

# Joslin Vision Network Diabetes Eye Care Program



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# Joslin Diabetes Center

## Research

- Sections are basic and clinical
- \$310 million over past 20 years
- 60% of NIH grant applications approved, 20% is usual
- 140 MDs/PhDs in training: 1/3 MD, 1/3 PhD, 1/3 both degrees

## Clinic

- Founded by Dr. Elliott P. Joslin in 1898
- Largest center in the world for treatment and education of patients with diabetes
- Over 87,000 patient visits a year to experts in adult and pediatric diabetes, kidney disease, eye care, mental health and pregnancy

## Strategic Initiatives

- Extends Joslin products, services and assets to the global marketplace
- Healthcare Services, Professional Education, Affiliated Programs, International Programs

## Joslin Ventures

- Provides an active framework that will seed new ideas
- Partner technologies for co-development with other companies
- Brings selected Joslin technologies to a commercially ready stage for spin-out opportunities and joint ventures

# The World Relies on Joslin

Largest institution in the world devoted exclusively to diabetes research, care and education

Affiliated with Harvard Medical School

Highest patient population on insulin pumps in the world

Database of medical data stretching back decades

Best record for saving kidneys, legs and eyesight potentially lost to diabetes



More than 40,000 patients cared for by the Joslin Vision Network

More than 100,000 patients seen each year at 41 Affiliated Centers

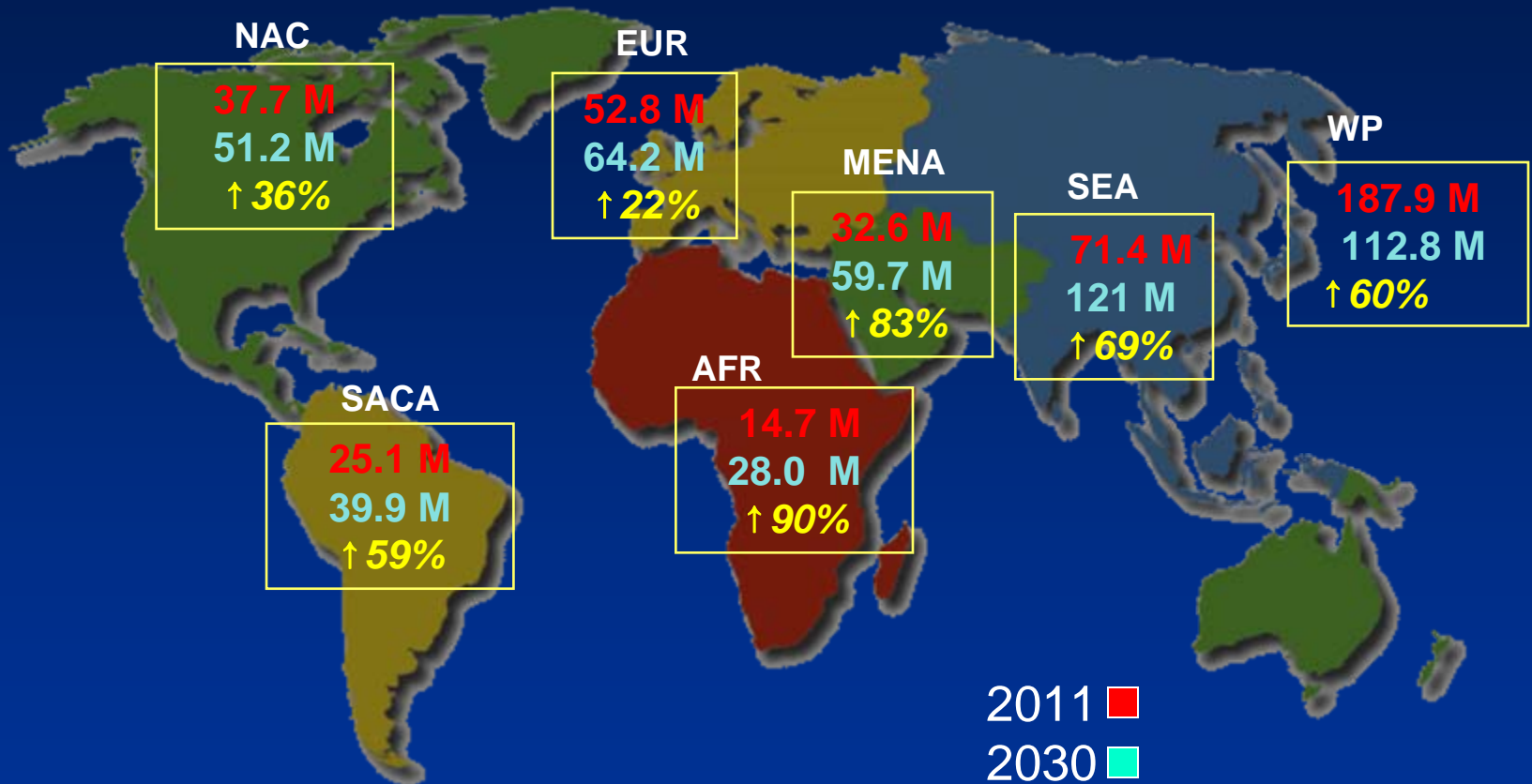
Highest concentration of diabetes educators in the world

Sets the standard of care and education with 250,000+ patients treated

World's largest team of board-certified physicians treating diabetes

**How Severe is the Problem?**

# Global Projections for the Diabetes Epidemic: 2011-2030



M = million, AFR = Africa, NAC = North America and Caribbean, EUR = Europe, SACA = South and Central America, MENA = Middle East and North Africa, SEA = South-East Asia, WP = Western Pacific  
Diabetes Atlas Committee. *Diabetes Atlas 5th Edition*: IDF 2011.

