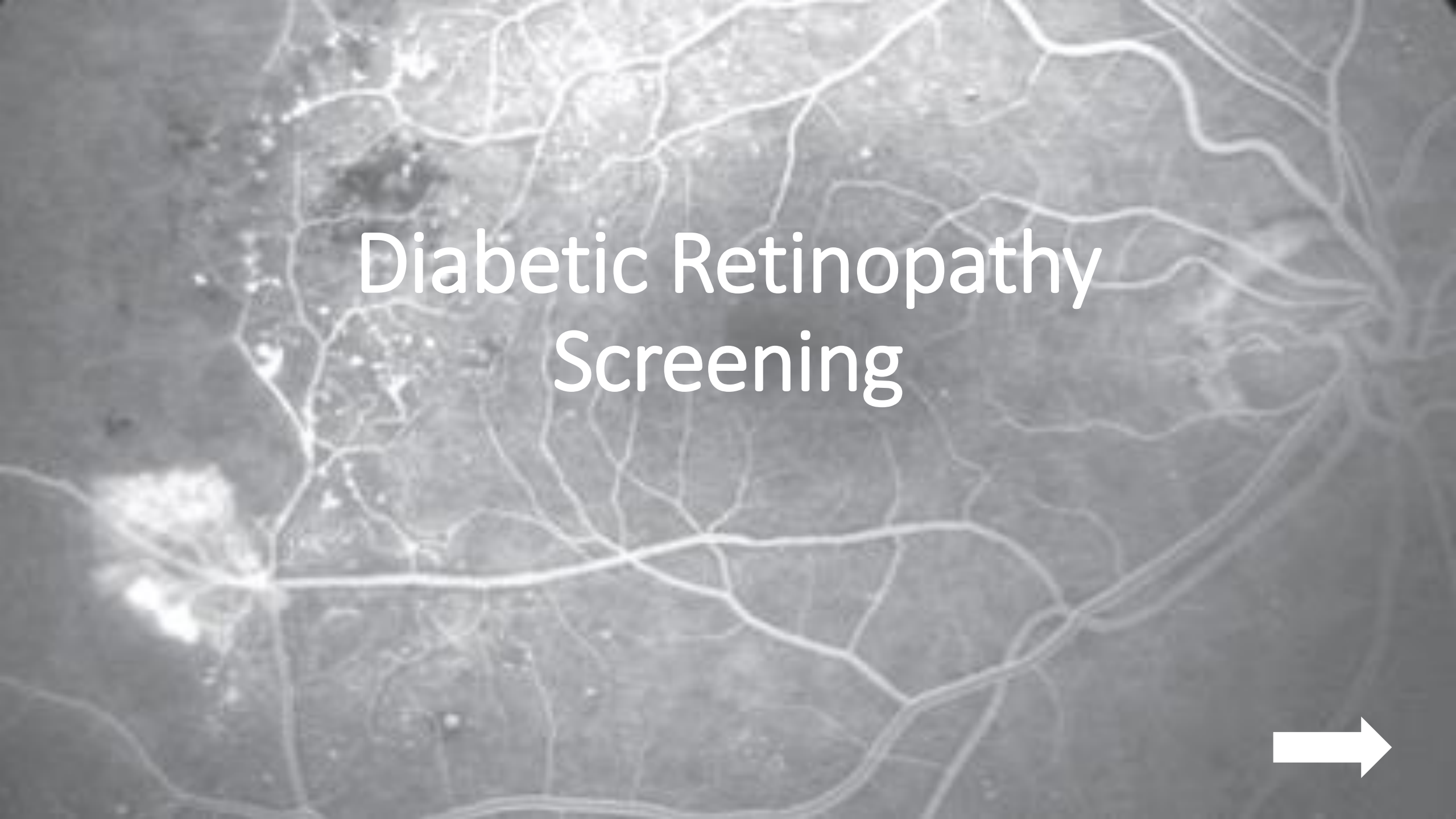

Diabetic Retinopathy
Screening

Table of contents

What is diabetic retinopathy?

- What is diabetic retinopathy (DR)?
- What causes diabetic retinopathy?

