# Intravitreal Injection – The Role of the Comprehensive Ophthalmologist

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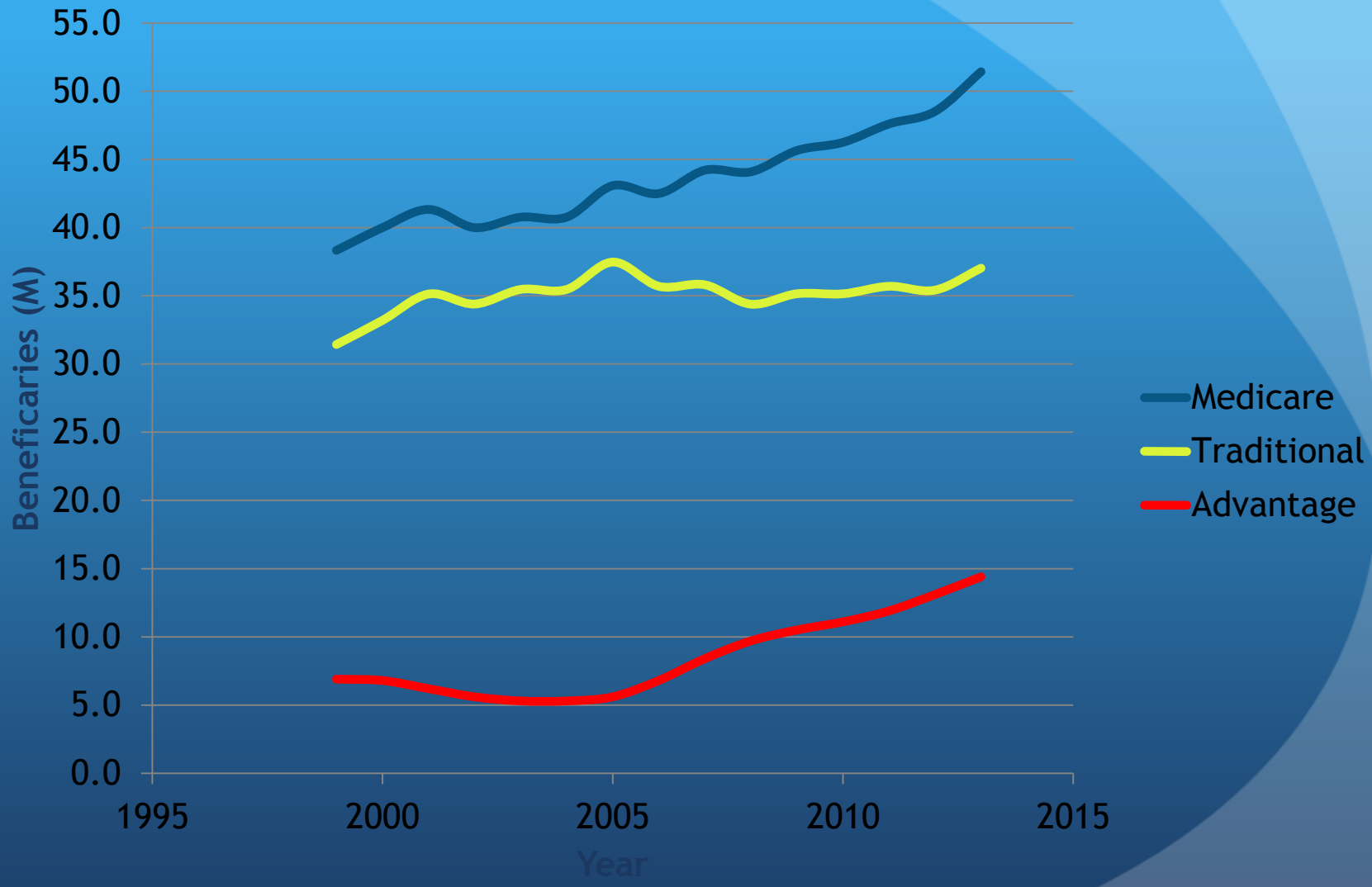
# Medicare Enrollment

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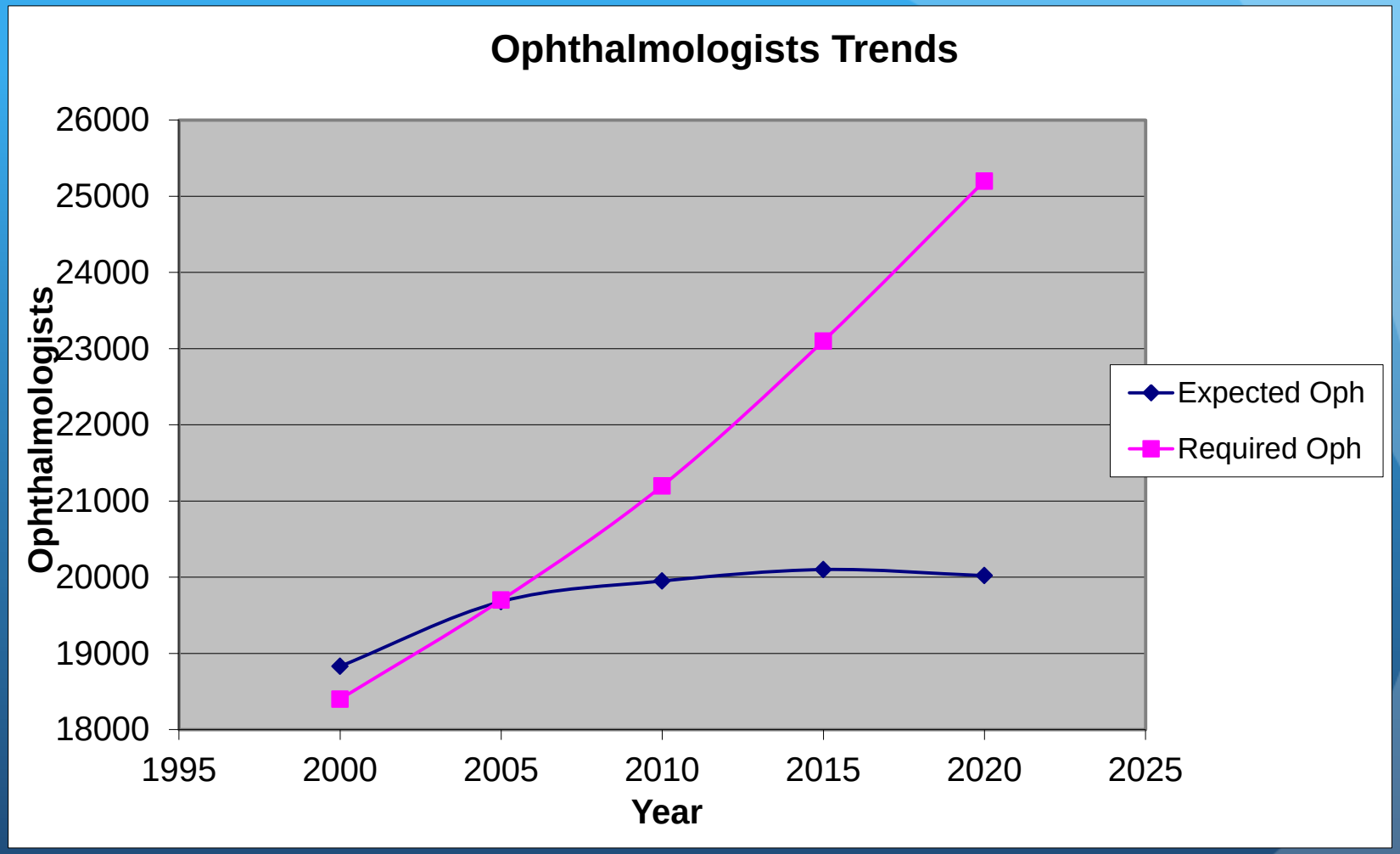
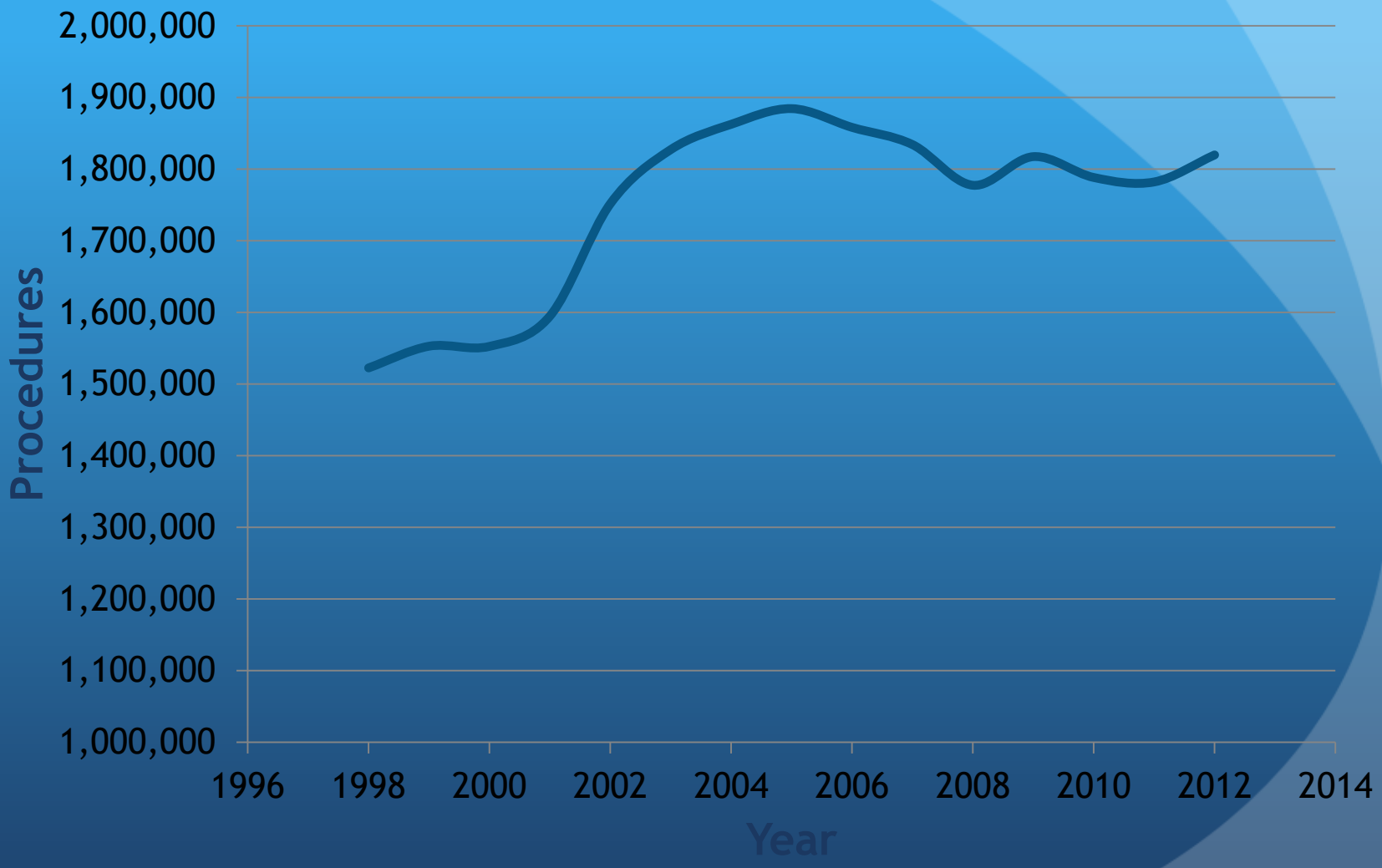
# Ophthalmologist Trends