# Diabetes Worldwide

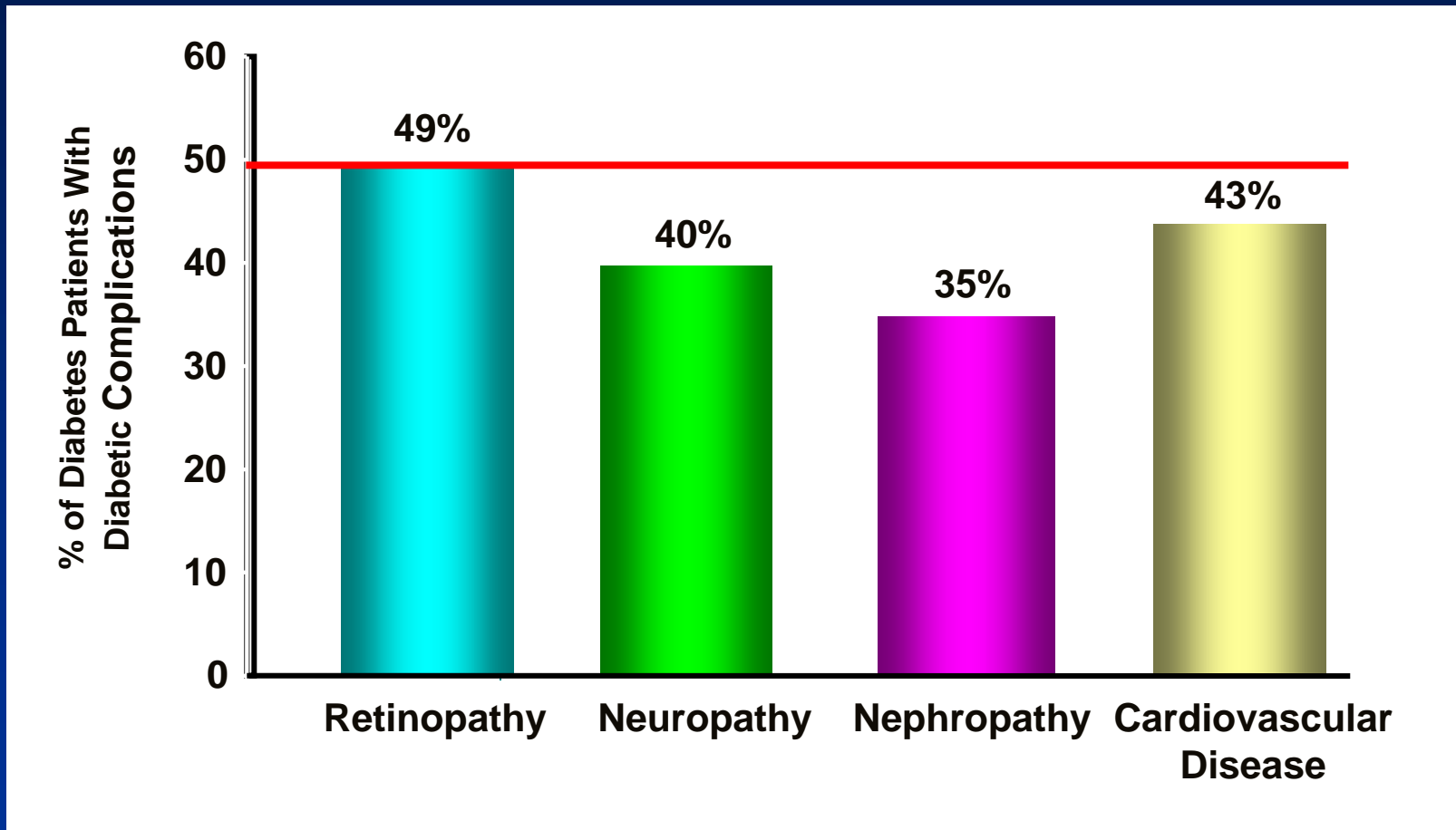
Persons with Diabetes 2011:

**366 million** (8.3% of world's adult population)

Persons with Diabetes 2030:

**552 million** (51% increase)

# Prevalence of Diabetic Complications



Centers for Disease Control and Prevention, 2008

# Global Retinopathy Evaluation Need

Based on current estimates

3 million eyes per day

at least will need to be

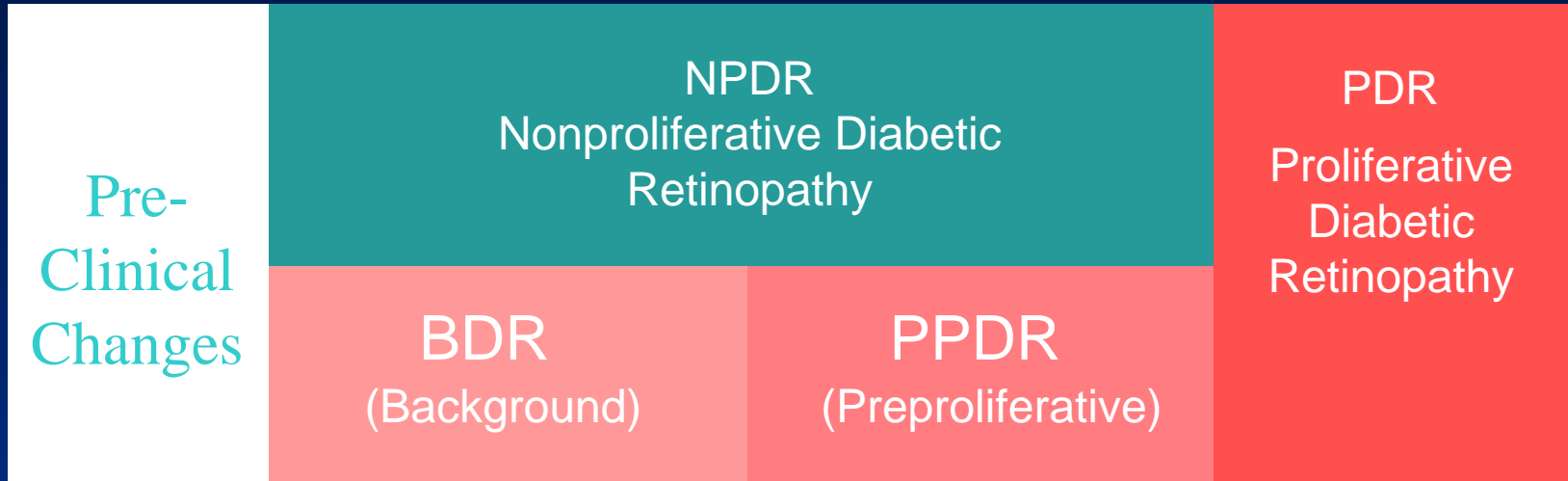
evaluated by 2030



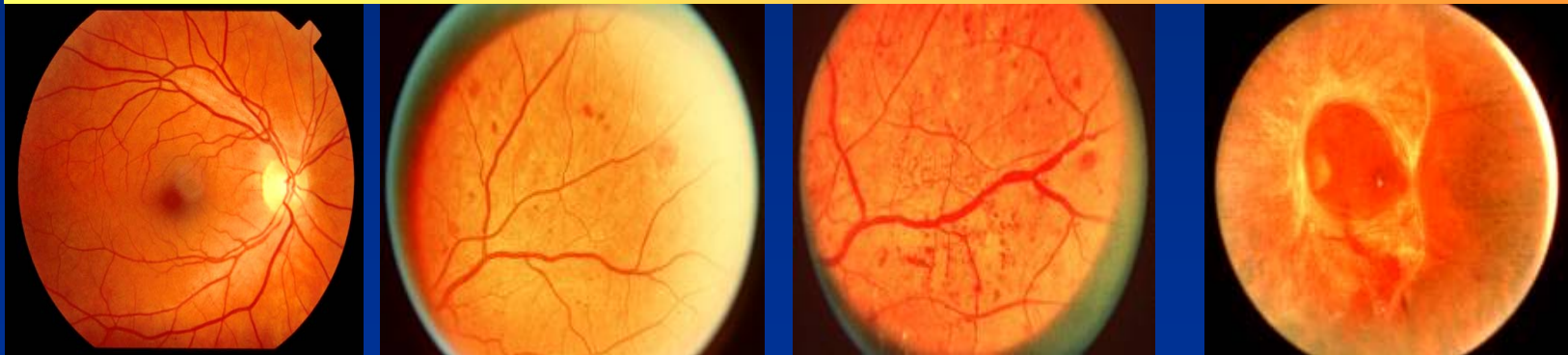
# **Why Focus on Diabetic Eye Disease?**

