



Alireza Ramezani

Alireza Ramezani MD

Imam Hossein Medical Center

Torfe Medical Center

Negah Eye Hospital

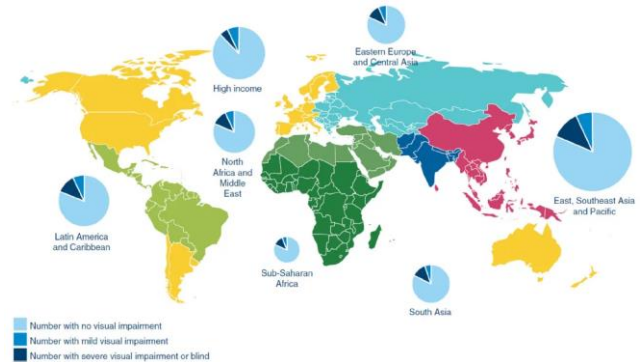
Shahid Beheshti University of Medical Sciences

ROP Screening

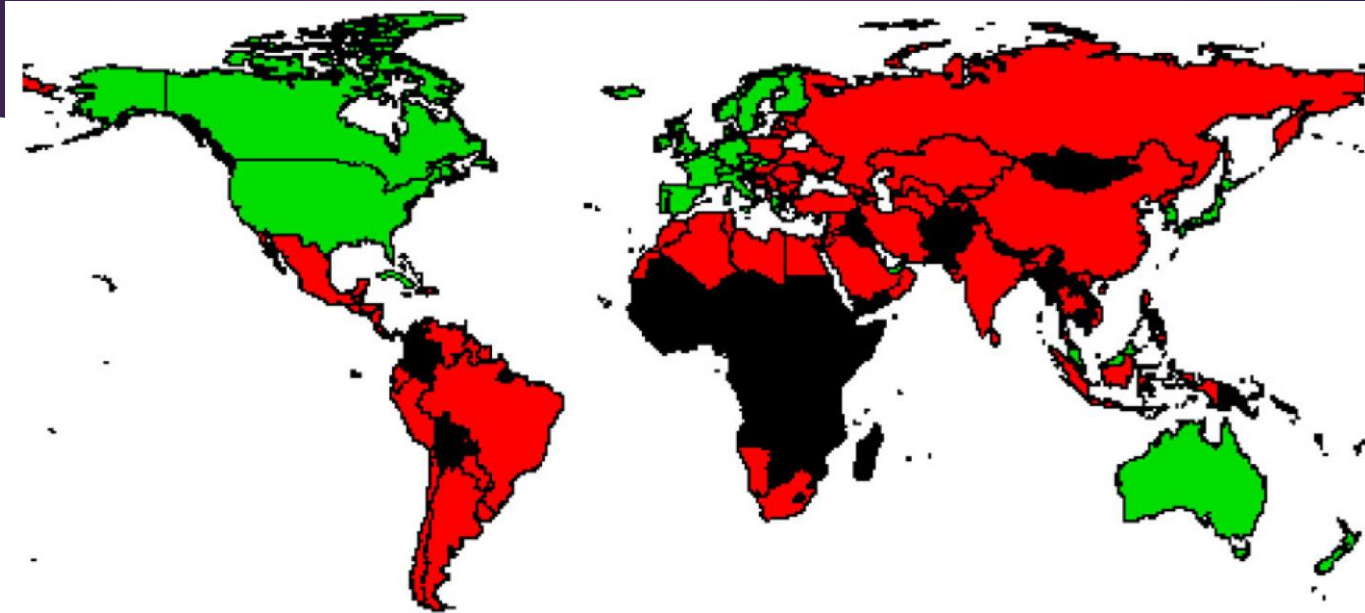


Retinopathy of prematurity (ROP)

- ▶ Is a leading cause of childhood blindness worldwide
- ▶ the two strongest risk factors
 - ▶ low gestational age
 - ▶ low birth weight
- ▶ 20,000 babies go blind around the world each year,
- ▶ the Global Burden of Disease study: in 2010 → 257,000 years lived with disability worldwide secondary to ROP



despite the fact that blindness from ROP is often preventable with appropriate primary, secondary, and tertiary prevention