Sources: DHHS Physician Supply and Demand Projections to 2020

Source- Kevin Corcoran- Used with permission

# Cataract Surgery

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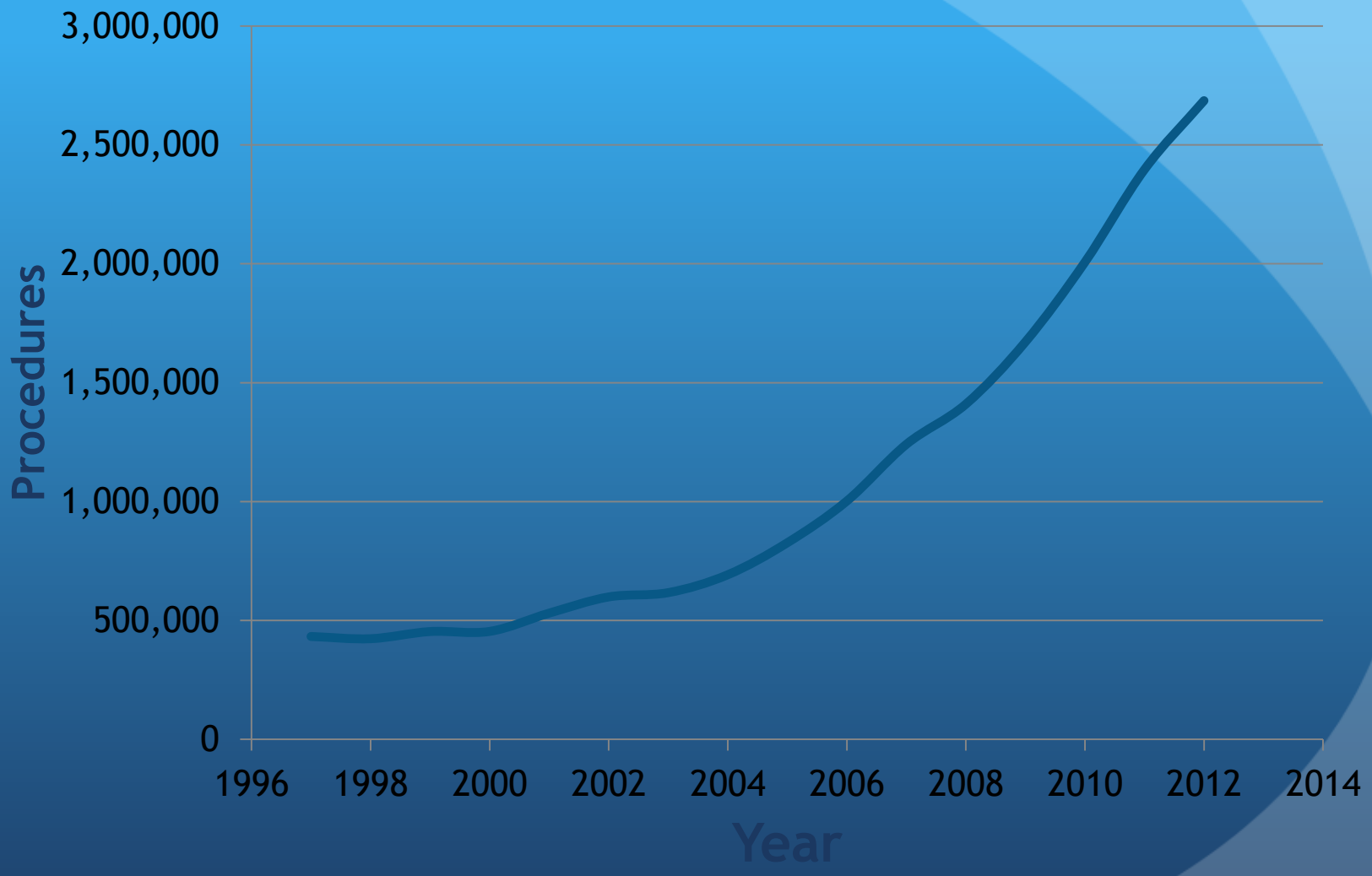
# Retina Surgery

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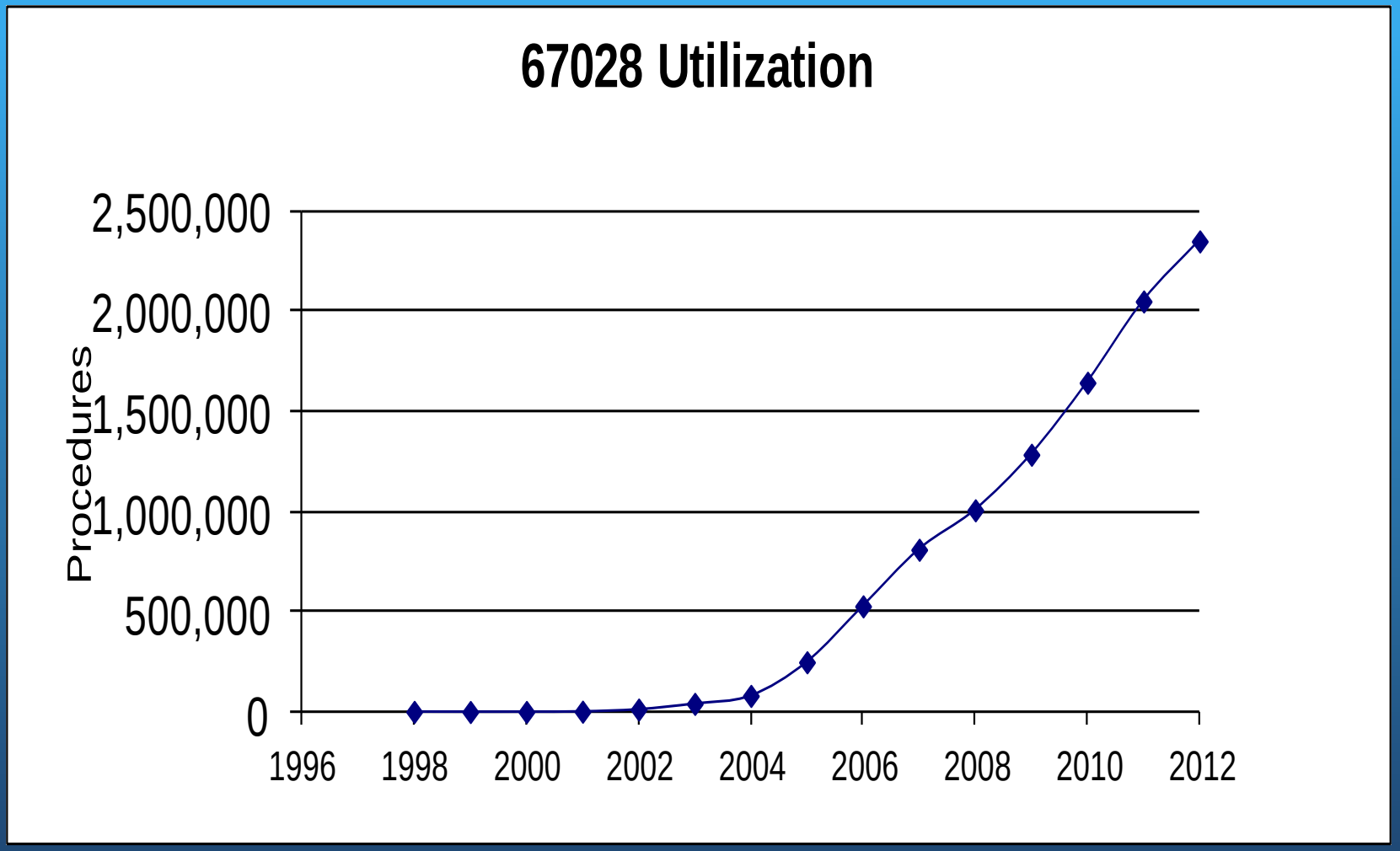
# Medicare Utilization – 67028 – IV Injection




