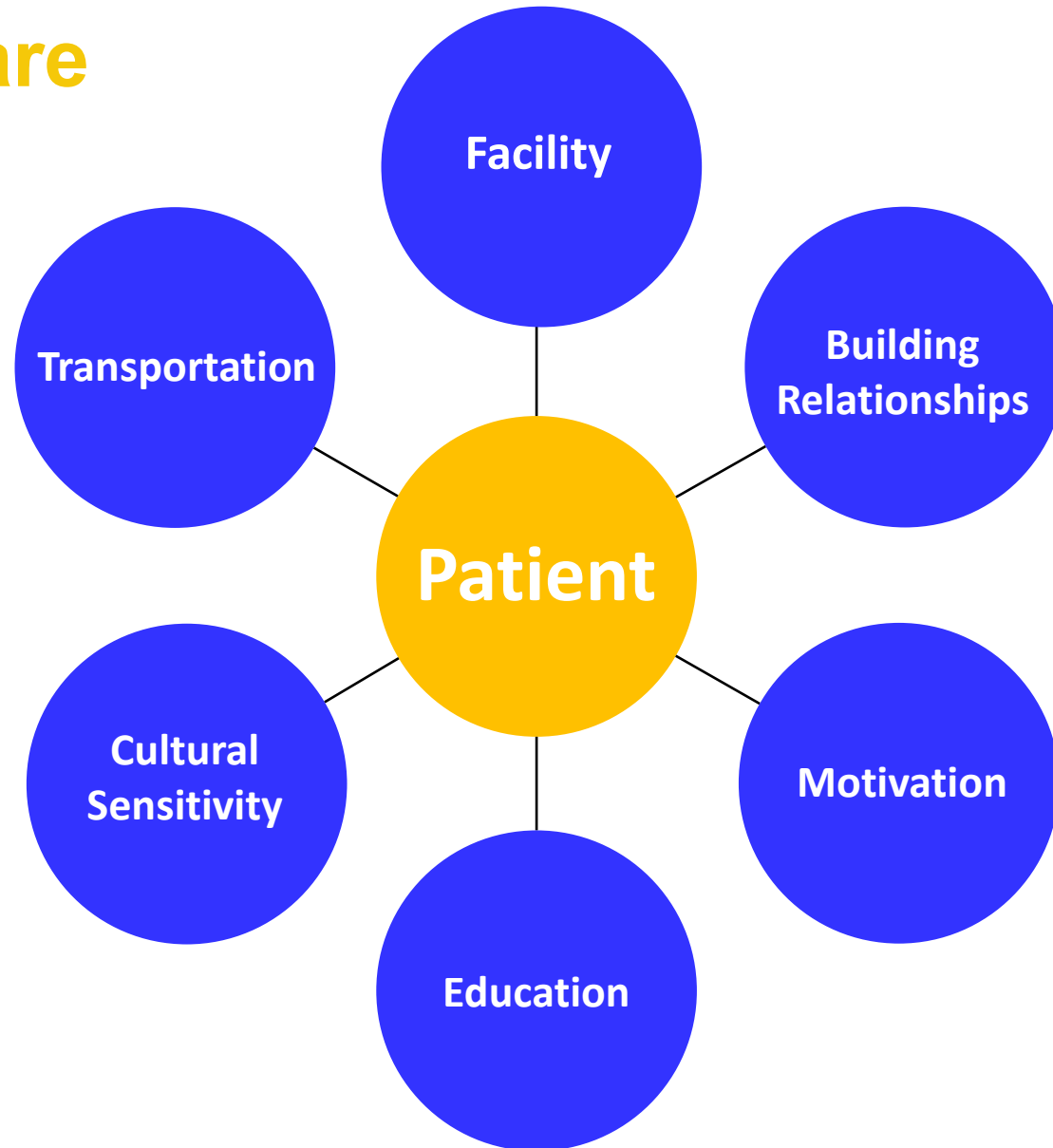
Refer to Eye Clinic Based on the above findings, we recommend follow up with an optometrist/ophthalmologist for dilated retinal examination within one month.