# Clinical Stages of Diabetic Retinopathy

STAGES



SEVERITY



None

Mild to Moderate

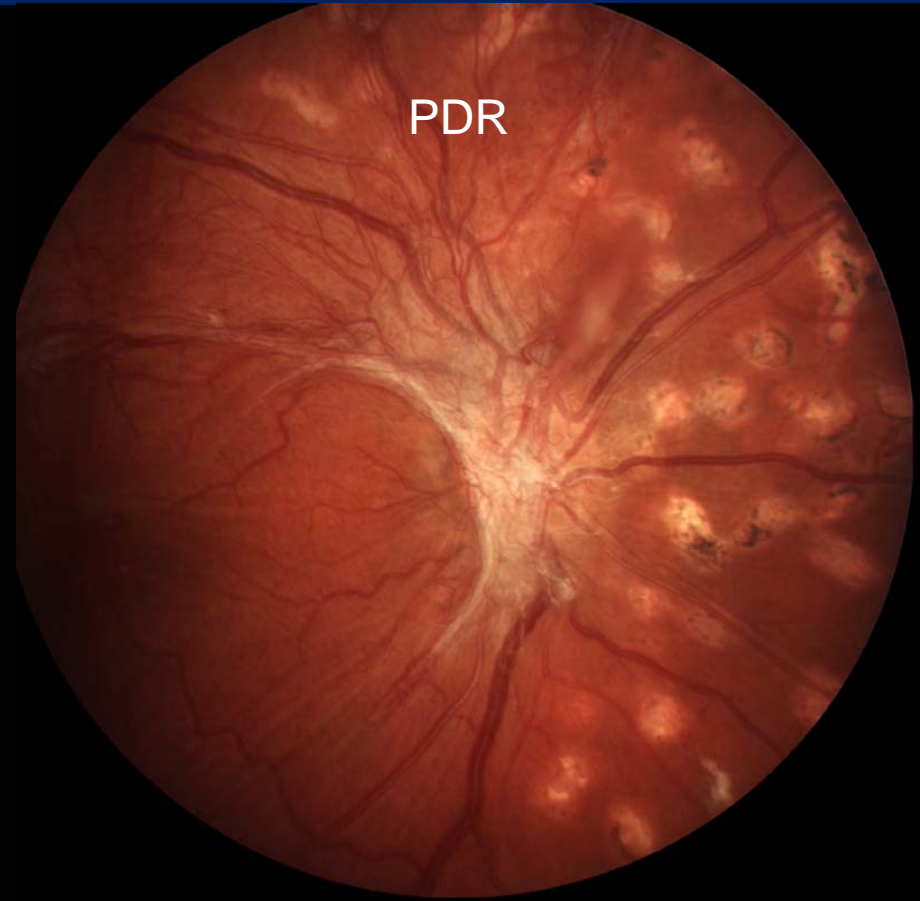
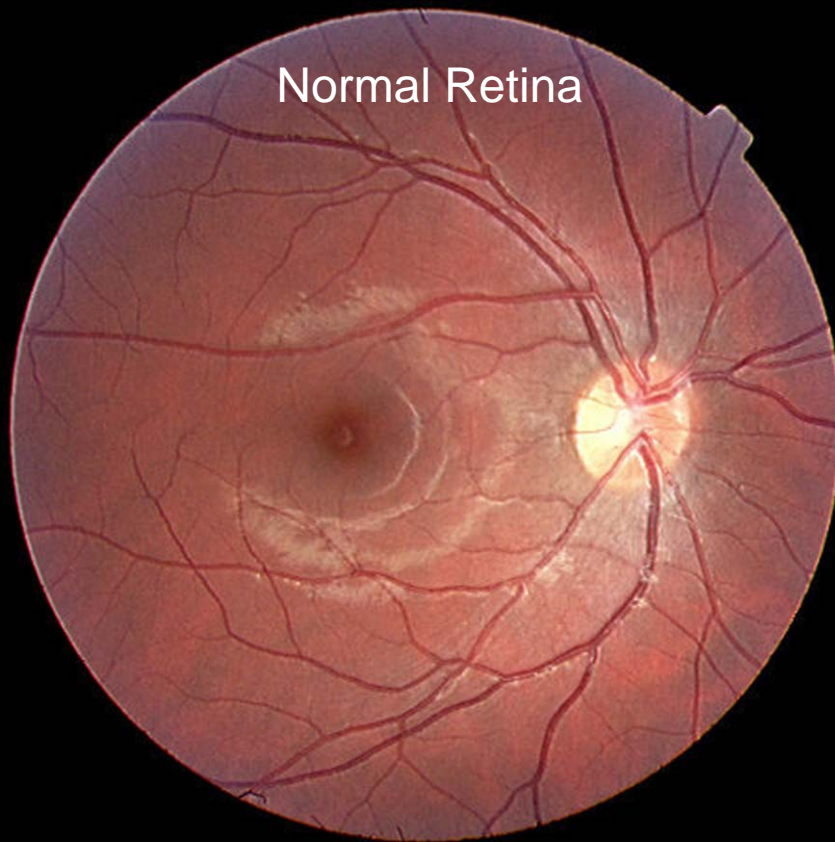
Moderate to Severe

Neovascularization

# Vision Loss from Diabetic Retinopathy

Retinal Vascular Proliferation

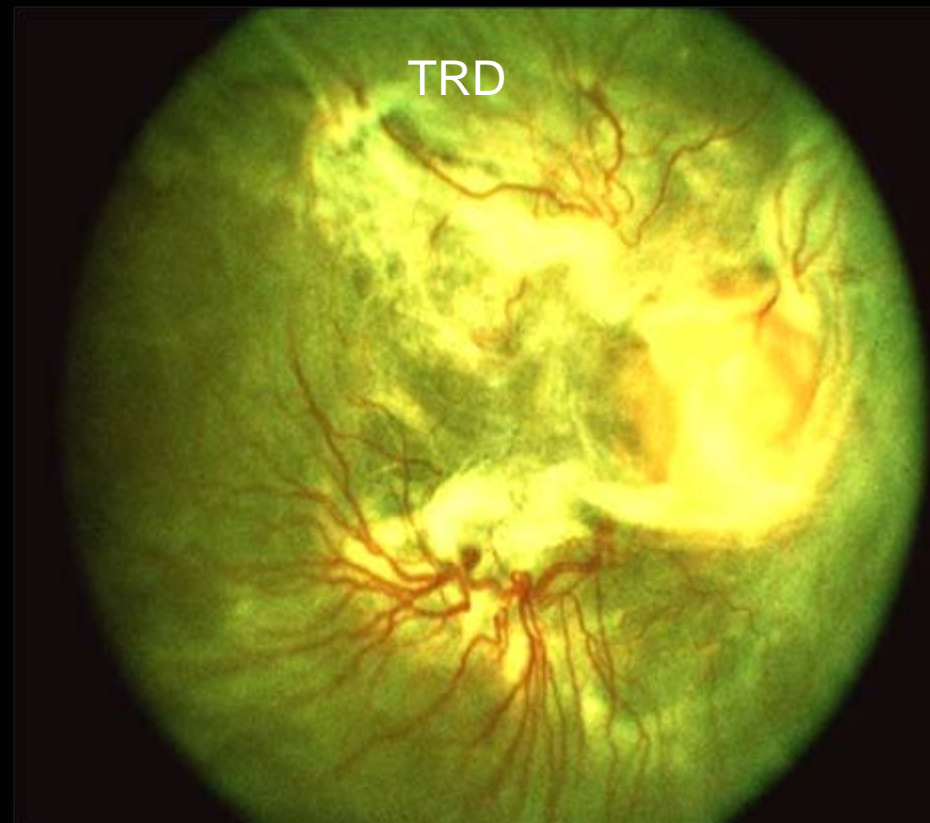
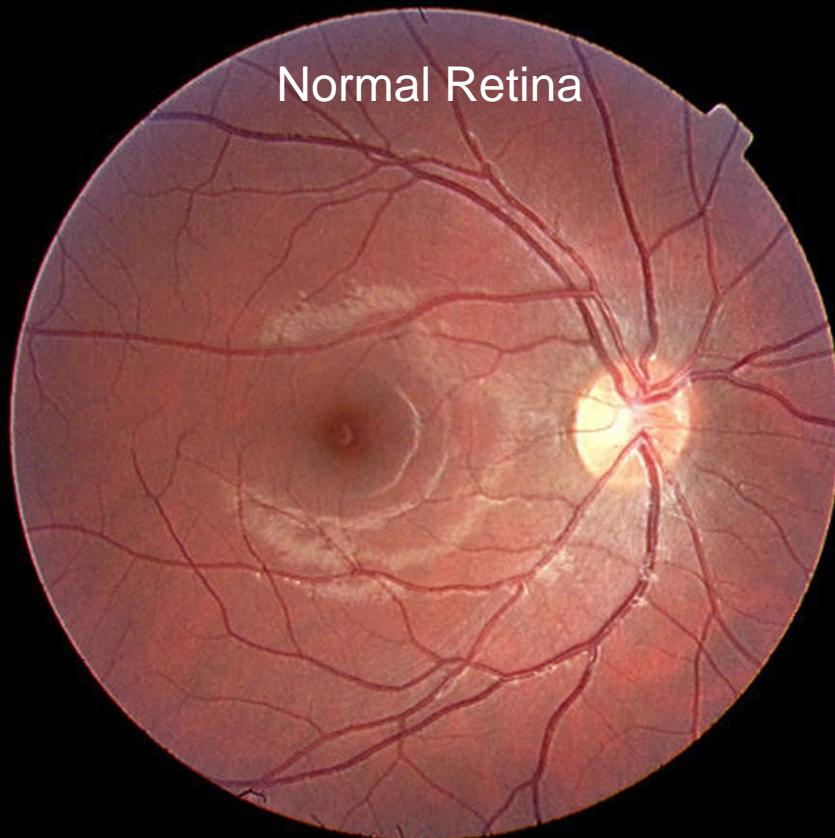
(Proliferative Diabetic Retinopathy - PDR)