Source: CMS data (1998 – 2012), 18 – Ophthalmology

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# Common Ophthalmic Surgery

## Medicare Utilization Patterns (18 - Ophthalmology)

| CPT | Procedure | λ | CPT | Procedure | λ |
|---|---|---|---|---|---|
| 67028 | Intravitreal injection | 11% | 68761 | Punctum plugs | 1% |
| 66984 | Cataract & IOL | 8% | 67228 67210 | Retina laser | 1% |
| 66821 | YAG | 3% | 67820 | Epilation | 1% |
| 66761 65855 | Glaucoma laser | 1% | 15823 | Blepharoplasty | 1% |

**Frequency is per 100 office visits (%) on Medicare beneficiaries**

**Source: CMS data (2012), 18 - Ophthalmology**

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# Top 10 Ophthalmic Procedures

## Medicare Utilization Patterns Ophthalmology (18)

| Rank | CPT | Procedure | Rank | CPT | Procedure |
|---|---|---|---|---|---|
| 1 | 67028 | Intravitreal Injection | 6 | 66982 | Complex Cataract |
| 2 | 66984 | Cataract w/IOL | 7 | 65855 | Lx Trabeculoplasty |
| 3 | 66821 | YAG capsulotomy | 8 | 67210 | Focal Laser |
| 4 | 68761 | Punctum plug | 9 | 15823 | Blepharoplasty |
| 5 | 67820 | Epilation | 10 | 67228 | PRP |

Source: CMS data 2012, 18 - Ophthalmology

Used with permission - Source- Kevin Corcoran

# Resident experience with IV injections

# The Case for Comprehensive Ophthalmologists Performing IV Injections

- Technically an easy procedure to teach and perform
  - Current residents receive extensive experience
- Strong safety profile
- Injection volume is high and growing
  - Meets a community need
- Cost effective use of manpower within a managed care environment
- Patient convenience
  - Travel considerations

# What to do 1st?

- Diagnosis – including testing
  - FA – assists with diagnosis confirmation
  - Color photos- baseline documentation
  - Spectral Domain ( SD) Retina OCT-
    - Diagnosis confirmation
    - Quantitative and qualitative assessment
    - Response to treatment

# Diseases Worth Treatment Consideration

- Pseudophakic CME
- Macular edema associated with Retinal Vein Occlusion
- Diabetic Macular Edema
- Exudative ARMD

Different " treatment model" could be used for each condition

# IV Injection Treatment Plan Models

- Injector alone model
- Injector “ plus” model
- “Do all you possibly can” model

# Injector Alone model

- Initially assess patient – tentative diagnosis made clinically
- Refer to Retina for :
  - Diagnosis confirmation
  - Diagnostic testing
  - Initial treatment ( gives 1st injection)
  - Treatment plan ( Avastin q 4 weeks x 3 then reassess one month later)
- Comp doc does 2nd and 3rd injection ; performs all injections not done at Retina “Assessment” visits

# Injector ‘Plus” model

- Initially assess patient and diagnosis made. Includes some or all of the diagnostic testing ( includes Retina OCT)
- Refer to Retina for :
  - Diagnosis confirmation
  - Possibly some diagnostic testing ( FA / Color photos )
  - Treatment plan ( Avastin q 4 weeks x 3 then reassess one month later)
- Comp doc treats with OCT guided follow-up
- Periodic reassessment with Retina to tailor management

# “Do All You Possibly Can” Model

- Initially assess patient and diagnosis made. Includes all of the necessary diagnostic testing
- Follows established protocols for treatment
- Refers to Retina for incomplete or non-responders

# Pre-op Assessment

- No active inflammation / Infection
- Note pre-op IOP / Glaucoma history
- Consent for procedure

# Instruments needed on Sterile Tray

- Alcaine
- 5% Betadine solution
- 10% Betadine swabs
- 2% lidocaine plain on 3 cc syringe
- Eyelid specula
- Caliper
- Marking pen
- Sterile Q –tips
- 1cc syringe with 19g & 30g needles
-


STEAM INDICATOR STRIP
Indicator turns dark when processed.
Date: _____ Operator: _____
MERESSON
Regular Tip

# My Injection procedure

- Mark procedure eye
- 1 drop proparicaine
- 1 drop 5% Betadine
- Eyelid prep with 10% Betadine swabs
- 2% lidocaine drops to cornea
- Place eyelid specula
- Mark injection site 3.5 mm posterior to limbus with caliper / marking pen
- Optional: 1 drop of 5% Betadine to injection site ( DRCR protocol requirement)

# My Injection Procedure

- Hold 2% Lidocaine soaked Q-tip over injection site for 30 seconds
- Draw up medication - filtered 19g needle on TB syringe/ prepare for injection ( 30g needle)
- Hold 2% Lidocaine soaked Q-tip over injection site for another 30 seconds
- Inject into vitreous cavity – hub of syringe to the sclera, use Q-tip in non-dominant hand to slide conjunctiva over injection site with needle withdraw
- Remove eyelid specula
- Optional – check perfusion of optic nerve with BIO
- Optional – check IOP
- No postop antibiotics ( Artificial tears PRN)

# What to Treat With?

- Use 0.05 cc dosing:
  - Avastin 1.25mg
  - Lucentis 0.3mg ; 0.5mg
  - Eylea 2mg
  - Triescence 2 mg

# Treatment Protocols

- PRN therapy
  - Treat only if active disease / edema is present
- Fixed interval
  - Ex: Monthly treatment x 1-2 years of Lucentis / Avastin as in the monthly CATT study arms
- Treat and extend
  - Treat at each clinic visit, extend treatment interval if no active disease/ dry macula
  - If/ when recurrence develops – tighten treatment interval then fixed interval " for a while" .

# Diseases Worth Treating

- Pseudophakic CME
- Macular edema associated with Retinal Vein Occlusion
- Diabetic Macular Edema
- Exudative ARMD

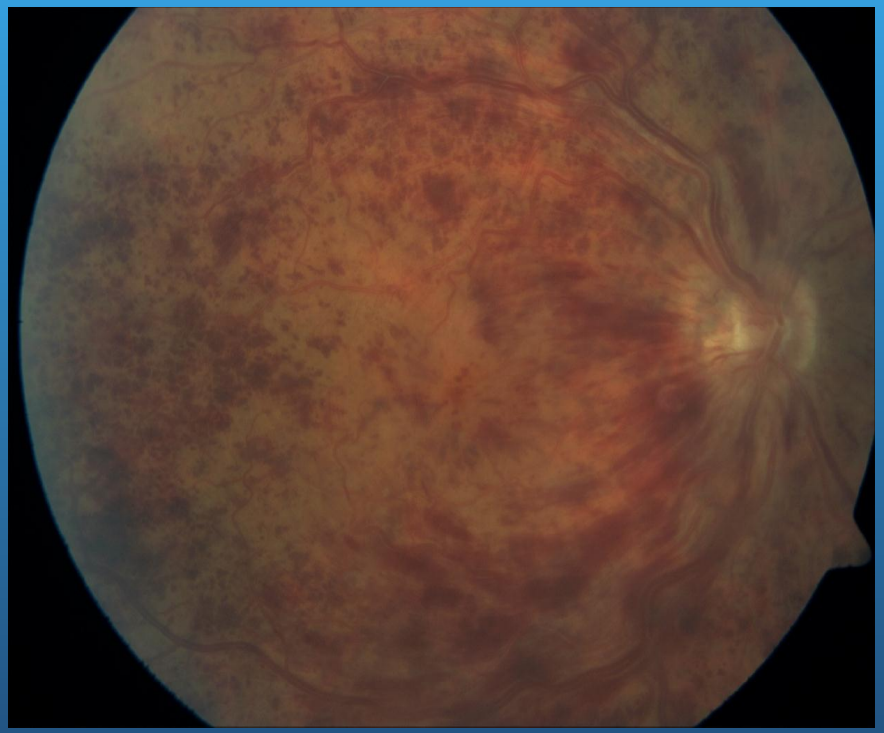
# Pseudophakic CME - Ideal 1st Treatment Case

- Occurs in 1-2 % of cases
- All cataract surgeons encounter this condition
- Self limiting disease
- Avoids the trip to Retina
- Not all cases respond to 1st line topical NSAIDs / Steroid
  - compliance
  - inflammation not fully controlled
- Most cases respond to one dose of Avastin (2nd line Tx)
  - "combined" CME/ DME cases often require multiple treatments
- Intravitreal Steroid ( 2mg Triescence ) – 3rd line therapy