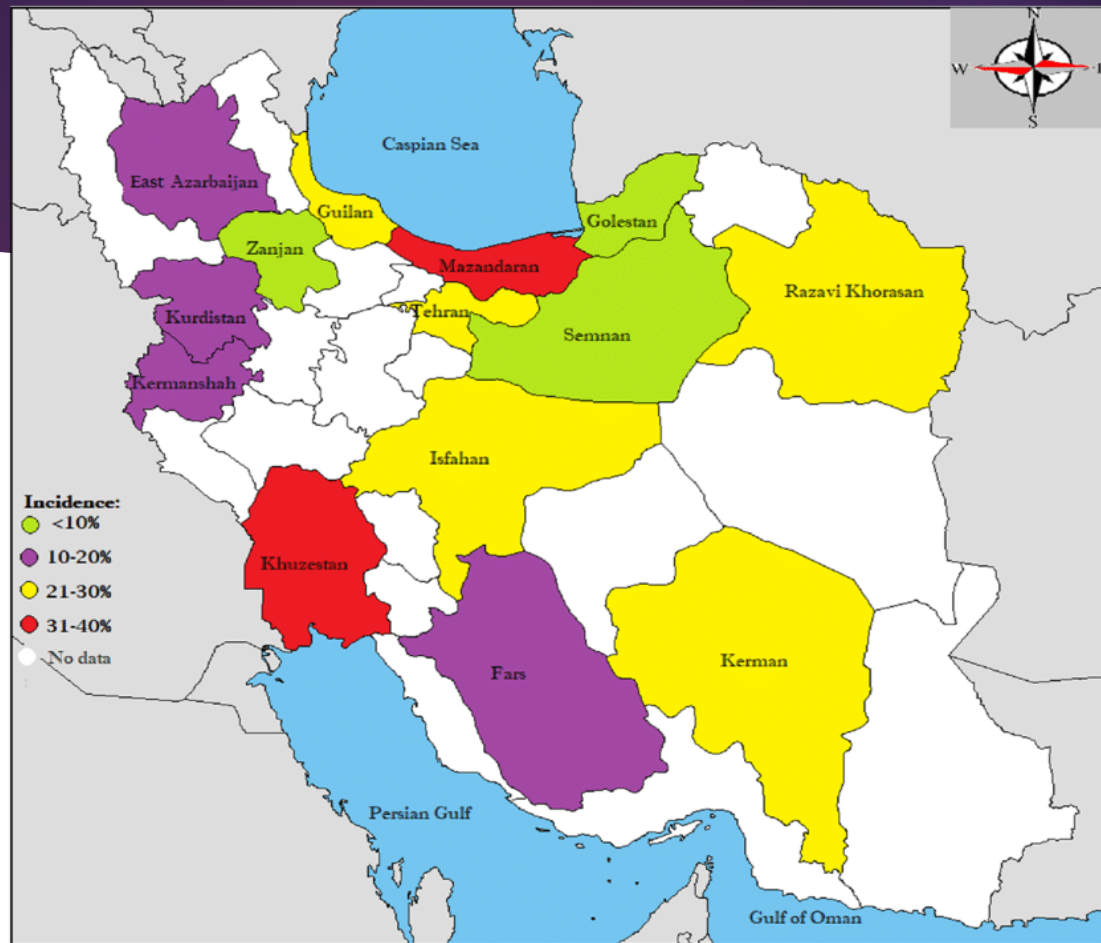


	≤8/1000	Low risk of ROP blindness – good neonatal care and screening
	9–60/1,000	High risk of ROP blindness – neonatal care and screening not always adequate
	≥61/1,000	Low risk of ROP – neonatal care not well developed

□ در کشور ما میزان شیوع رتینوپاتی نارسایی در مطالعات و نواحی مختلف، متفاوت گزارش شده است، از سه درصد تا ۳۸ درصد. این تفاوت به دلایل متعددی می‌تواند باشد. در این مطالعه، ما می‌خواهیم بدانیم که آیا تفاوت در شیوع رتینوپاتی نارسایی در کشور ما وجود دارد یا نه.