# Vision Loss from Diabetic Retinopathy

Retinal Vascular Proliferation

Traction Retinal Detachment - TRD

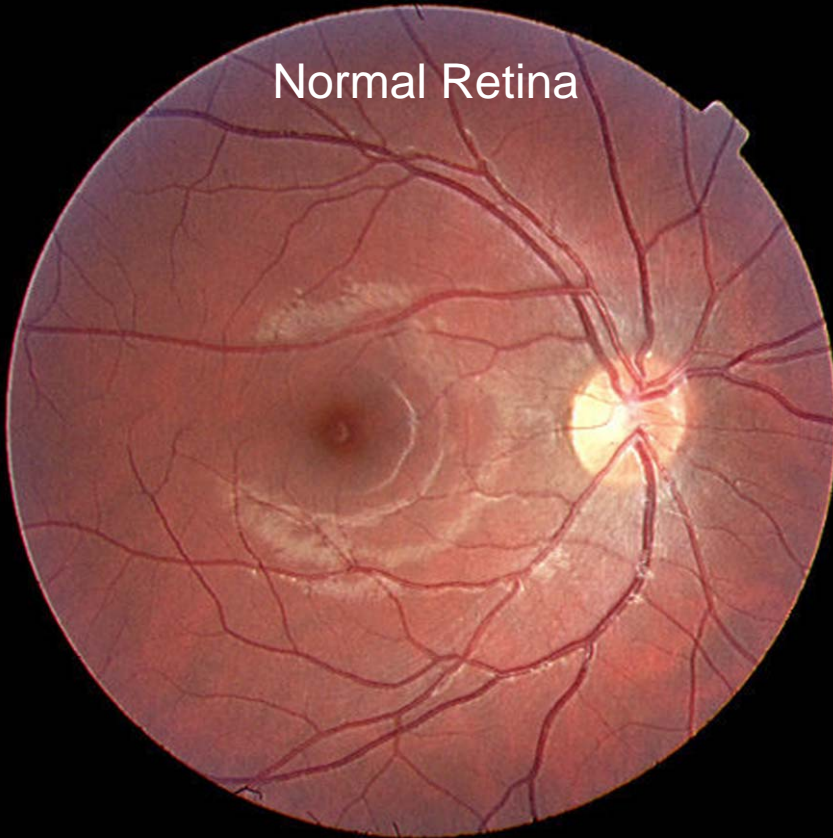




# Vision Loss from Diabetic Retinopathy

## Vitreous Hemorrhage

Normal Retina

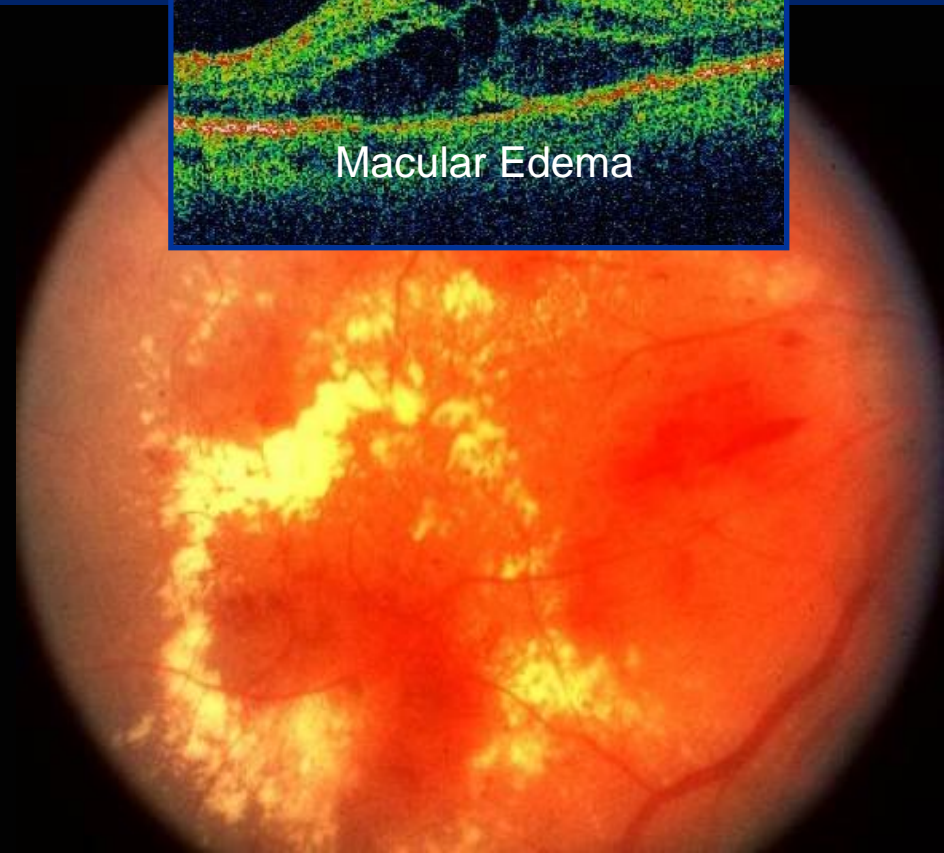
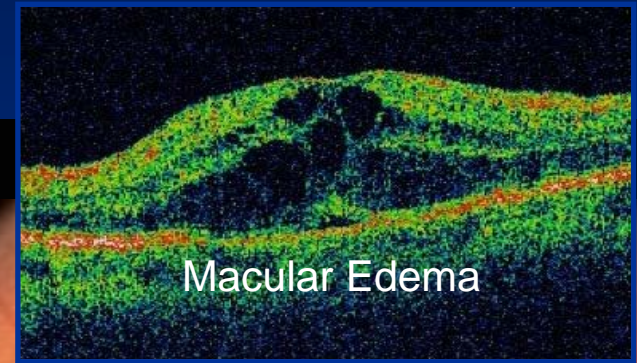
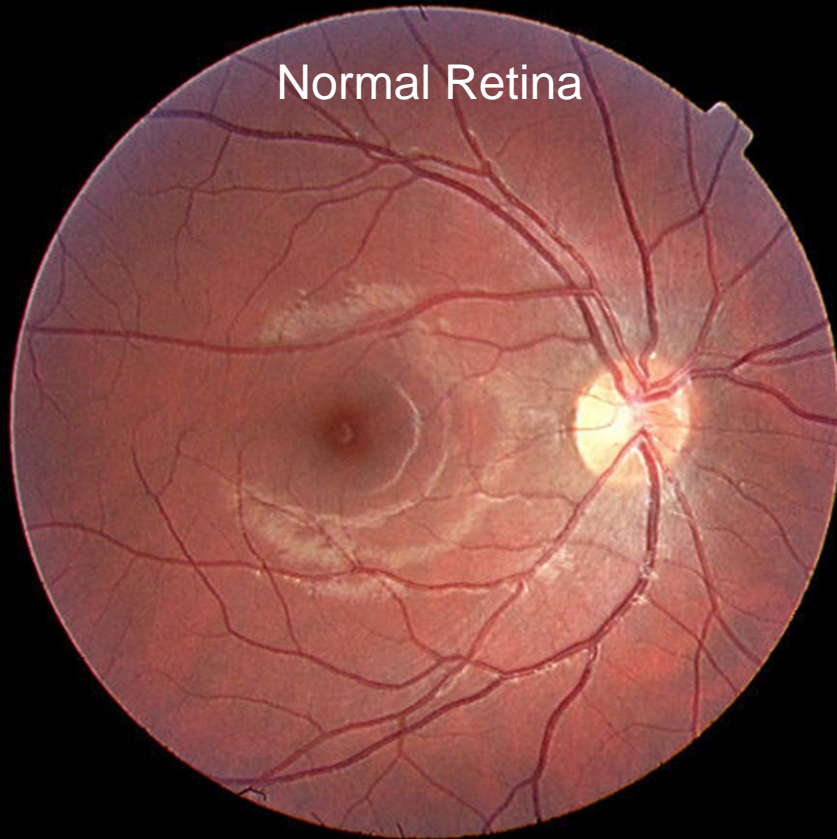