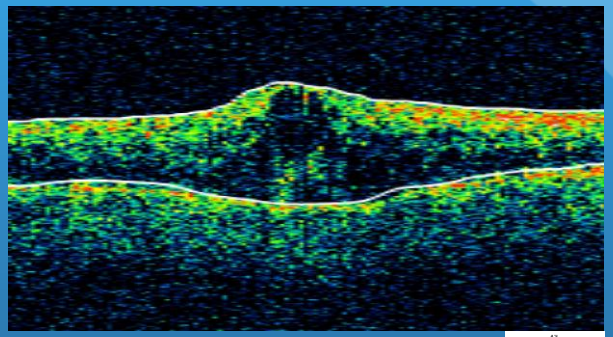
# Macular Edema Associated with RVO

- Treatment options
  - Avastin – works in almost all cases
  - FDA approved- Eylea, Lucentis 0.5mg
- Use for center –involved macular edema
- Almost all cases respond to any ANTI- VEGF agent
- Early treatment provides better final visual acuity outcome versus delayed treatment
  - Treat as soon as center is involved
- Treat every 4-6 weeks until dry, then PRN or treat and extend
  - Some cases resolve in several months

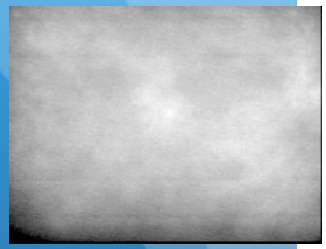
# Case #1 Va (RG) – Va 20/100



OCT Image

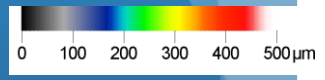


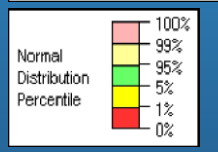
Fundus Image

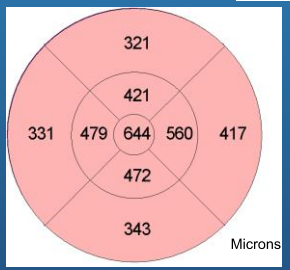


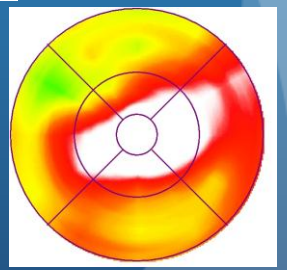
| Center | 672+/-8 microns |
|---|---|
| Total Volume | 11.04 mm³ |

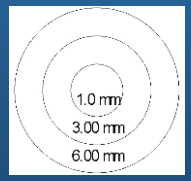
| Signal Strength (Max 10) | 4 |
|---|---|




Map Diameters

Scans Used: 1, 2, 3, 4, 5, 6

CMT- 644um

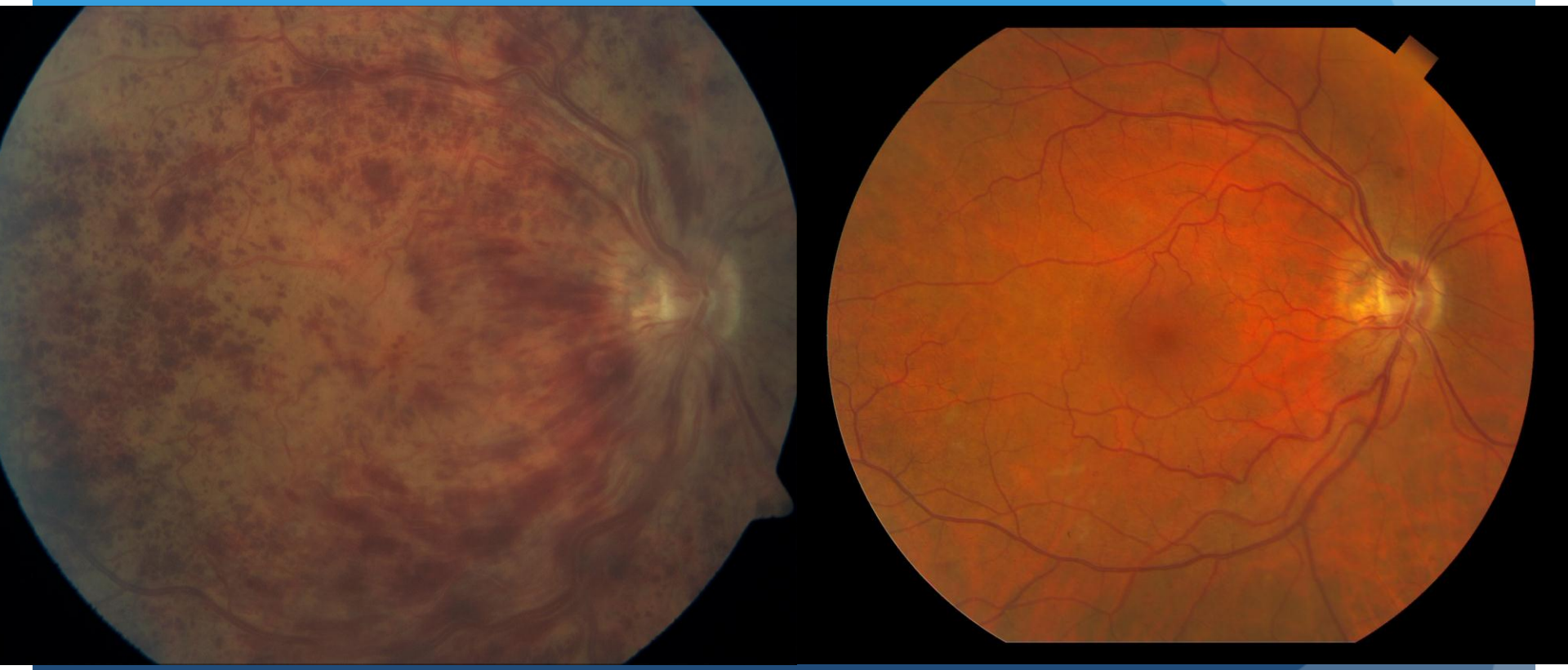
Signature:

Physician: Michael Rauser M.D. LLUMC

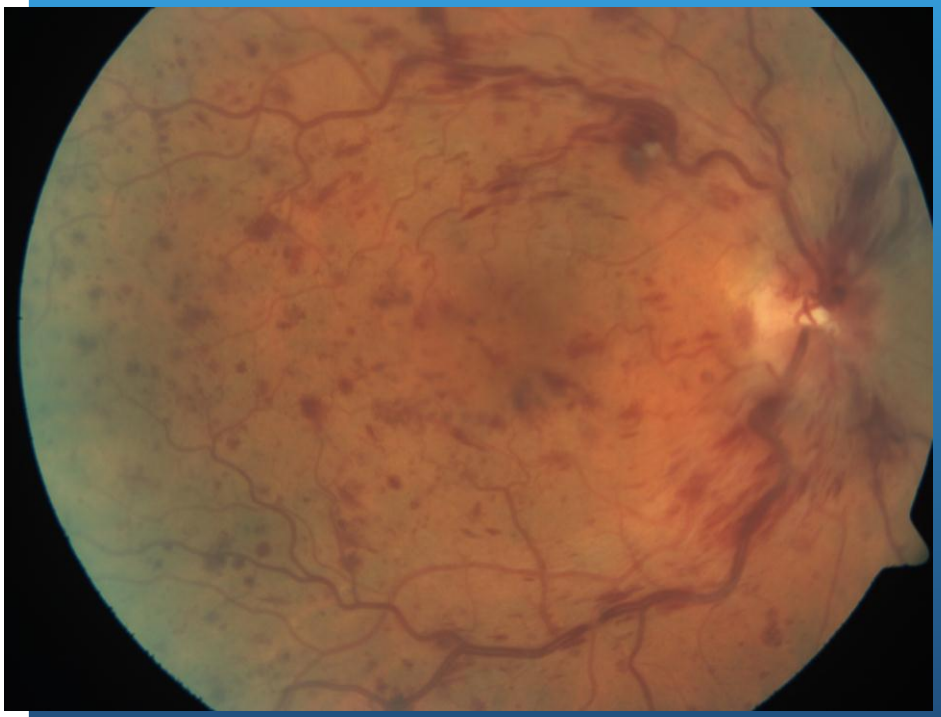
# RG – 7 months of Avastin Tx – Va 20/40

Pre- treatment

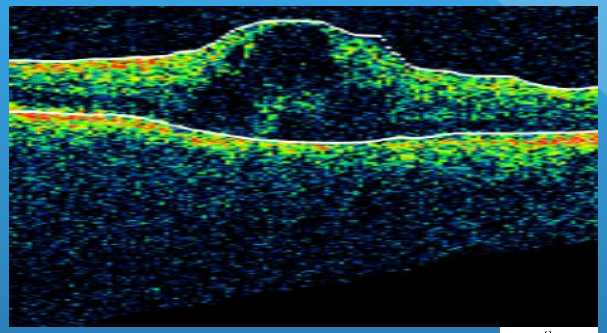
Post- treatment



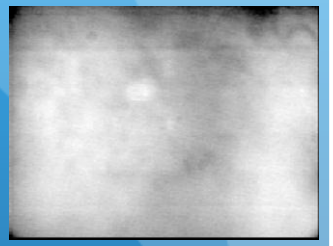
# CS - Pre-Treatment 20/50 ( 673um )