جدول شماره ۱- فراوانی بروز رتینوپاتی نارسایی در دانشگاه های مختلف کشور بین سال های ۱۳۸۰-۱۳۹۰

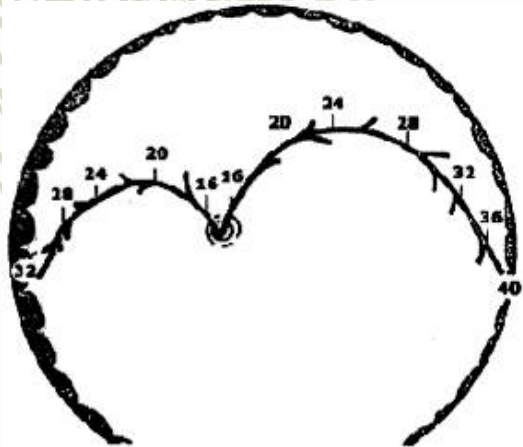
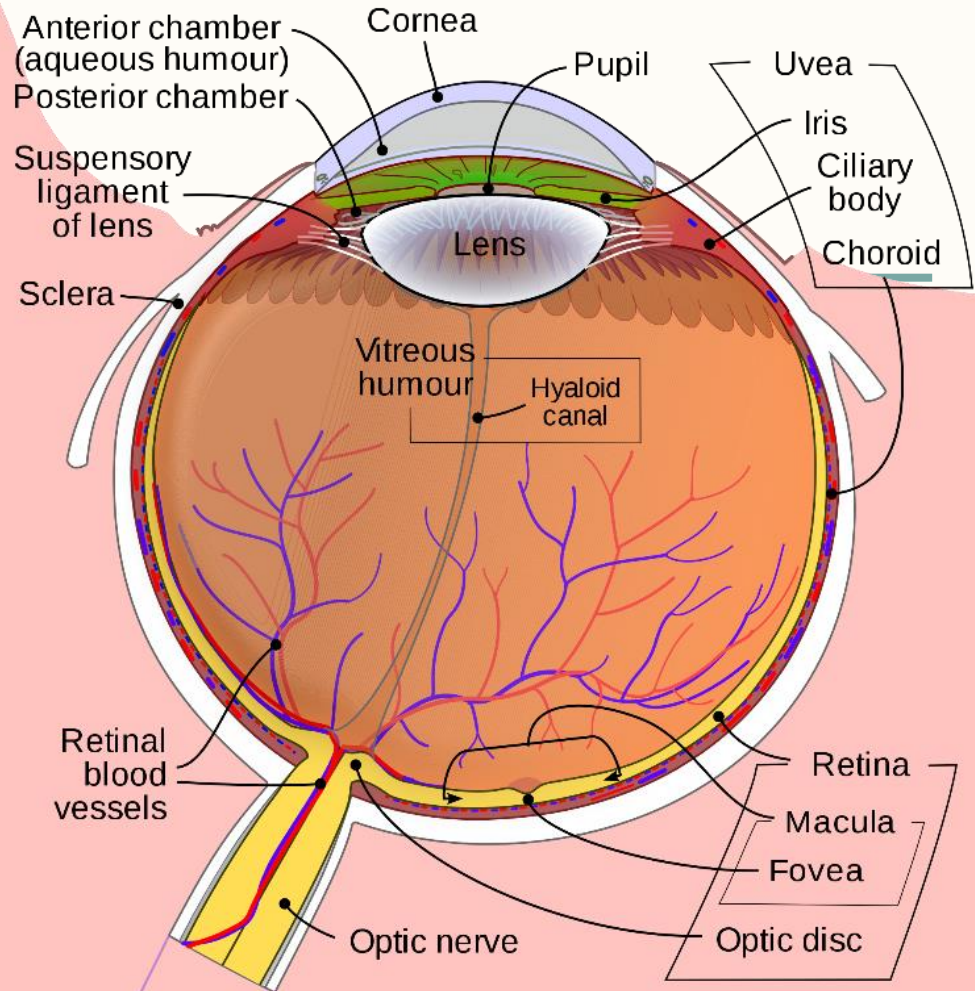
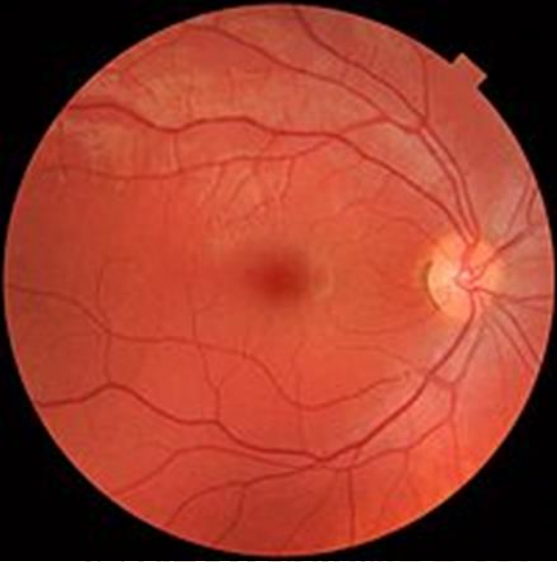
شماره	دانشگاه	تاریخ	جمعیت مورد مطالعه	تعداد نوزادان مبتلا به ROP	درصد ابتلا به ROP
۱	تبریز	۱۳۸۴-۱۳۸۵	۳۹۹	۲۹	۷,۲۷
۲	مشهد	۱۳۸۴-۱۳۸۵	۴۵	۴	۸,۸۹
۳	کرمانشاه	۱۳۸۸-۱۳۸۹	۸۴	۱۱	۱۳,۱۰
۴	تهران	۱۳۸۲-۱۳۸۴	۱۹۸	۲۷	۱۳,۶۴
۵	تهران	۱۳۸۵-۱۳۸۶	۷۱	۱۲	۱۶,۹۰
۶	تبریز	۱۳۸۳-۱۳۸۴	۱۵۰	۲۶	۱۷,۳۳
۷	مشهد	۱۳۸۰-۱۳۸۱	۵۰	۱۴	۲۸,۰۰
۸	کرمان	۱۳۸۵-۱۳۸۸	۸۳	۲۴	۲۸,۹۲
۹	اهواز	۱۳۸۵-۱۳۸۹	۵۷۶	۱۸۳	۳۱,۷۷
۱۰	تهران	۱۳۸۰-۱۳۸۷	۷۹۷	۲۵۷	۳۲,۲۵
۱۱	شیراز	۱۳۸۵-۱۳۸۶	۱۹۹	۶۵	۳۲,۶۶
۱۲	شیراز	۱۳۸۵-۱۳۸۹	۷۸۷	۲۹۳	۳۷,۲۳
	کل	۱۳۸۰-۱۳۹۰	۳۴۳۹	۹۴۵	۲۷,۴۸