Vitreous Hemorrhage



# Vision Loss from Diabetic Retinopathy

## Macular Edema



# Diabetic Retinopathy

A Leading Cause Of:

Severe visual loss

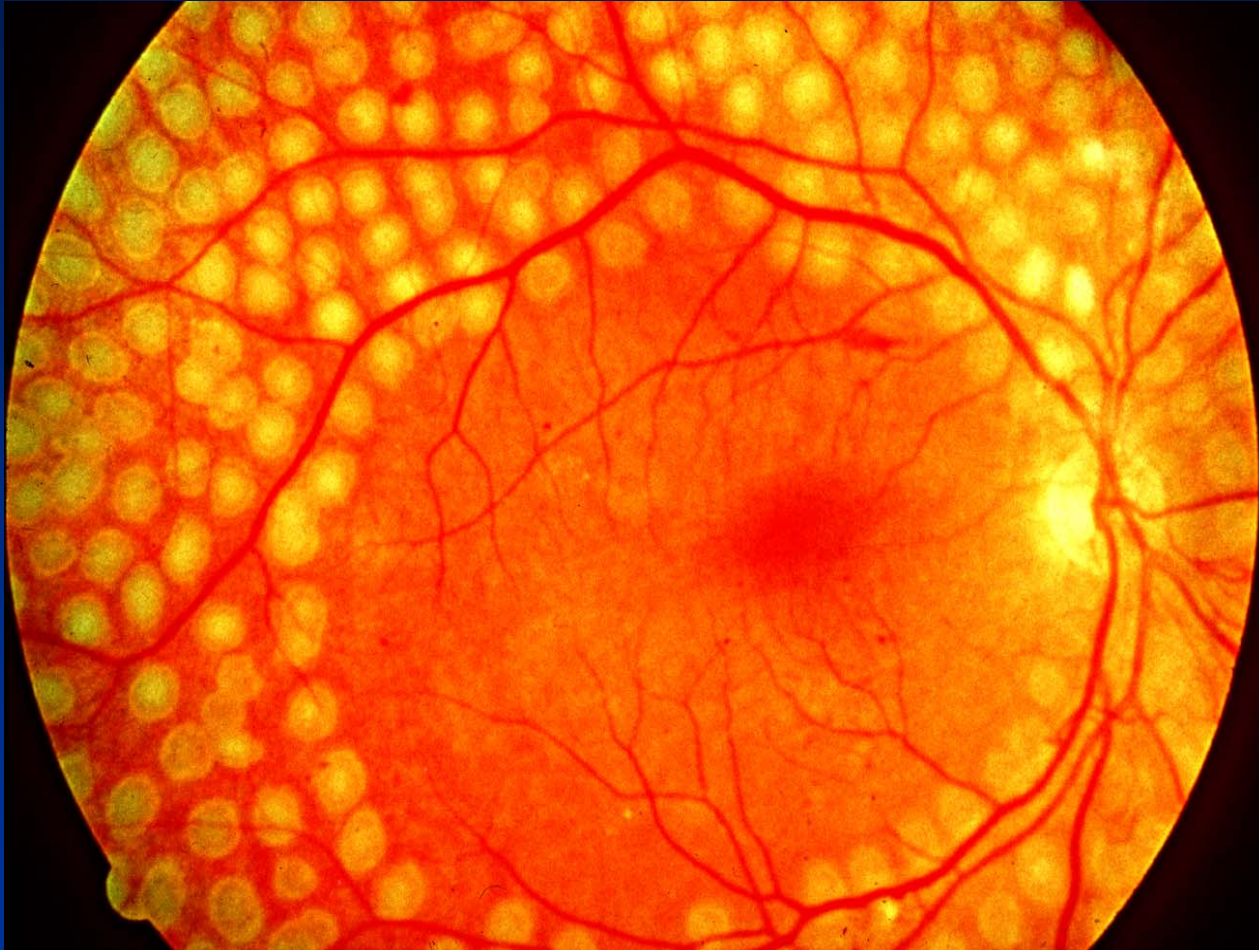
Moderate visual loss

New onset blindness

# **How Well Can We Treat Diabetic Eye Disease?**

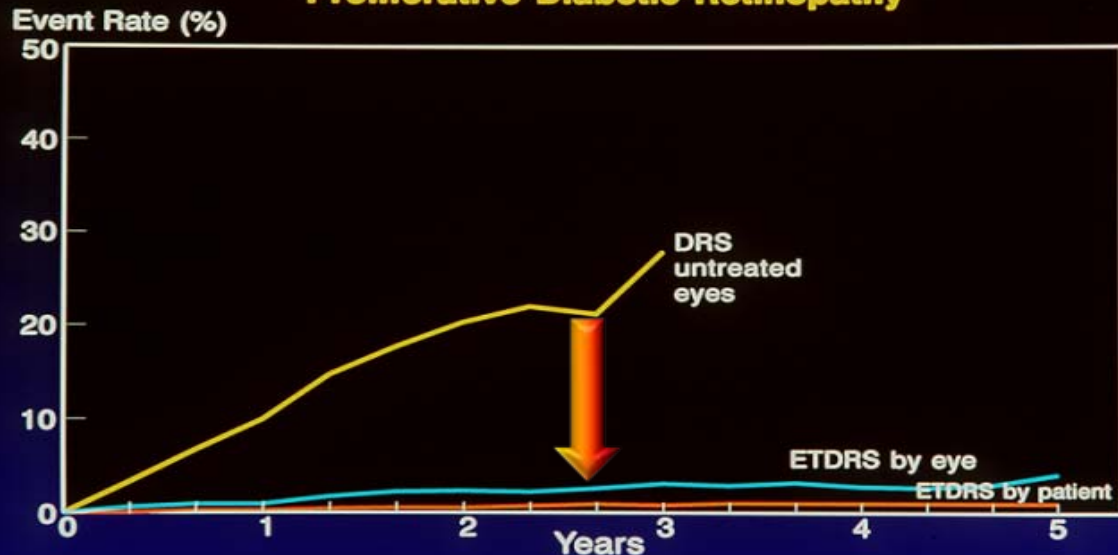


# Panretinal Laser Photocoagulation

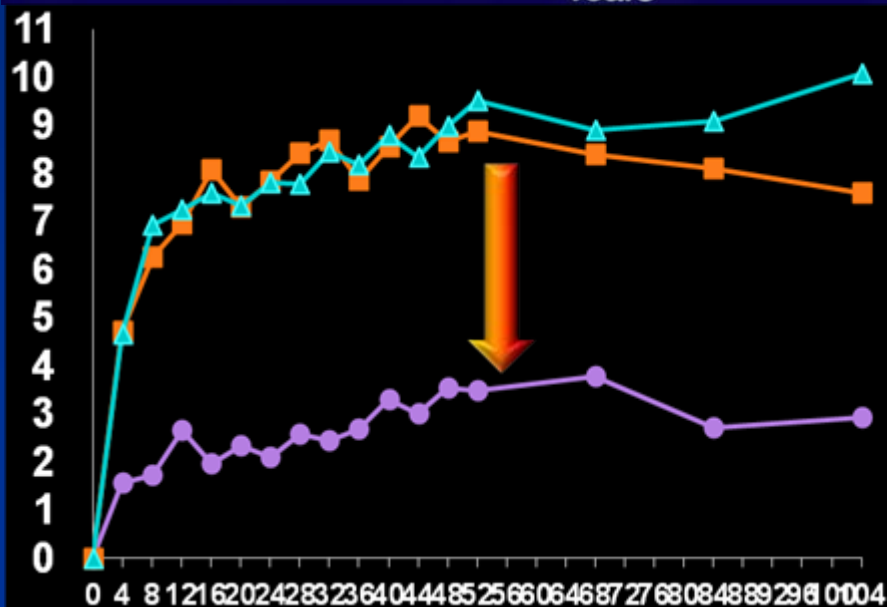


# Effective Evidence Based Eye Care

**Visual Acuity less than 5/200 at each visit  
Proliferative Diabetic Retinopathy**



**60-96%  
reduction in  
moderate &  
severe  
visual loss**



Extensive evidence based data upon which to develop evaluation & treatment approaches

# Visual Outcomes at the Joslin Diabetes Center 2006 – 2010 (N=14,597 patients)

Best Corrected VA, median (Q1, Q3)*	<b>20/20</b> (20/16,20/25)