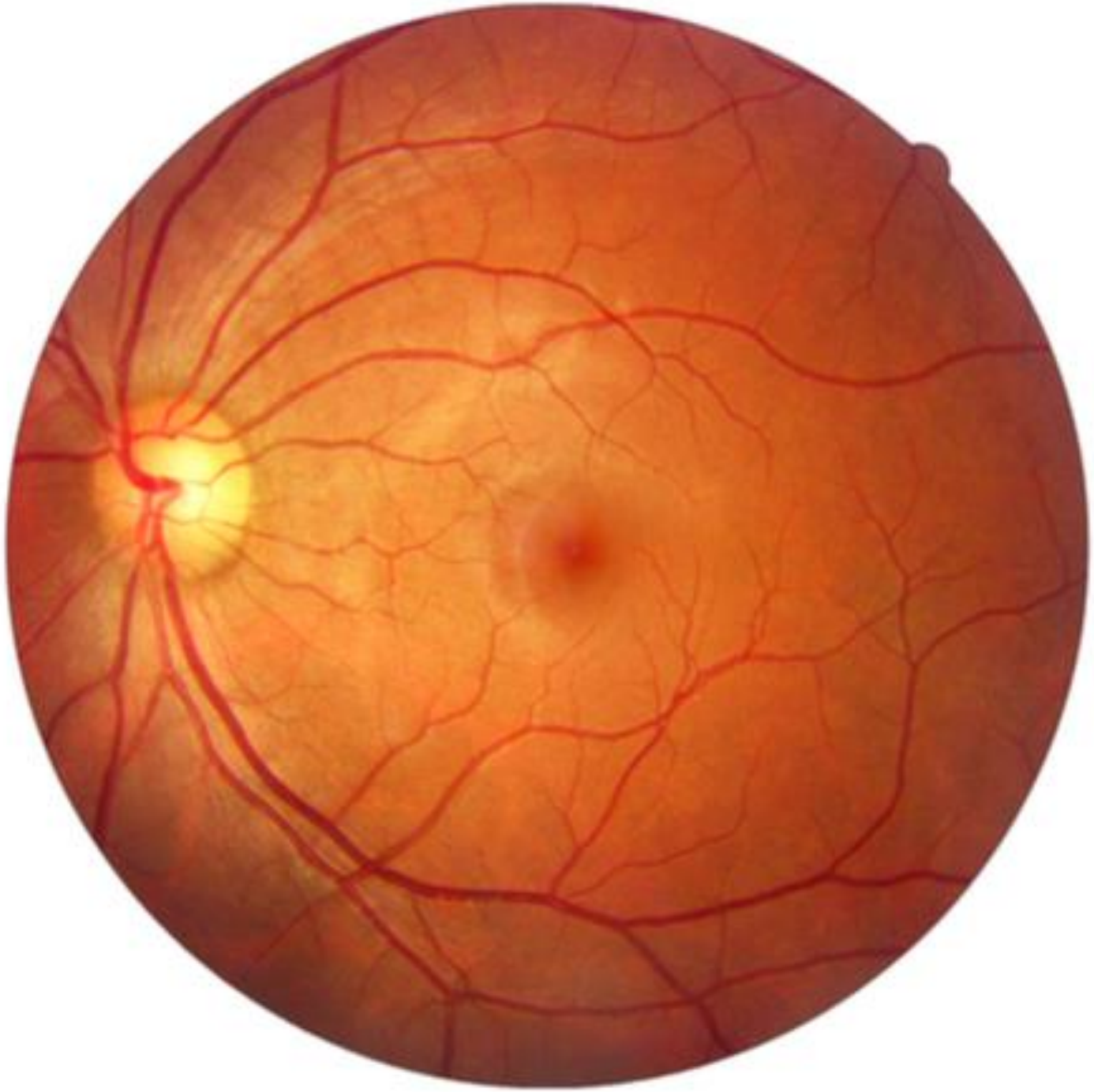
Screening

- Who should be screened for diabetic retinopathy (DR)?
- How often should DR be screened for?
- How good are we at screening?
- Does population based screening work?