مطالعه	Screening criteria	N	Mild ROP	Severe ROP
مطالعه شیراز 2006-2007	BW≤ 2000gr	199	65 (32.6%)	19 (9.5%)
مطالعه اهواز 2006-2010	BW≤ 2000g and/or GA<32 Wk	576	183(32%)	46 (8%)
مطالعه بابل 2004-2008	GA<37 Wk	173	33 (19.1%)	
مطالعه مشهد 2006-2010	GA<32 Wk	122	32 (26.2%)	11 (9%)
مطالعه فارابی 2003-2007	GA< 37 Wk	953	(34.5%) 329	215 (22.5%)
مطالعه گیلان 2011	BW≤2500g and/or GA≤36Wk	310	64 (20.6%)	14 (4.5%)
مطالعه شهید بهشتی ۲۰۱۸	BW≤2000 and /or GA wk	207	46(22%)	23(11%)

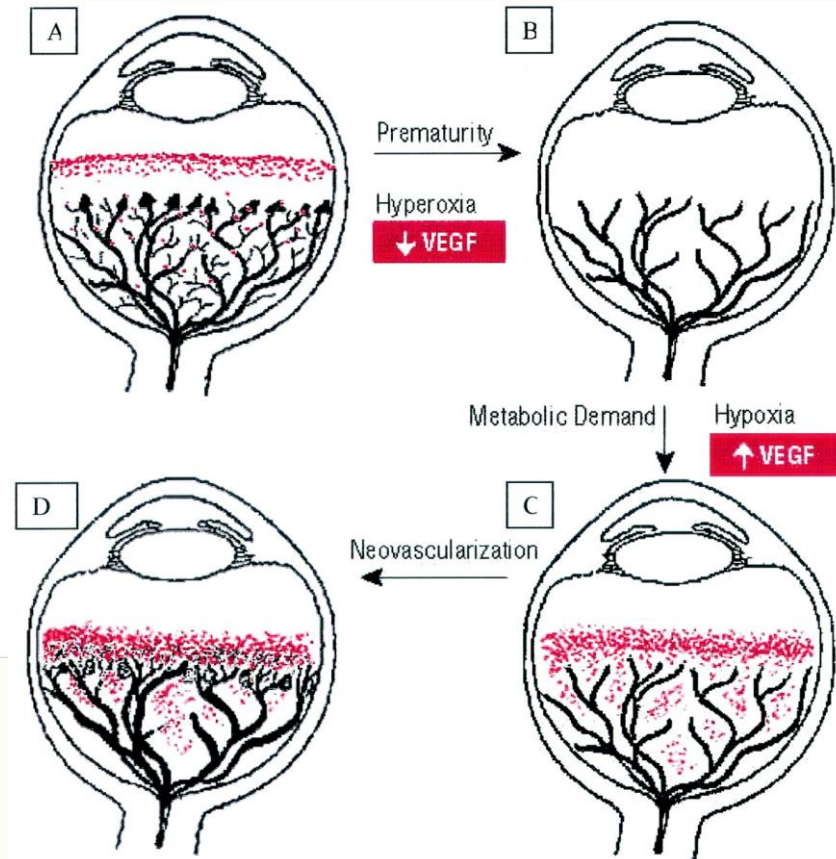
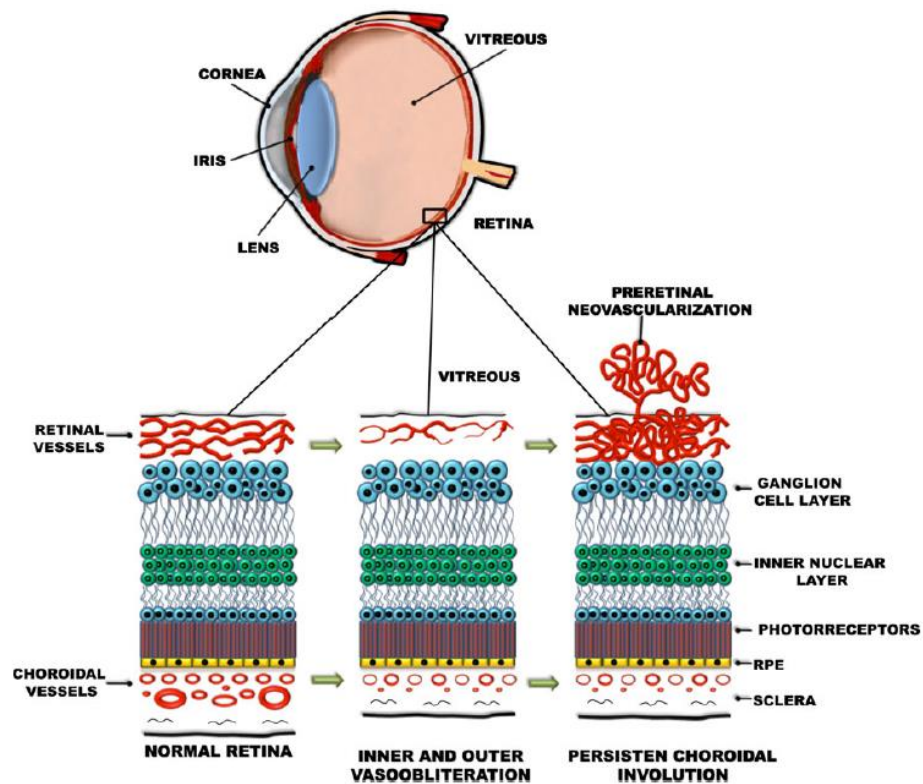