Change in BCVA, mean (SD)†	- 0.5 (± 7) letters
20/20 or better (N)	<b>72%</b> (10,535)
20/40 or better (N)	<b>92%</b> (13,414)
20/200 or worse (N)	<b>1%</b> (153)

*61% with DR, 18% with PDR, 22% with DME, 6% with CSME*

\*14,511 (99.4%) with measured BCVA, 12 patients with light perception or worse vision in the better-seeing eye

† Mean follow-up of 1.9 years

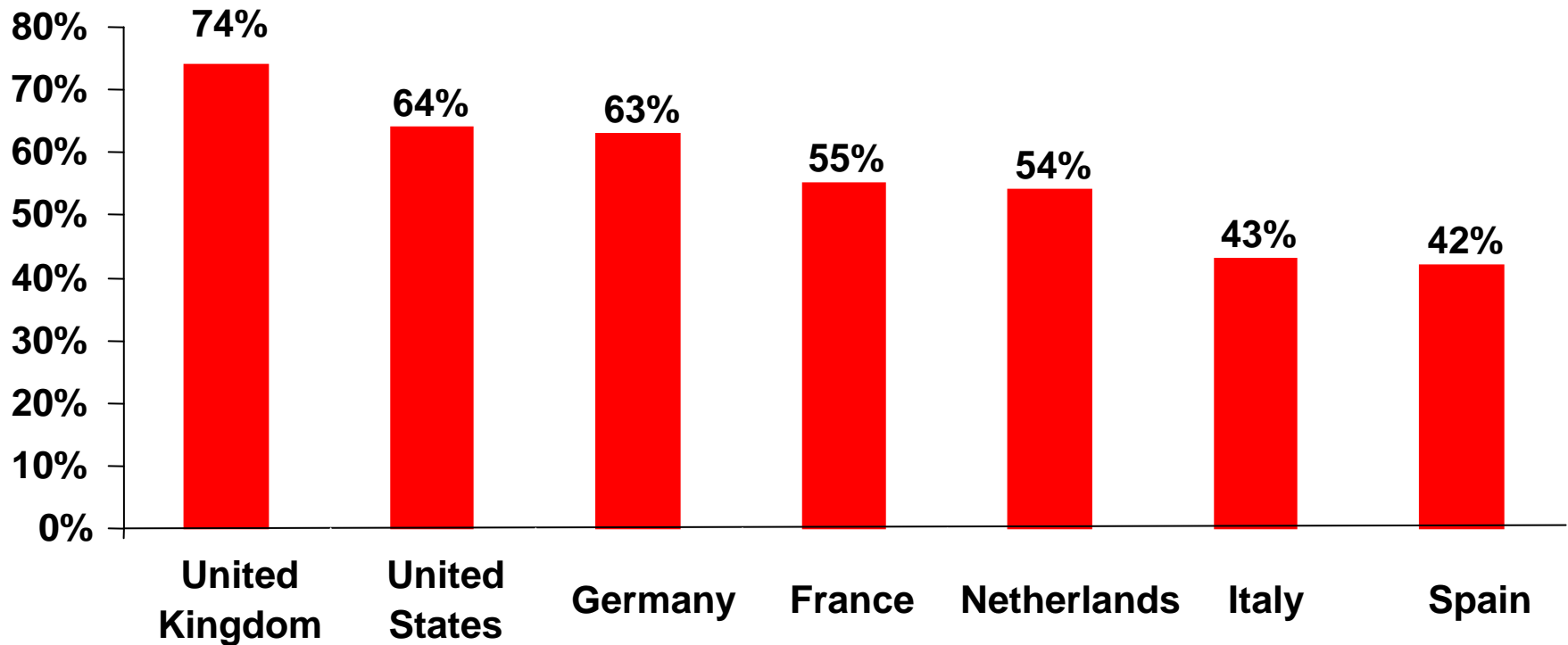
# Effective Diabetes Eye Care

- Identification of diabetes
- Assessment of the eyes for retinopathy
- Determination of retinopathy severity
- Routine lifelong eye care
- Coordinated medical care
  - Blood glucose, hypertension, lipids
- Patient education
- Prompt treatment when indicated