Retinal photos

- What do pictures of the retina look like?

- Identify the:
  - Right eye
  - Left eye
  - Optic disc
  - Vessels
  - Macula



What do abnormalities look like?

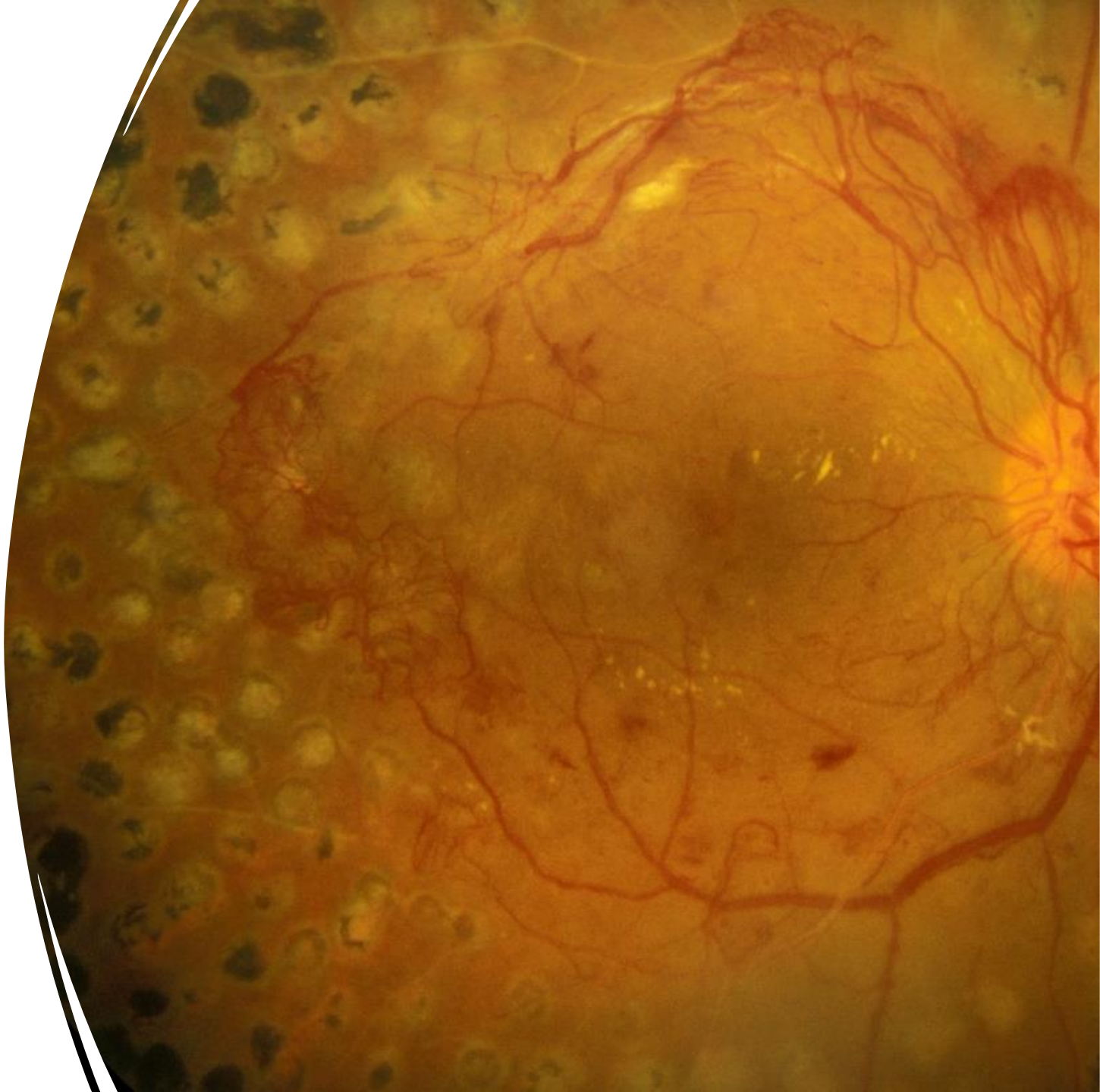
- Identify:
  - Hemorrhage
  - Microaneurysms
  - Exudates
  - Cotton wool spots

Follow up

- When is follow up indicated if the patient has:
  - No diabetic retinopathy
  - Mild non-proliferative diabetic retinopathy (NPDR)
  - Moderate-severe non-proliferative diabetic retinopathy
  - Proliferative diabetic retinopathy
  - Macular edema

Treatment

- What are treatment options?
- How do you prevent DR from occurring?