Pathogenesis of ROP





IGF-1



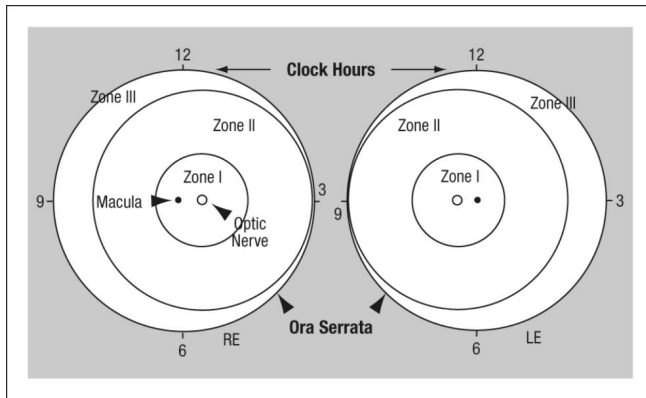


Stages of ROP

—

Classification of Retinopathy of Prematurity

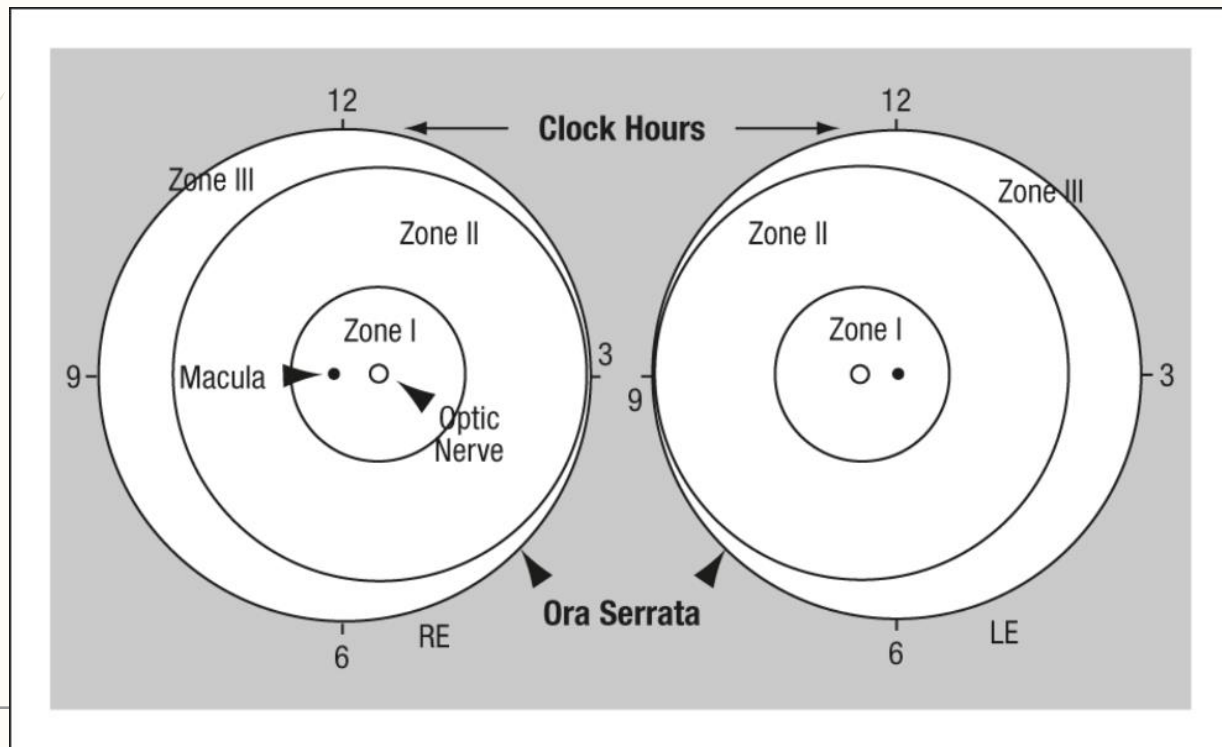
ROP is classified based on the location, extent, and severity of disease according to the guidelines described by the