OCT Image

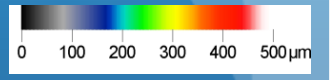


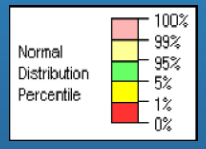
Fundus Image

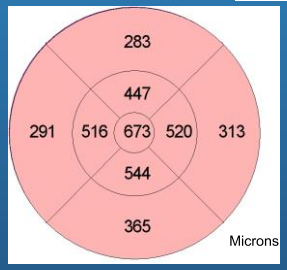


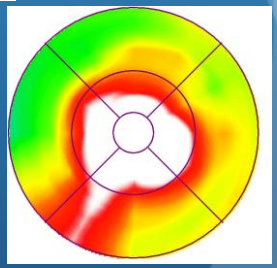
| Center | 682+/-12 microns |
|---|---|
| Total Volume | 10.36 mm³ |

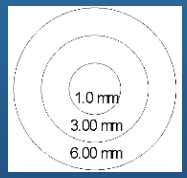
| Signal Strength (Max 10) | 4 |
|---|---|



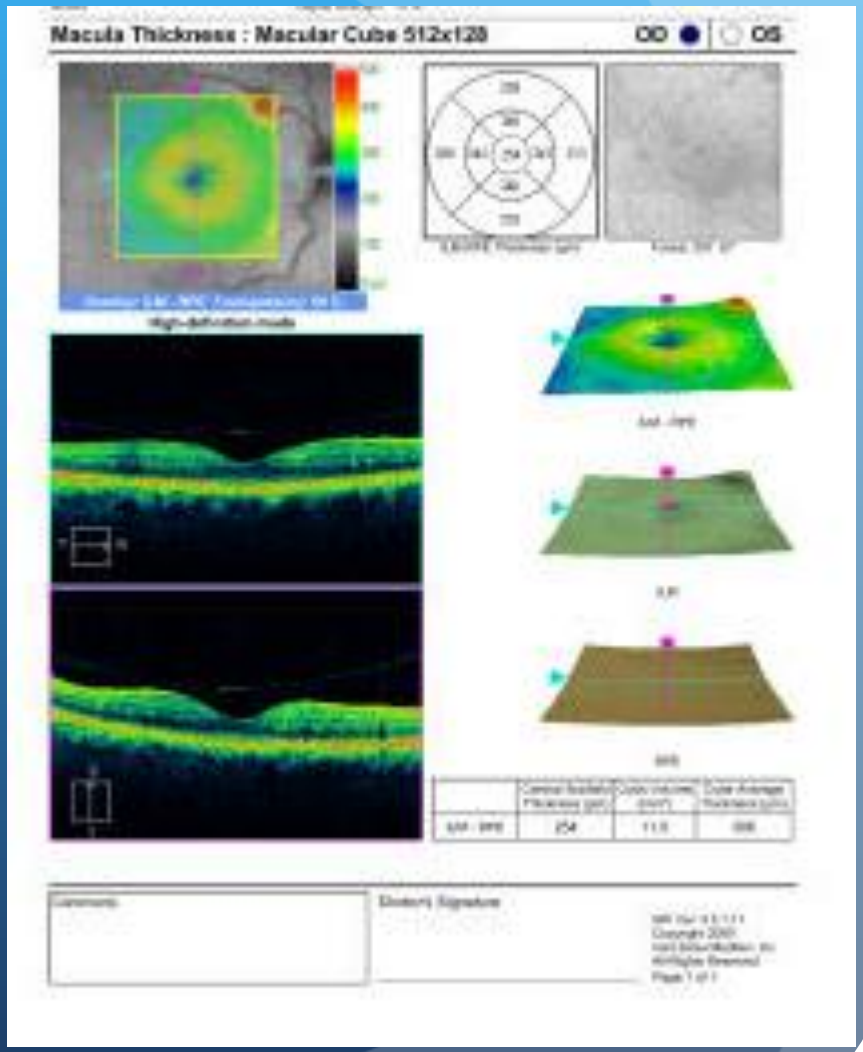

Map Diameters

Scans Used: 1, 2, 3, 4, 5, 6

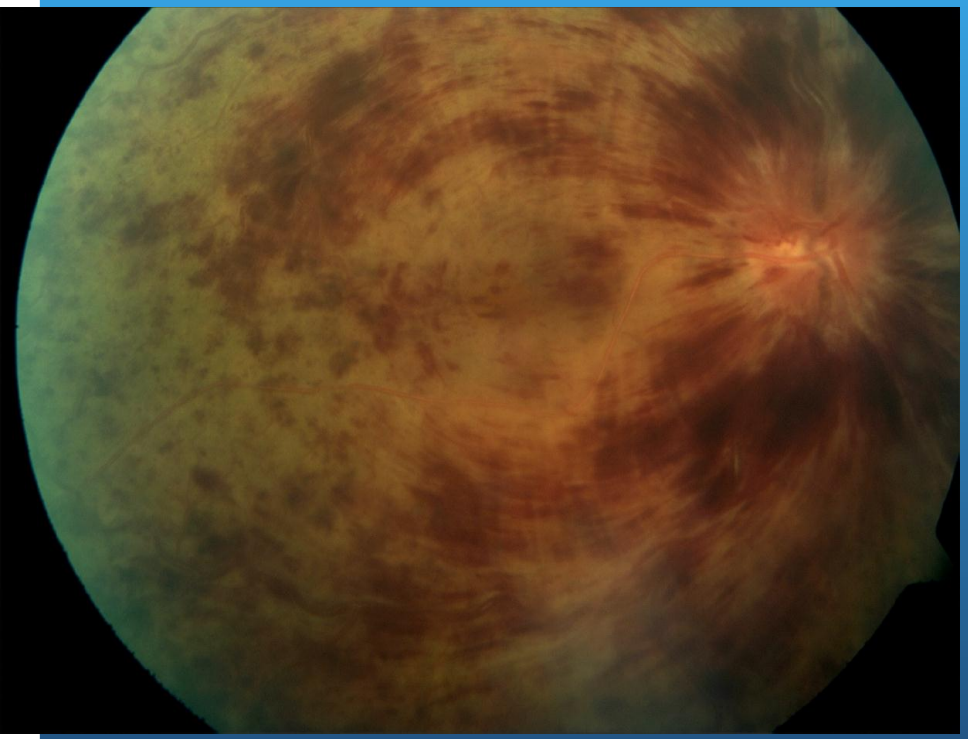
Signature: _____

Physician: Michael Rauser M.D. LLUMC

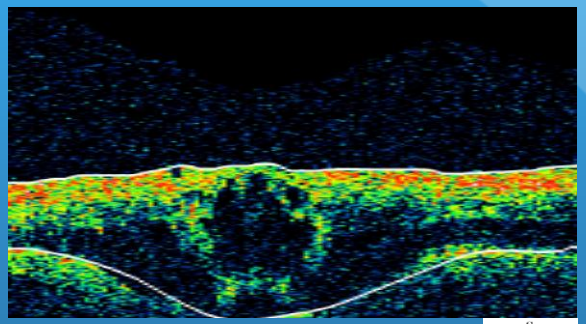
# CS  3 months post tx 20/30



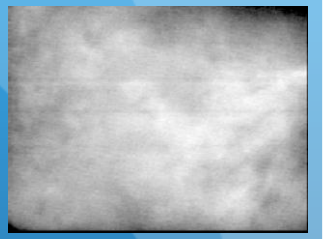
# Pretx Avastin (EM) Va – 20/200 ( 653um)



OCT Image

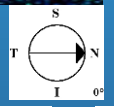


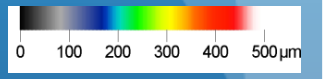
Fundus Image

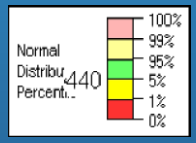


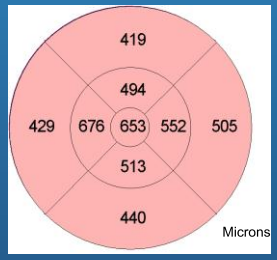
| | |
|---|---|
| Center | 649+/-148 microns |
| Total Volume | 13.55 mm³ |

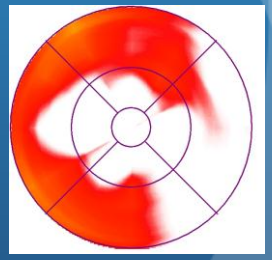
| | |
|---|---|
| Signal Strength (Max 10) | 5 |
| Analysis Confidence Low | |