**Can be addressed using Telemedicine**

# **How Well Are We Addressing Identification and Care Delivery?**

# **% of Diagnosed Diabetes Patients Who Said They had a Dilated Eye Exam in the Past Year**



# Discrepancies in Access to Eye Care

285,000,000 individuals with diabetes

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160,000 ophthalmologists

54% increase in diabetes population

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< 2% growth in the number of ophthalmologists

# Telemedicine Approach

- Brings exam to patient
- Within cultural context
- Flexible timing
- Avoid dilation
- Combined with education
- Apply disease management
- Facilitate clinical trials

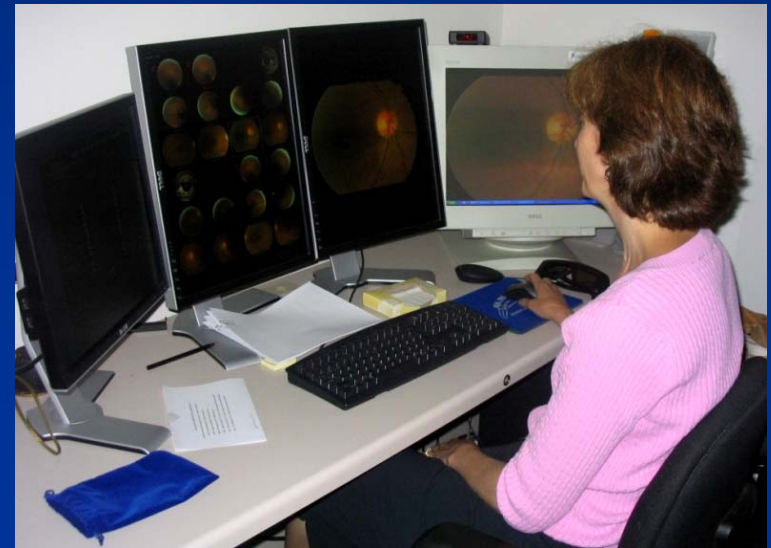


# Telemedicine Approach

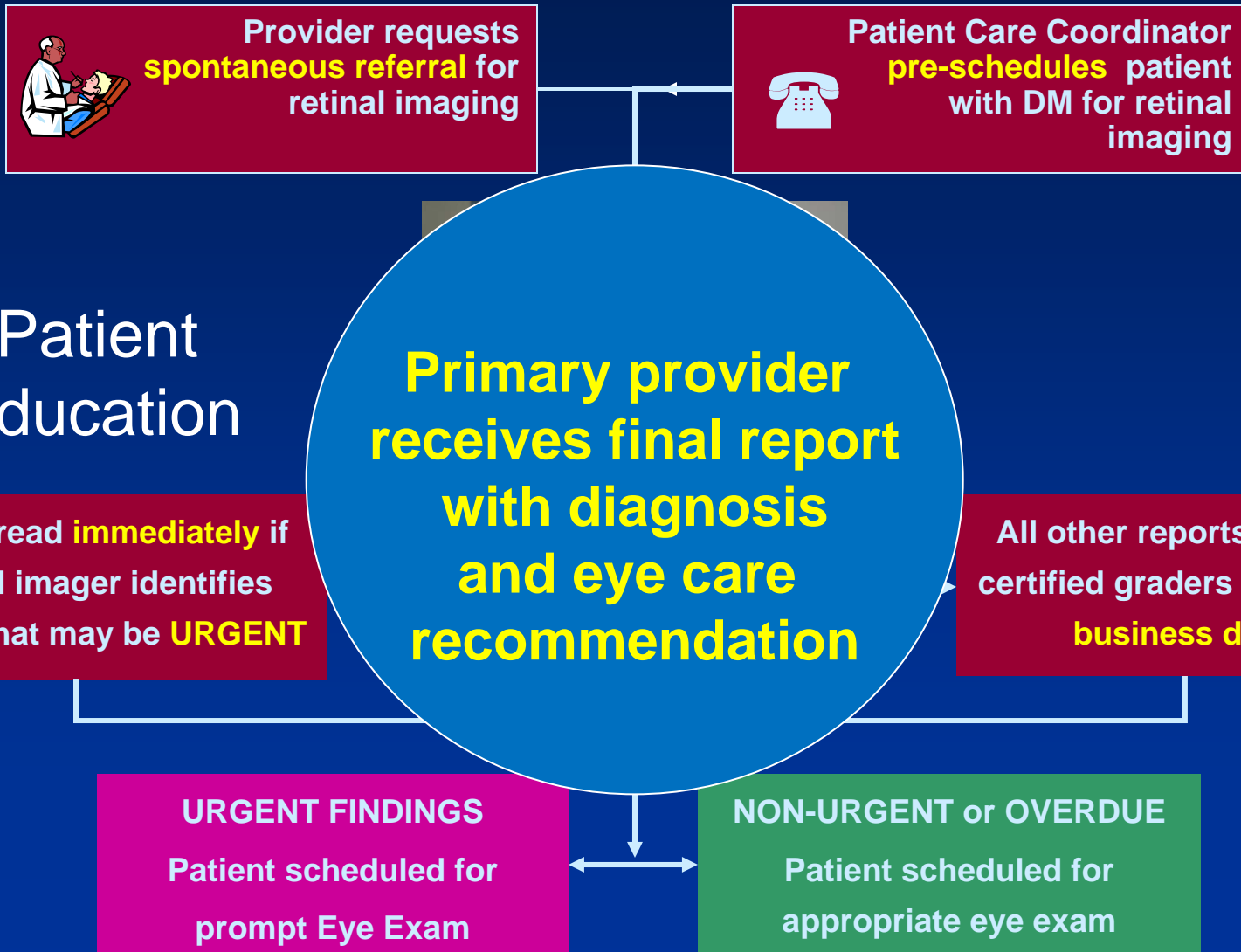
- Extends disease identification and provides medical resource triage
- Extends delivery of evidence-based diabetes eye care
- Integrate diabetes eye care and education into the total care of each person with diabetes

# Joslin Vision Network: Validated Telemedicine Program for DR

- Digital stereoscopic images
- Undilated pupils
- Image/data transfer & storage
- Clinical Level of DR
- Non DM retinal findings
- EMR interface
- Equivalent to retinal exam for diabetic retinopathy but does not replace a comprehensive eye exam