International Classification of Retinopathy of Prematurity (ICROP) in 1984 and 2005



Zone
Stage
Plus

From: **The International Classification of Retinopathy of Prematurity Revisited**

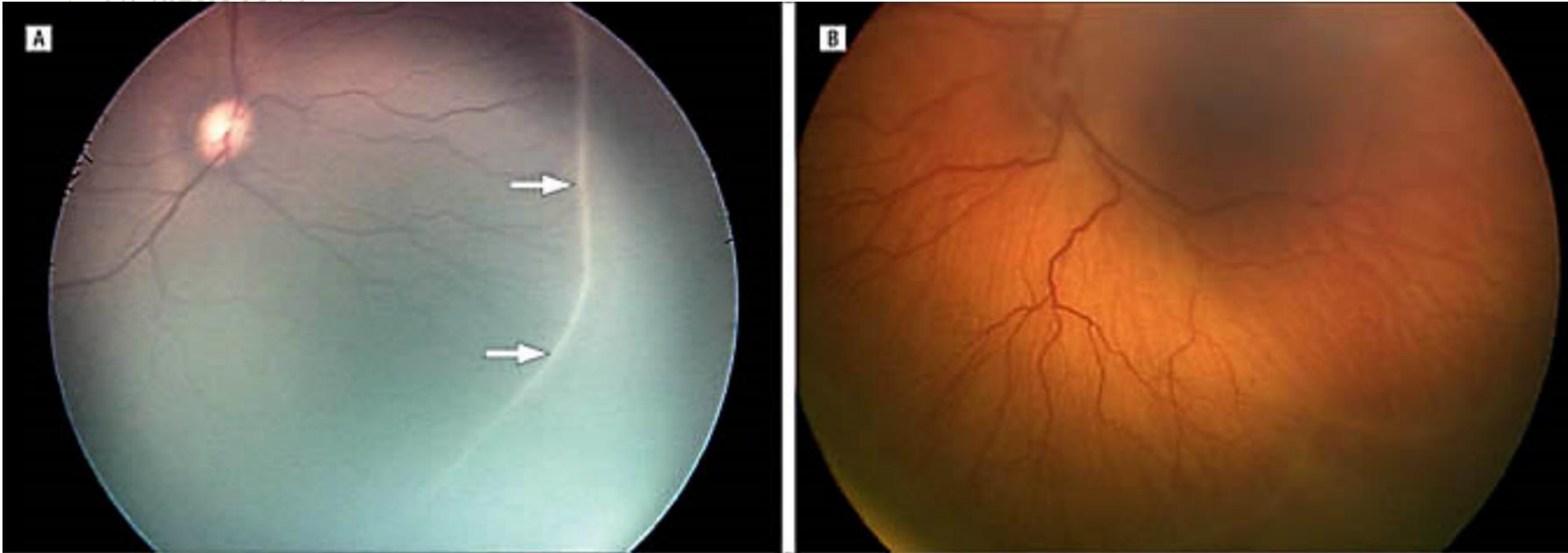
Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archophth.123.7.991