Taking pictures

- What do you take photos with?
- What are the benefits of photos over an exam?

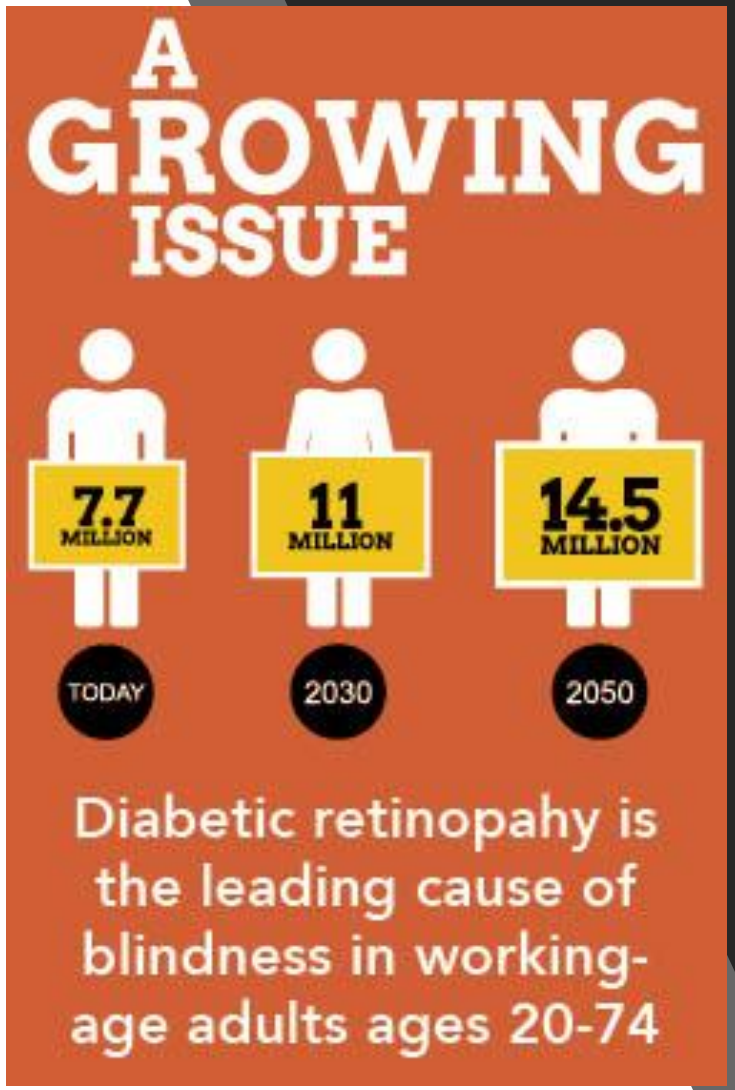
Glossary

Identify the following:

- CSME
- CRVO
- DM
- DR
- HTN
- IOP
- ME
- NPDR
- OCT
- OD
- OS
- OU
- PDR
- PRP
- VEGF
- VF

Best practices

- What are steps that can be taken to maximize screening rates and increase follow up when vision threatening retinopathy is present?



What is it?