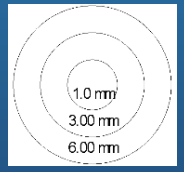





Map Diameters

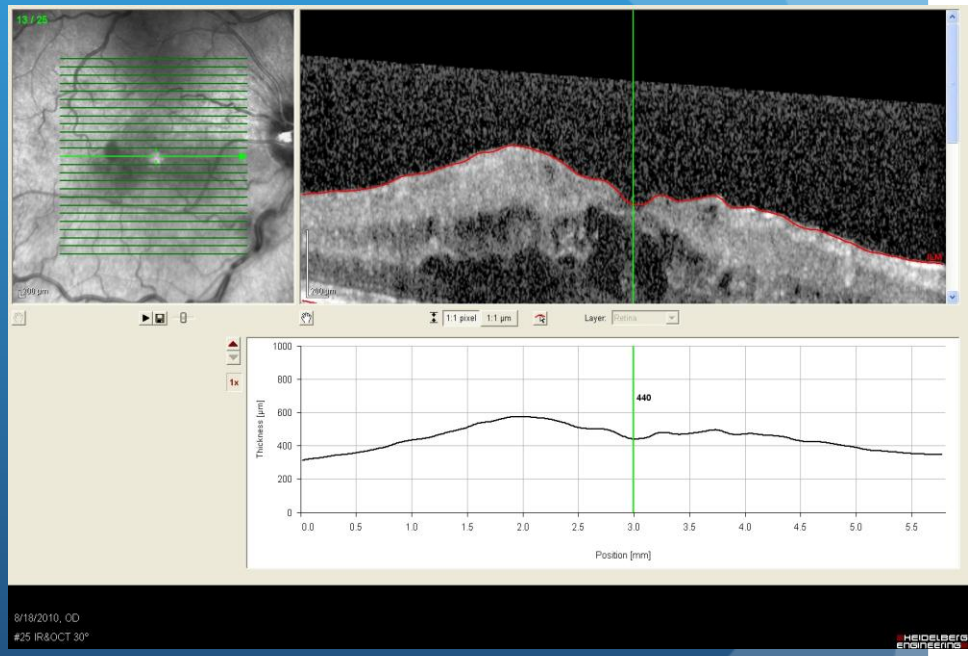
Scans Used: 1, 2, 3, 4, 5, 6

Signature: _____

_____

Physician: Michael Rauser M.D. LLUMC

# EM  3 months after Avastin x 2 – Va 20/60 (440 um Heidelburg OCT)

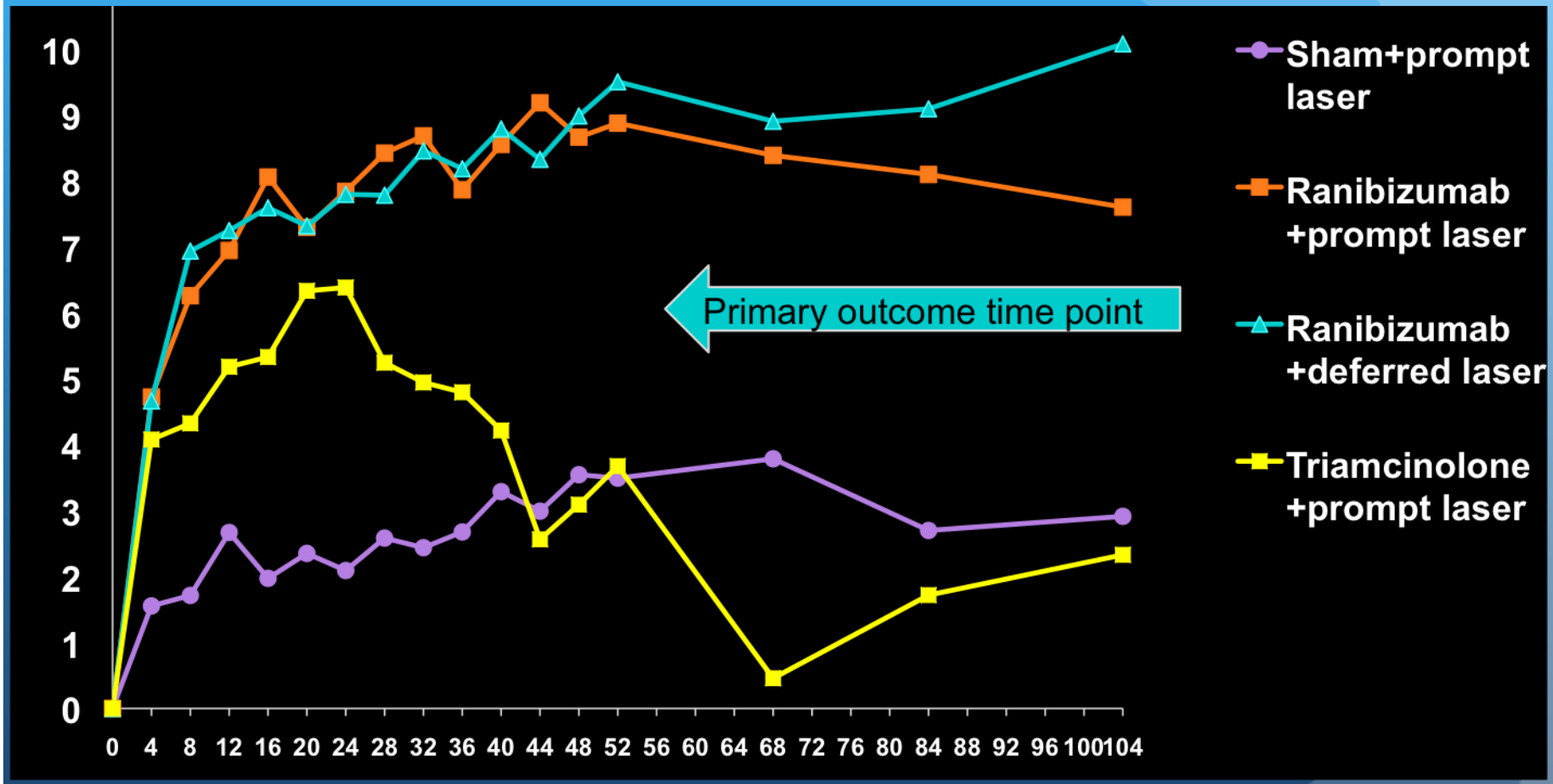


# Diabetic Macular Edema

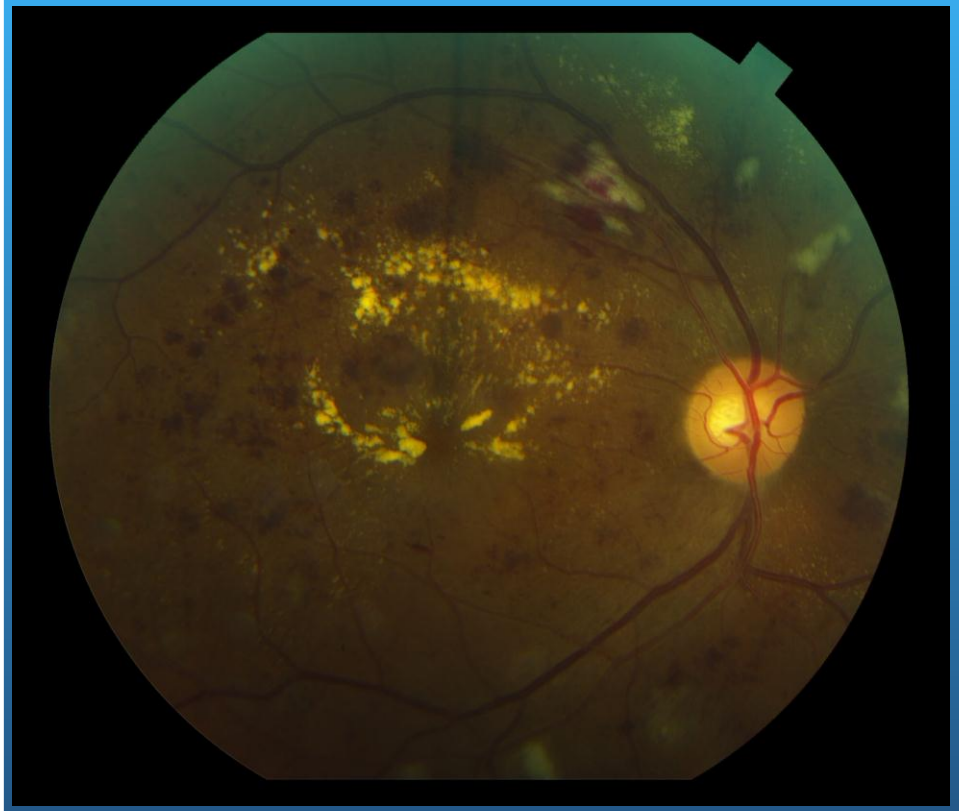
- Center-involved DME requires Treatment with Anti-VEGF therapy
- Tx options: Avastin or Lucentis 0.3mg (FDA approved)
- DRCR-I study results
  - Average 8 injections within the 1st year with monthly follow-up and treatmemt of foveal DME
  - Average 2-3 injections in the 2nd year
- Early, aggressive therapy is best
- Avastin or Lucentis 0.3mg every 4-6 weeks – treat until dry

# DRCR-I (Diabetic Retinopathy Clinical Research Network) Study

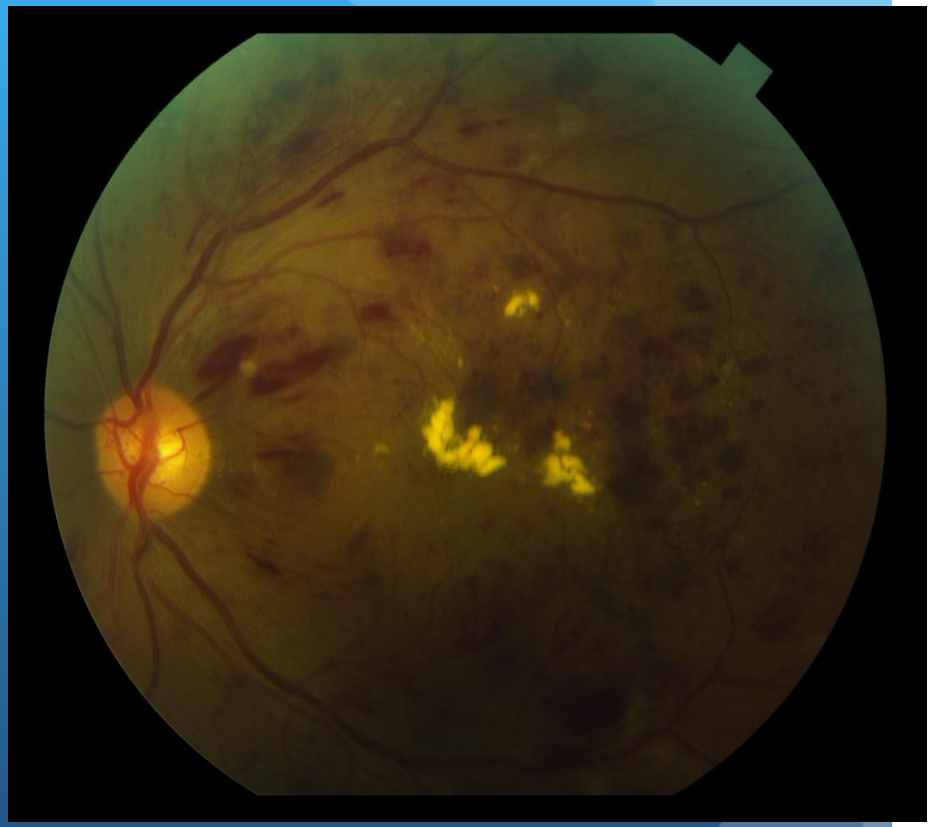
## Visual Acuity (Letters Gained)