**Great report, how about follow-up?**

# Patient Adherence

- Urgent referrals - currently studying rates of follow-up at our most well-resourced site (2018-2021)
- Results – So far, we know that the rate of ANY follow-up in this study is better than reported in the literature for minority or lower-income groups with sight-threatening eye disease.
- The results are not as high as other populations such as Medicare beneficiaries

# Access to Care



Focus on education and patient care coordination

# Artificial Intelligence

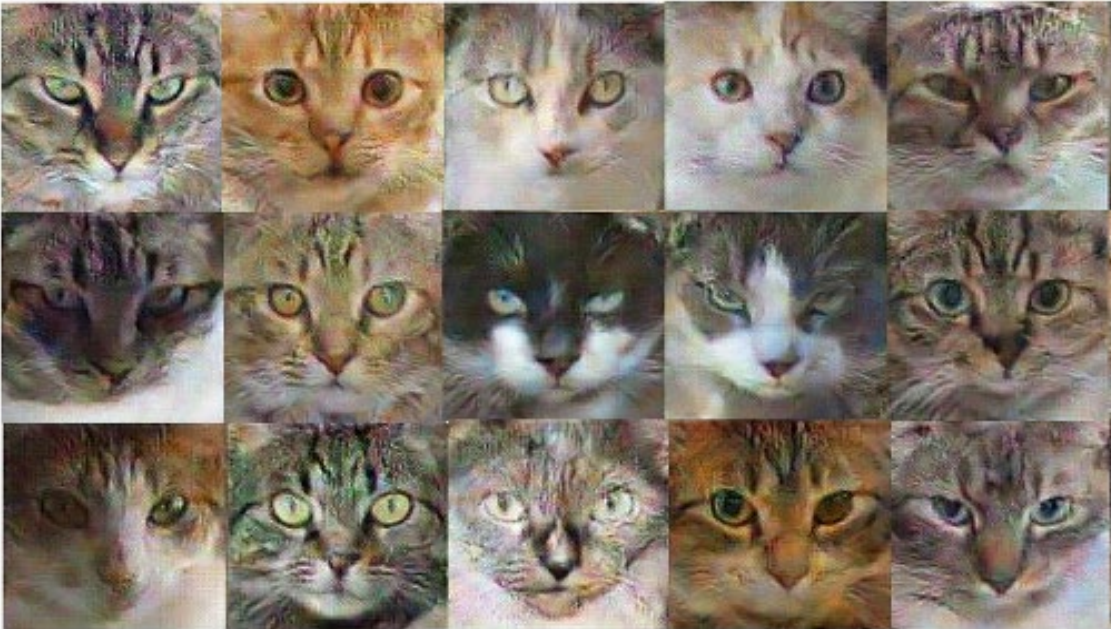
- It is the science that enables computers to think, learn, improve and make decisions like humans
- This extensive learning and improving requires a lot of training data
- Training data may take many forms (numbers/formulas for financial data, photographs or pictures, sounds)
- **For the JVN program, it is pattern recognition that allows AI to read images.**