- Diabetic retinopathy (DR) is the leading cause of blindness in 20-74yo (in the developed world)
- 1 in 3 over 40yo have retinopathy
- Sugar sticks in the small vessels of the eye causing them to leak, bleed or die. This can also lead to non-functional new vessel growth.
- High blood pressure and cholesterol also increase the risk of developing retinopathy

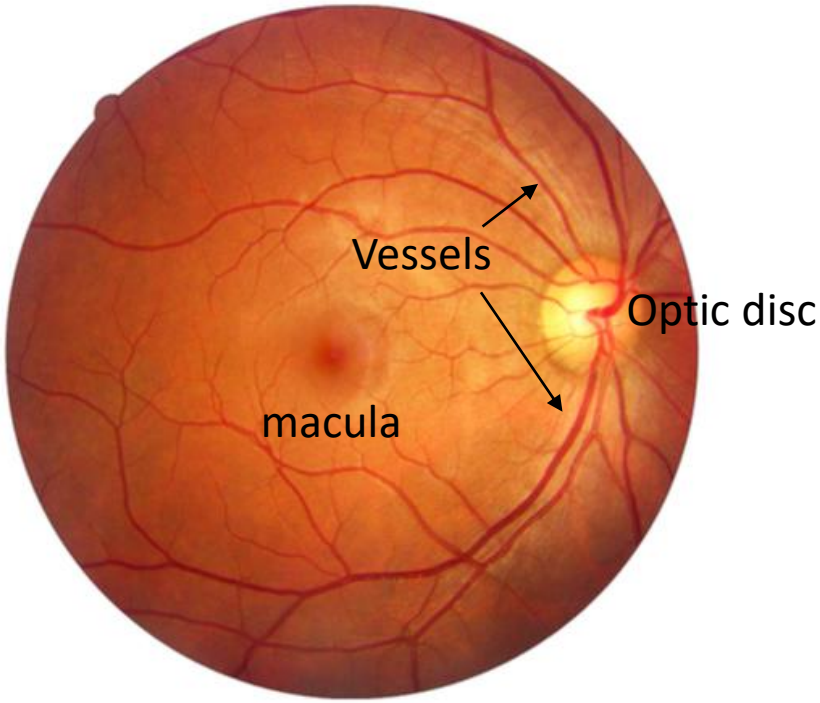
Screening

- We screen for DR to identify vision threatening conditions and treat to prevent blindness
- Screen everyone with Type II DM at diagnosis
  - Repeat screening every 2 years if no DR and A1c is controlled
  - There is little risk of developing significant retinopathy 3 years after a normal exam
- Screen everyone with Type I DM 5 years after diagnosis
- A formalized screening process needs to be developed in Zambia