# DRCR-I Patient – Pretreatment ( March 2008)

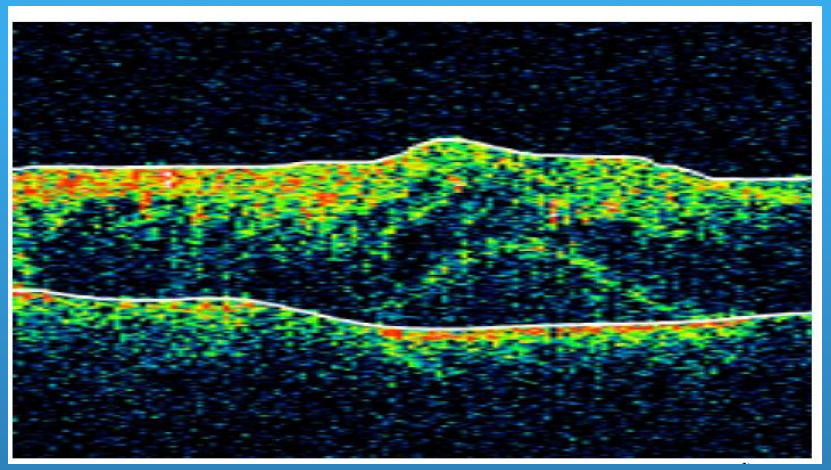


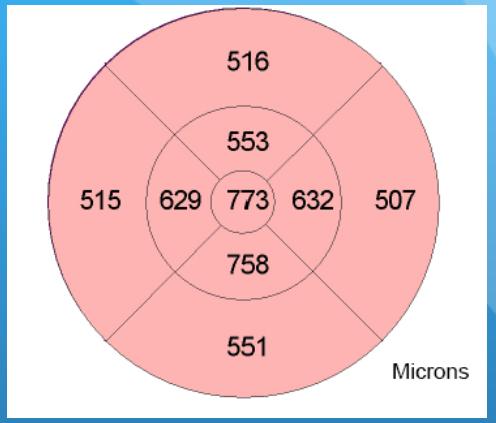
20/160



20/100

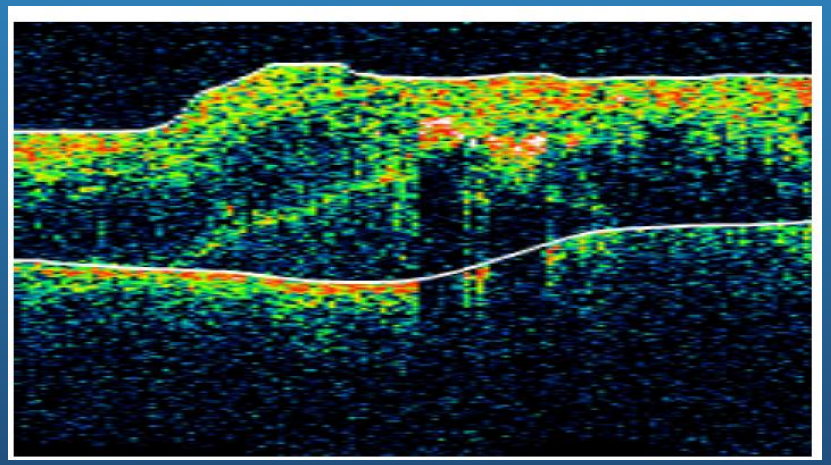
# Pre-Treatment Imaging: OCT

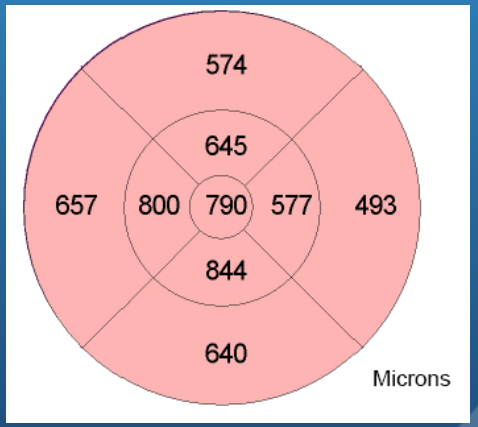





OD

773 um





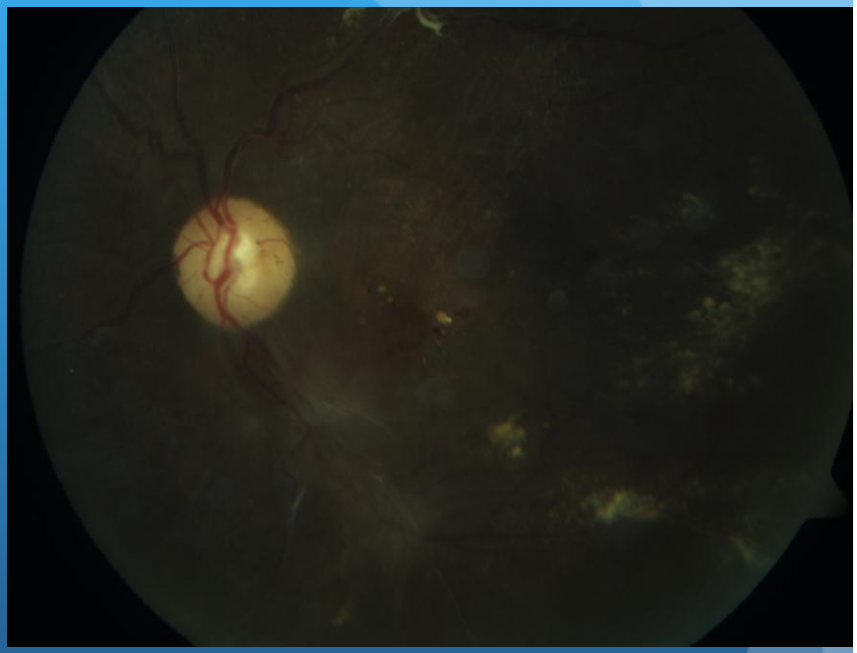

OS

790 um

# Post-Treatment Imaging : Fundus Photos 2 yrs later

Visual Acuity - 20/30

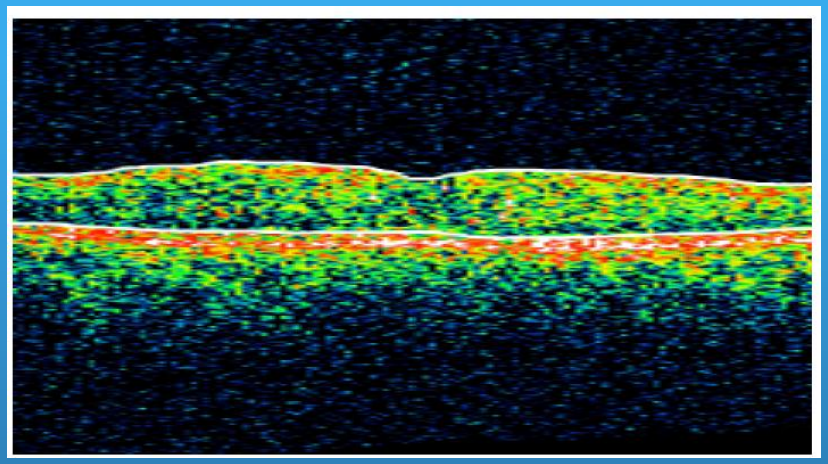
Ranibizumab + deferred laser

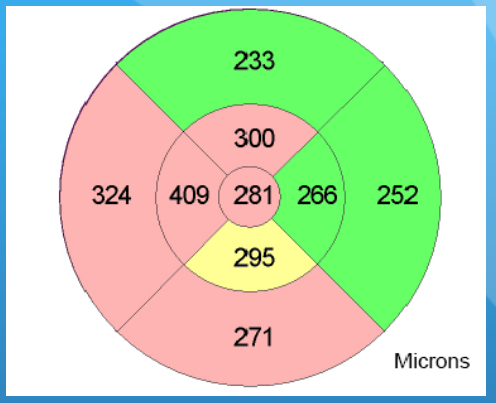


Visual Acuity 20/800

Laser alone

# Post-Treatment Imaging: OCT



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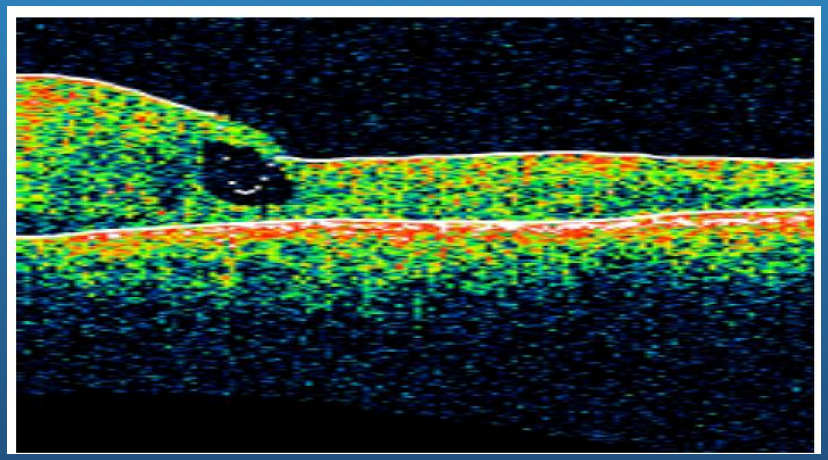