# CAT

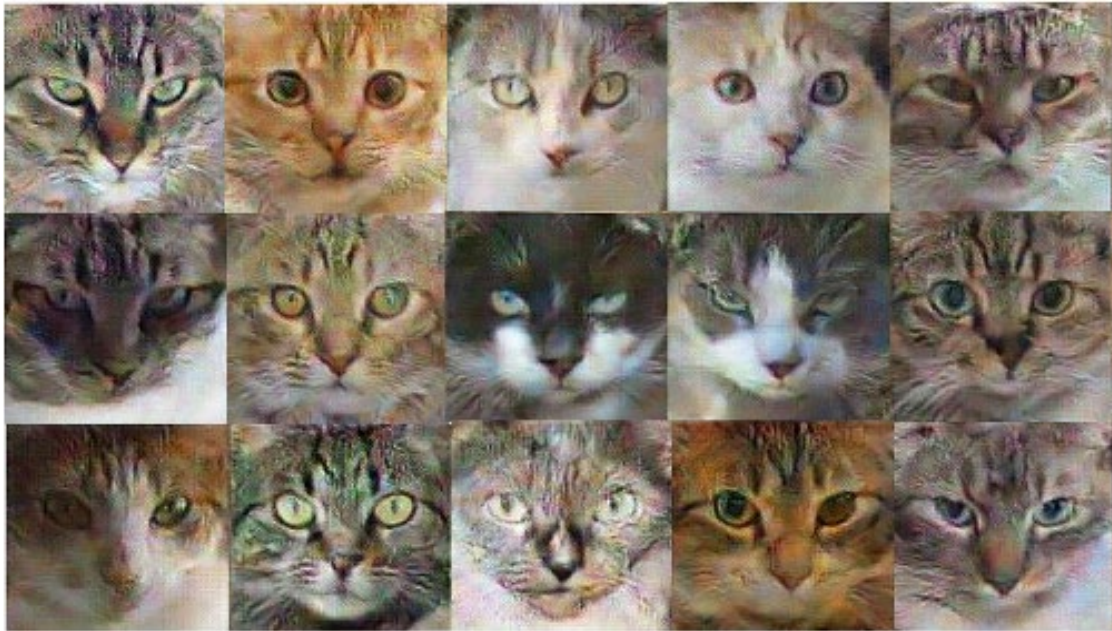
# NO CAT



*AI was trained to recognize the cat image*



# AI TRAINING



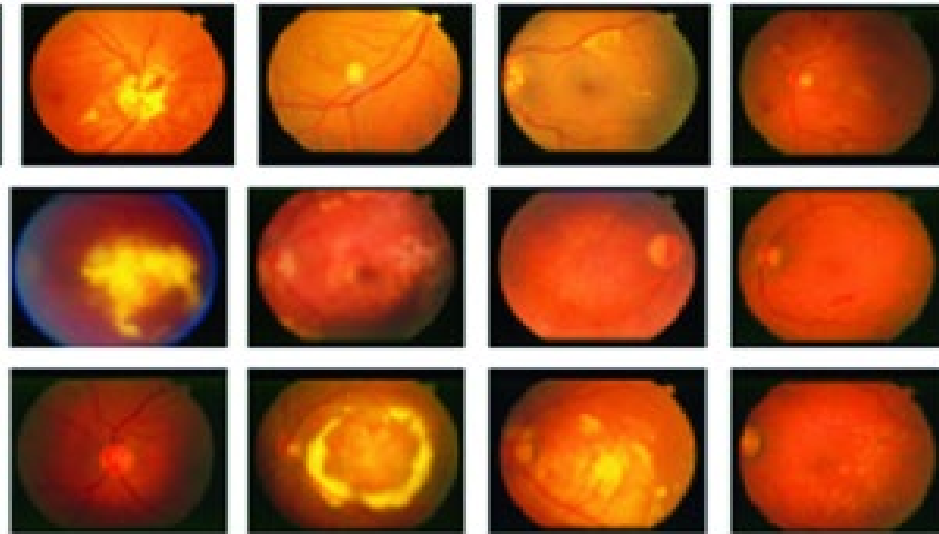
Teaches the computer to identify patterns in the pictures.