# Primary Care Practice Joslin Ocular Telehealth Program



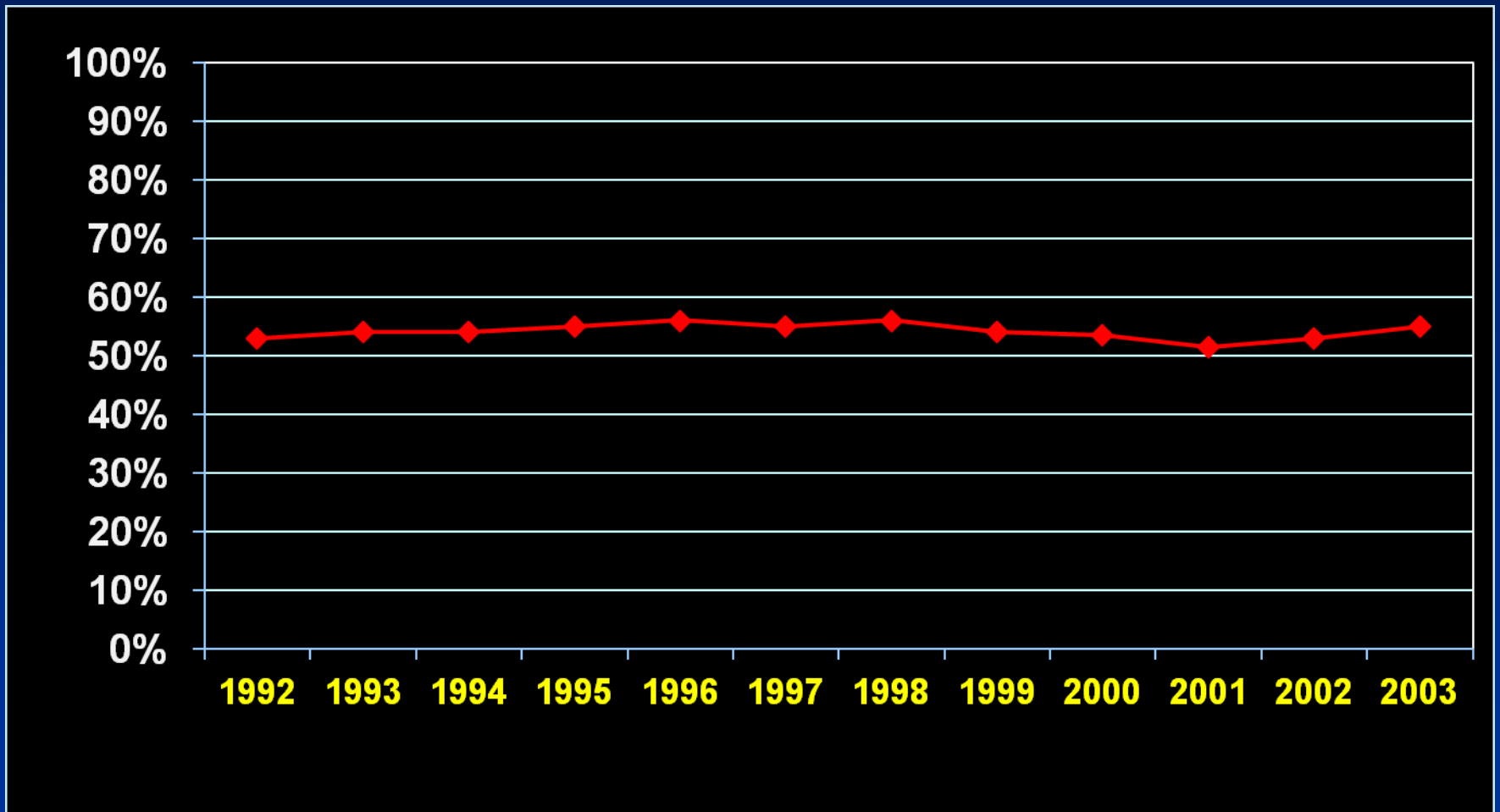
# Joslin Vision Network Deployment

## Clinical Programs in point-of-care setting

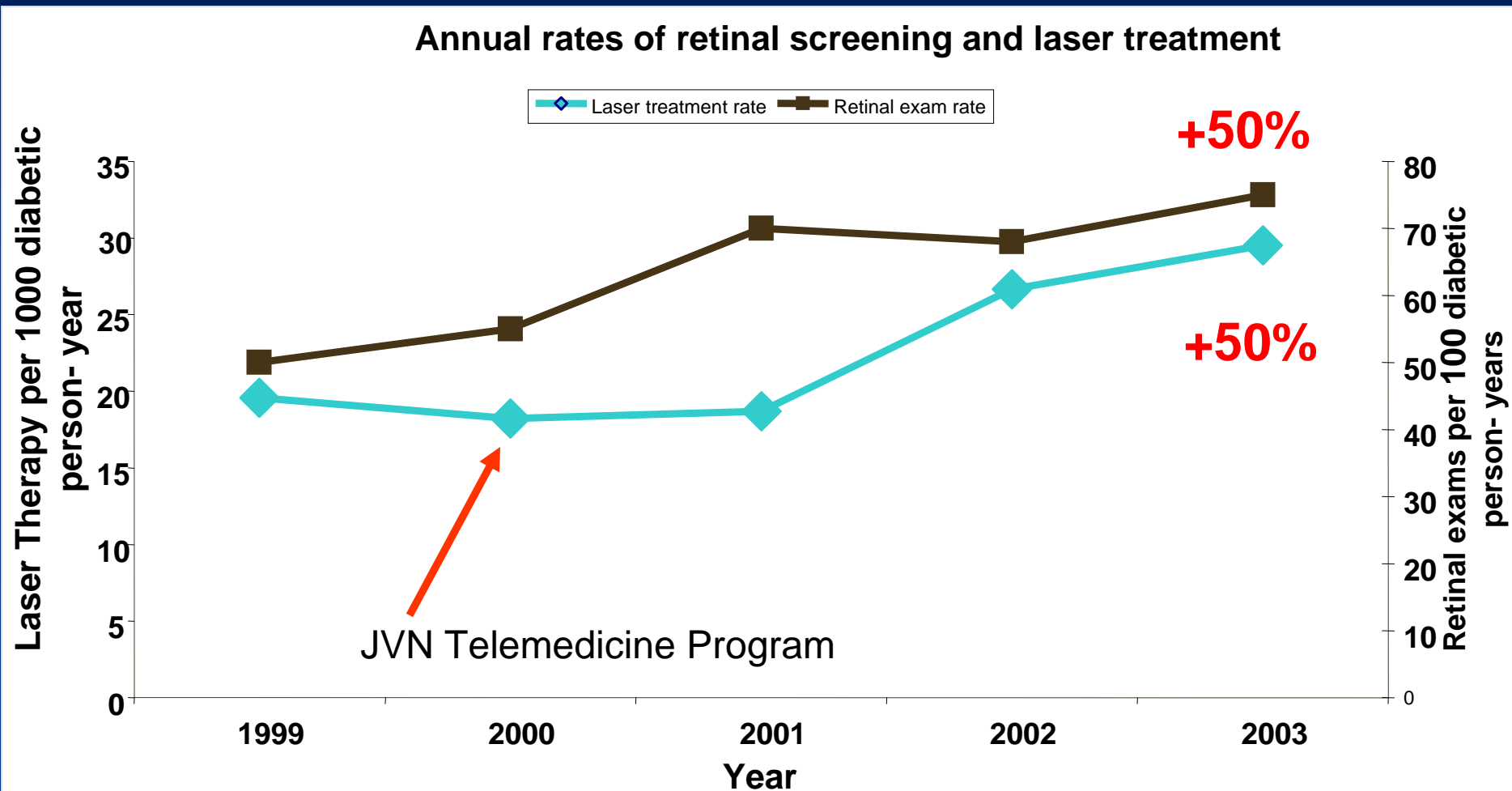
- Indian Health Service
  - Approximately 78 sites in 22 states
- Veteran's Administration
  - Approximately 15 sites - up to 2000 patients/month
- Department of Defense
  - Approximately 10 sites [Army & Air Force]
- Academics: 4 Boston sites (BWH, MGH, BIDMC, JDC)
- Venezuela-JVN Pediatric Program
- Frequent requests for additional clinical deployments (Domestic and International)

# **Can Joslin Vision Network Make a Difference?**

# Overall IHS Diabetic Retinopathy Examination Rate 1992-2003



# Diabetic Retinopathy PIMC Telemedicine Impact



# Impact on Telemedicine Programs for Retinopathy Assessment

- Telemedicine diabetic retinopathy assessment is feasible and effective
- Telemedicine provides convenient, expanded management of diabetic patients in the primary care setting and may reduce risk of vision loss through early and routine surveillance for diabetic retinopathy
- Telemedicine systems may increase surveillance and timely treatment rates for diabetic retinopathy