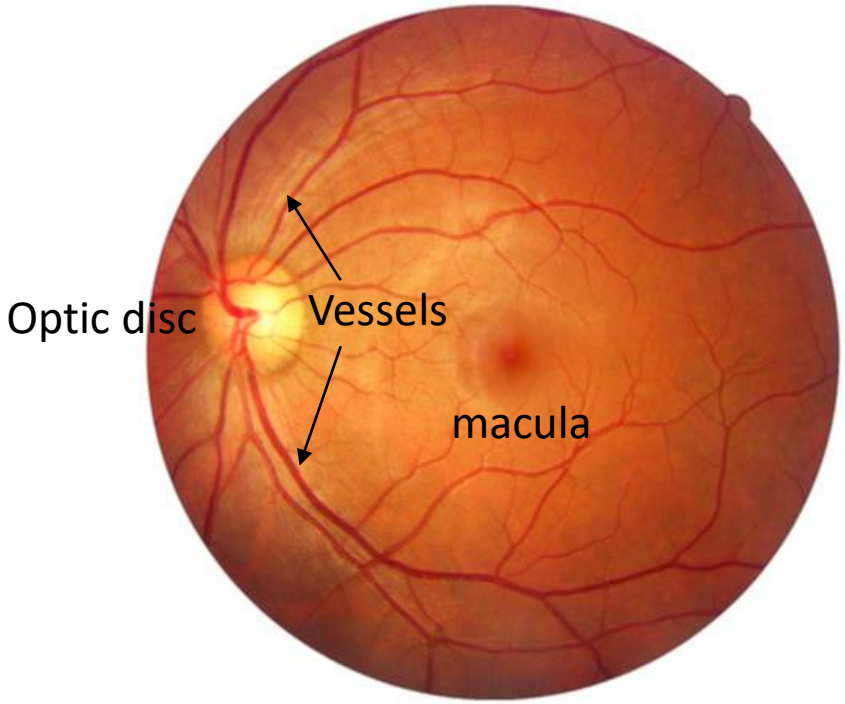
Screening Rates

- Zambia: low
- US National Underserved: 33%
- US National average: 60%
- Canada utilizes nurses to read fundus photos
- In the UK screening is performed in the primary care setting
- UK initiated a population-based screening process using retinal cameras in 2003 and by 2008 achieved a national screening rate of 82.%
    - For the first time in 5 decades there was a decrease in blindness due to diabetes
    - DR is no longer the top cause of blindness in the UK
- AZ free clinic implemented a similar program and achieved a 99% screening rate
- What can Zambia do to increase screening rates?