Initially learned cat vs. other

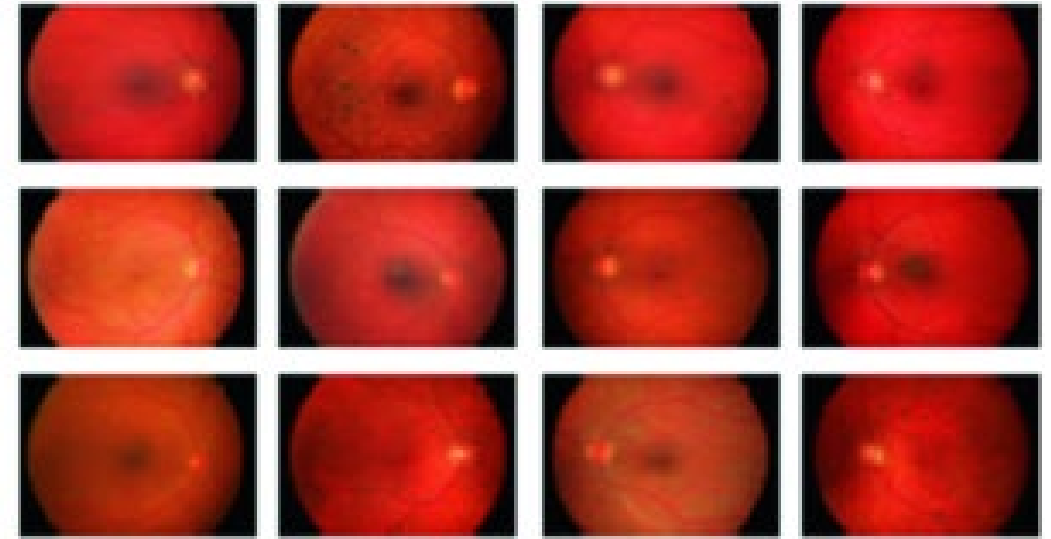
No can distinguish 5,000 species

# JVN: PATTERN RECOGNITION

*DR*

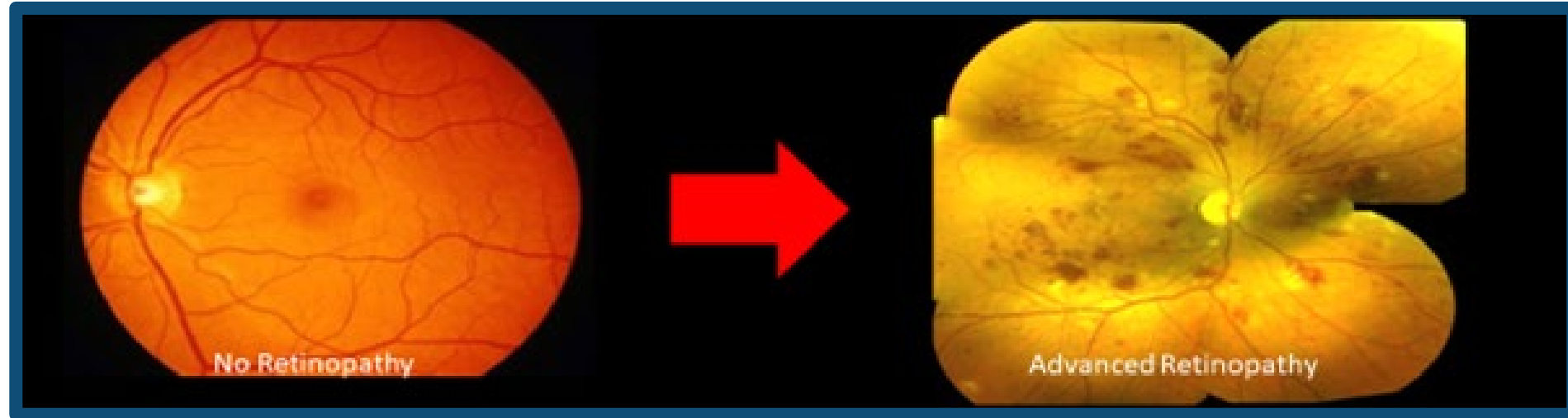


*NO DR*



- AI algorithms have already been developed and validated based on retinal images similar to JVN.

# AI - Answering Difficult Questions



Photographs courtesy of Dr. Paolo Silva, Joslin Vision Network, Boston

- Will DR progress in a patient with no retinopathy or mild retinopathy?
- This would help to predict who may need closer monitoring



**Figure 1: Bayesian network model predicting the 5 year risk of diabetic retinopathy progression.** PDR: proliferative diabetic retinopathy, NPDR: nonproliferative diabetic retinopathy, A1c: hemoglobin A1c, BP: blood pressure, DBP: diastolic blood pressure; Max: maximum; Min :minimum; SBP: systolic blood pressure

# IHS-JVN Goals for A.I.

- **2025/2026: Early testing of software and use of AI to determine if diabetic retinopathy is present. Identify the 70 percent of patients who do not have significant retinopathy.**
- **Eventually develop an algorithm specific to our patient population**
- **Goals include predicting 3 to 5 year progression risk.**

# Semaglutides

- Does not make DR progress. If new or worse DR findings, generally transient (as with any intense glycemic control)
- May increase risk for Ischemic Optic Neuropathy



<https://ophthalmologymanagement.com/issues/2020/july/advances-in-diabetic-retinopathy-surveillance/>

# IHS/JVN STAFF



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Imagers and Trainers  
Research Team

Adjudicators (Ophthalmology)  
IT and Deployment Support  
Health System Specialist



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The contents do not represent the views of the Indian Health Service or the United States Government



# Diabetic Retinopathy Examination – GPRA measure

Annual examination rate of  
Active DM patients

Qualifying DR examinations

- \*Dilated eye examination

- \*Validated telemedicine retinal imaging

# Annual DR Examination Rate Clinical Outcome

## IHS-JVN Exams vs IHS DR Exam Rate