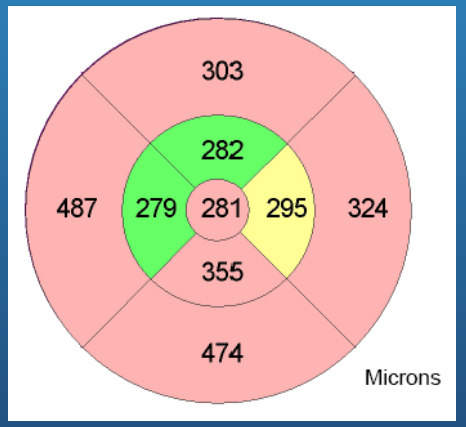


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# Central Diabetic Macular Edema Injection Burden

- DRCR-I data ( using their treatment protocol)
- Monthly clinic visits - Lucentis + deferred laser group
  - 1st year – 8 injections
  - 2nd year – 2-3 injections
  - 3rd year – 1-2 injections

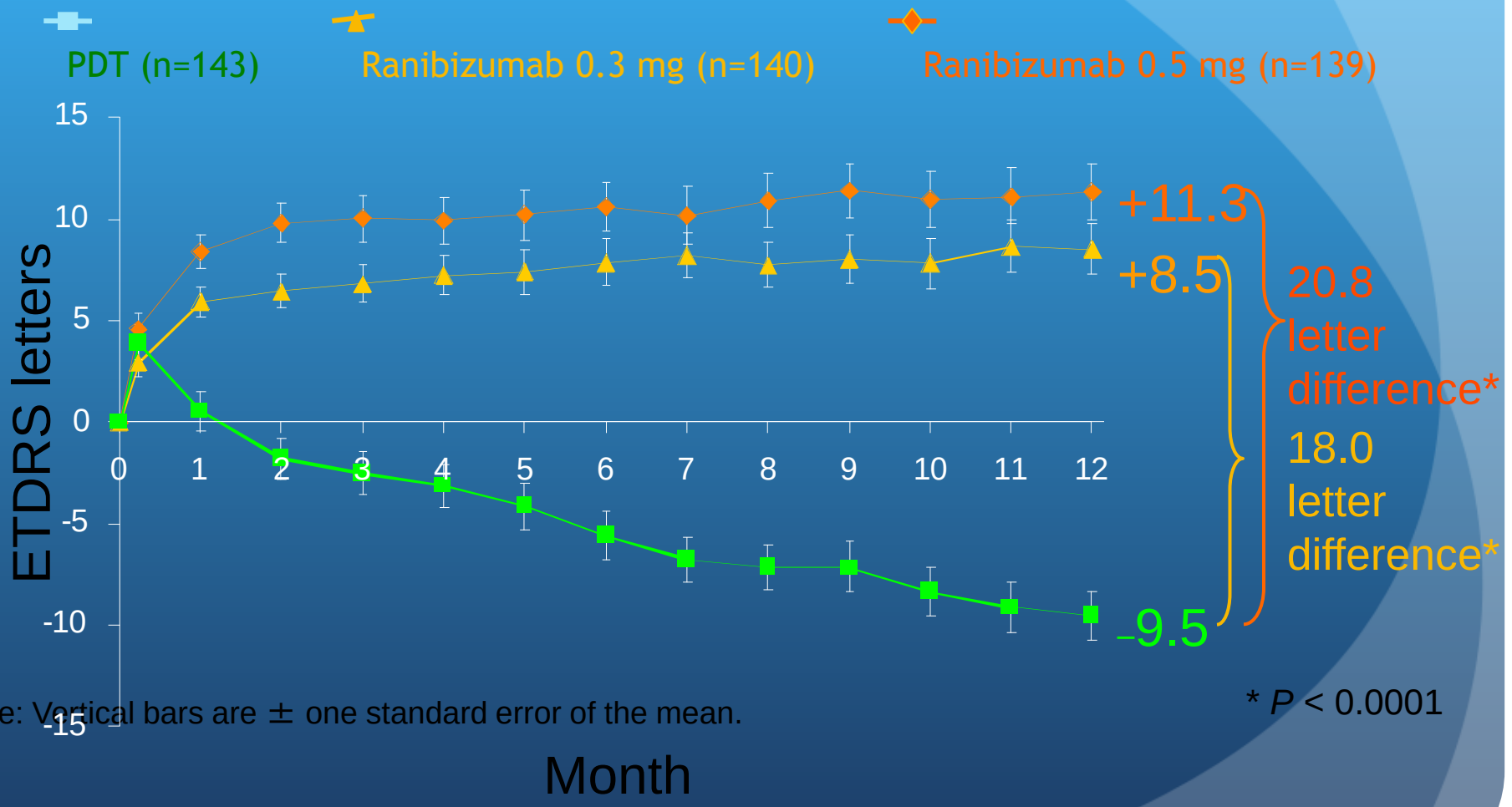
# Exudative Age-Related Macular Degeneration

- The most difficult to manage
- Diagnosis is usually straight forward
  - Mimic cases
    - Chronic CSR
    - Adult vitelliform disease
    - ERM with CME
- Treatment options:
  - Avastin, Lucentis 0.5mg; Eylea 2mg

# Exudative Age-Related Macular Degeneration

- Complex OCT findings
  - Edema
    - Intraretinal Edema / Subretinal fluid
      - Fluid almost always improves but may not resolve
      - ? treatment endpoint
  - Pigment Epithelial Detachment
    - More likely to need chronic therapy
  - Need to look at multiple Retina OCT image cuts to fully understand anatomy and make treat decisions

# Anchor Study: Secondary Endpoint: Mean Change in Visual Acuity Over Time




Note: Vertical bars are ± one standard error of the mean.

* $P < 0.0001$

# CATT Study ( Comparison of Age-Related Macular Degeneration Treatment Trial)

- Comparison of Avastin vs Lucentis ( Ranubizimab) for wet AMD therapy
- Multicenter clinical trial sponsored by National Eye Institute ( not Genentech!)
- Designed to study the comparative efficacy of Avastin vs Lucentis, and also evaluate the “current practice” of PRN therapy vs monthly treatment regimens
- 1107 patients ; monthly follow-up
- 4 treatment groups
  - Monthly Lu x1 yr ; re-randomization to monthly vs PRN dosing
  - Monthly Avastin x1 yr ; re-randomization to monthly vs PRN dosing
  - Lu PRN dosing x 2 yrs; after initial tx monthly evaluation and treat based signs of lesion activity
  - Avastin PRN dosing x 2 yrs; after initial tx monthly evaluation and treat based signs of lesion activity

# CATT Study Summary

- Lucentis 0.5mg vs Avastin 1.25mg were equivalent in final visual outcome at 1 and 2 years
- Lucentis was better than Avastin in achieving a “dry” macula
- Monthly dosing ( Lucentis / Avastin ) vs PRN therapy by 2 years
  - Achieved slightly better final visual outcome vs PRN
  - Higher rate of geographic atrophy development
  - Higher rate of endophthalmitis
    - 10/11 pts in monthly treatment arm
    - 0.06% endophthalmitis injection rate

# View Study Results

- Eylea q 4 week or q 8 week dosing interval ( after monthly losing dose x 3) non-inferior to monthly Lucentis 0.5mg
- Dry macula at 4 months:
  - Lucentis 0.5mg- 70%
  - Eylea – 80%
- Eylea “Persistent edema” patients – better VA outcome with q 4 week therapy vs q 8 week therapy

# Exudative AMD Injection Burden

- Combining injection data from CATT, Horizon, Seven Up studies:
  - 21-28 injections over 7 years
    - 5-7 injections in years 1 and 2
    - 4 injections in years 3 and 4
    - 1.6 years 5-7

Information presented at the Hawaiian Eye Meeting - Jan 2014

# Exudative Age-Related Macular Degeneration

- Given more complex decision making process and evolving treatment paradigm – Injector alone model with Retina co-management may be best option

# Summary

- Intravitreal injection therapies have revolutionized the treatment of retinal disorders
- Frequent injections are needed to stabilize disorders – many patients need chronic therapy
- The number of annual injections performed per year remains on a significant growth curve
- Comprehensive ophthalmologists will play an important role in the co-management of these patients