Retinal photos



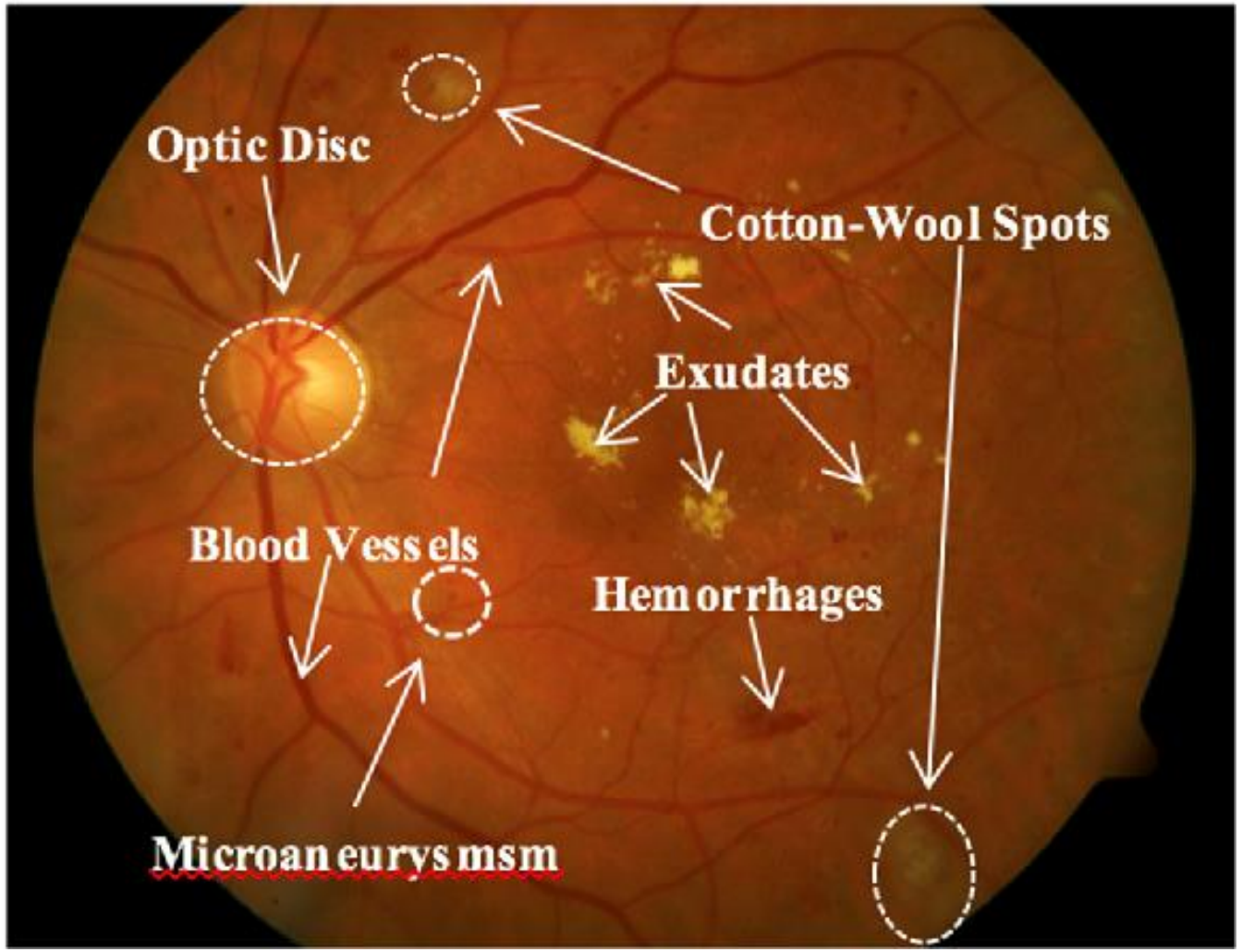
The optic nerve is nasal: Right eye



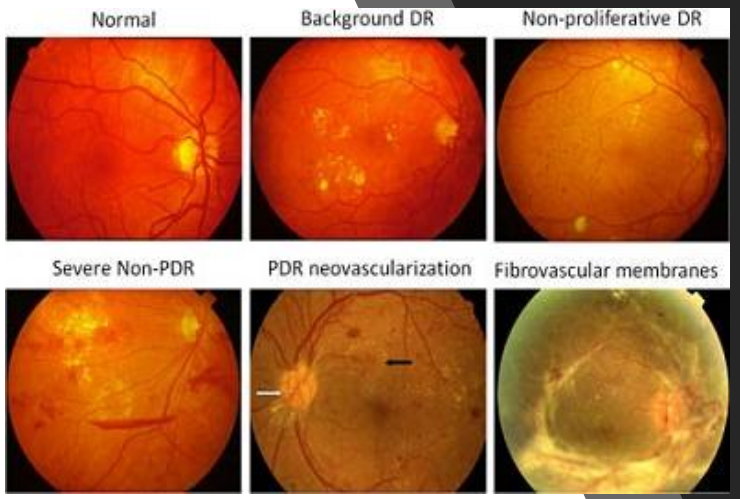
The optic nerve is nasal: Left eye

Abnormal findings

- ***Hemorrhage***: bleeding in the retina, can be subtle or dramatic
- ***Microaneurysms***: aka dot hemorrhage are tiny red dots and usually the earliest visible manifestation of DR
- ***Exudates***: are bright yellow (usually rings) that develop from vascular leakage
- ***Cotton wool spots***: small cloud like yellow-white-grey lesion thought to be from ischemia



Follow up and Treatment



FINDINGS	Follow Up	Treatment options
Normal	2 years if glucose is controlled	Control sugar & blood pressure
Mild/Background	1 year	Control sugar & blood pressure
Moderate	6-12 months with ophthalmology	Control sugar & blood pressure
Severe NPDR	Retinal specialist	Laser (photocoagulation)
Proliferative DR	Urgent referral to retinal specialist	Laser +/- Intravitreal injection of anti-VEGF +/- vitrectomy
Macular edema	Urgent referral to retinal specialist	Intravitreal injection of anti-VEGF or laser

Taking pictures

- Retinal cameras: can range in size from a smart phone to a large desktop computer
- Benefits:
  - Takes minutes
  - Cheap
  - Painless
  - Non-invasive
  - No dilation needed
  - No driver needed
  - Performed at PCP during any visit
  - Increases screening rates
  - Images can be saved
  - Can be performed by non-medical staff
- Selfies are the future

- Have a standardized protocol
- Create a standing order for staff
- Provide staff/provider education
- Cross train all staff
- Provide easy access references
- Screen every patient when they are due
- Proactive outreach
- Follow evidence-based practices
- Train PCP to read as normal or abnormal
- Use artificial intellegence
- Have result prior to the patient leaving
- Perform continuous quality improvement
- Adopt a specialist for curbside consults
- Encourage staff to have ownership in the process, results and follow through

Glossary

- CSME: clinically significant macular edema
- CRVO: central retinal vein occlusion
- DM: diabetes mellitus
- DR: diabetic retinopathy
- HTN: hypertension
- IOP: intraocular pressure
- ME: macular edema
- NPDR: nonproliferative diabetic retinopathy
- OCT: optical coherence tomography
- OD: right eye
- OS: left eye
- OU: bilateral eyes
- PDR: proliferative diabetic retinopathy
- PRP: pan-retinal photocoagulation
- VEGF: vascular endothelial growth factor
- VF: visual field

**Use this if needed to interpret the specialist note