From: **The International Classification of Retinopathy of Prematurity Revisited**

Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archopht.123.7.991



stage 1



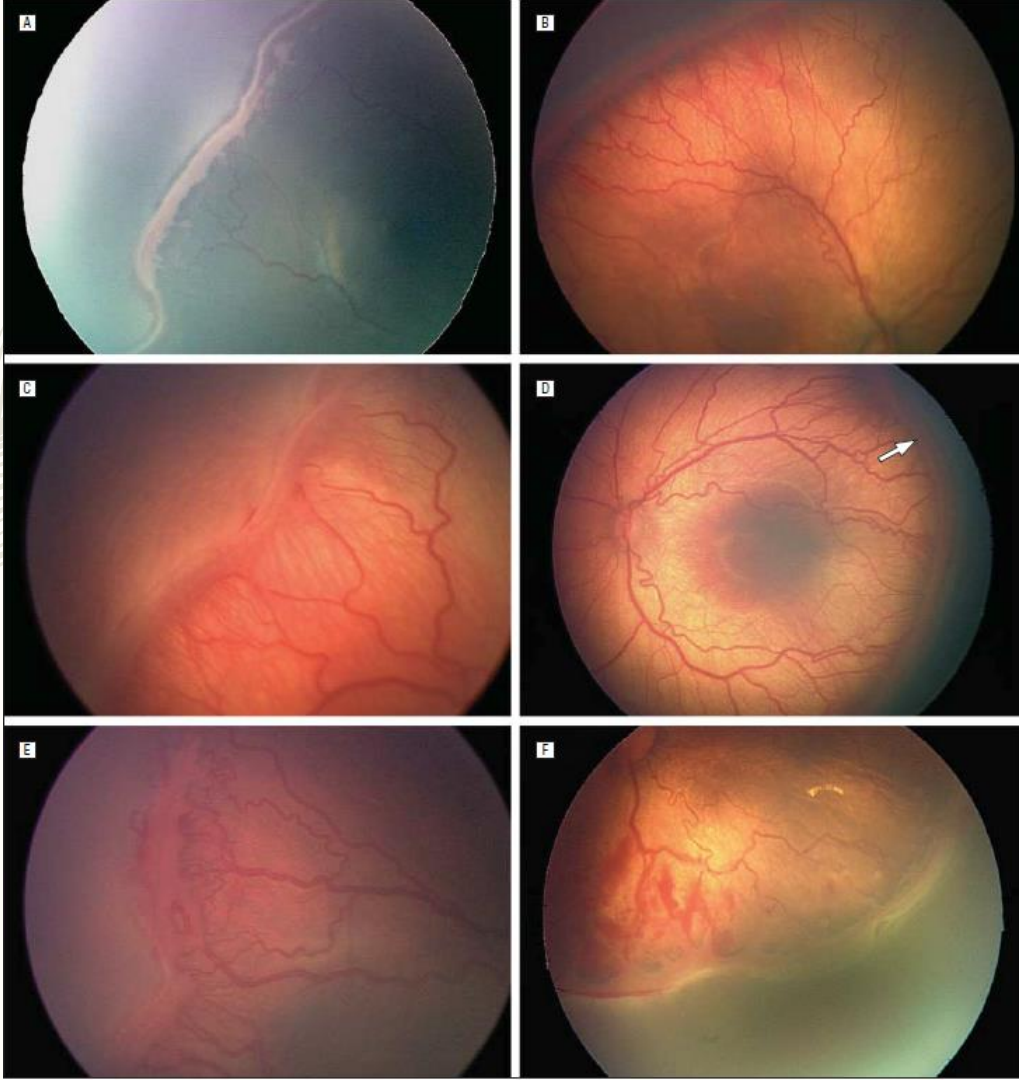
From: **The International Classification of Retinopathy of Prematurity Revisited**

Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archopht.123.7.991



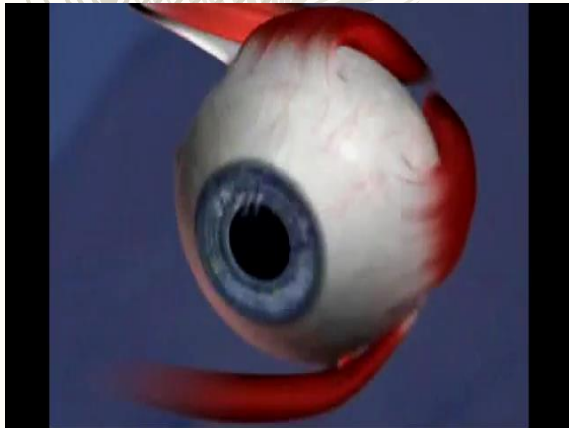
stage 2

Stage 3



From: **The International Classification of Retinopathy of Prematurity Revisited**

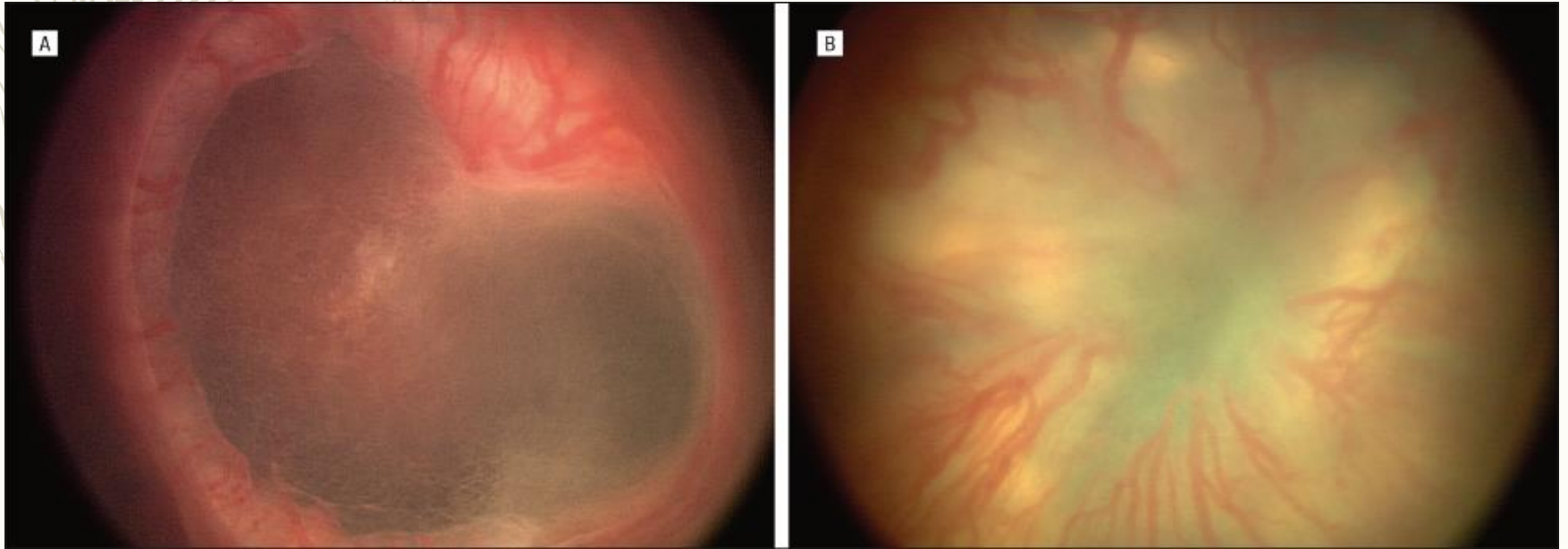
Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archophth.123.7.991



stages 4A and B

From: **The International Classification of Retinopathy of Prematurity Revisited**

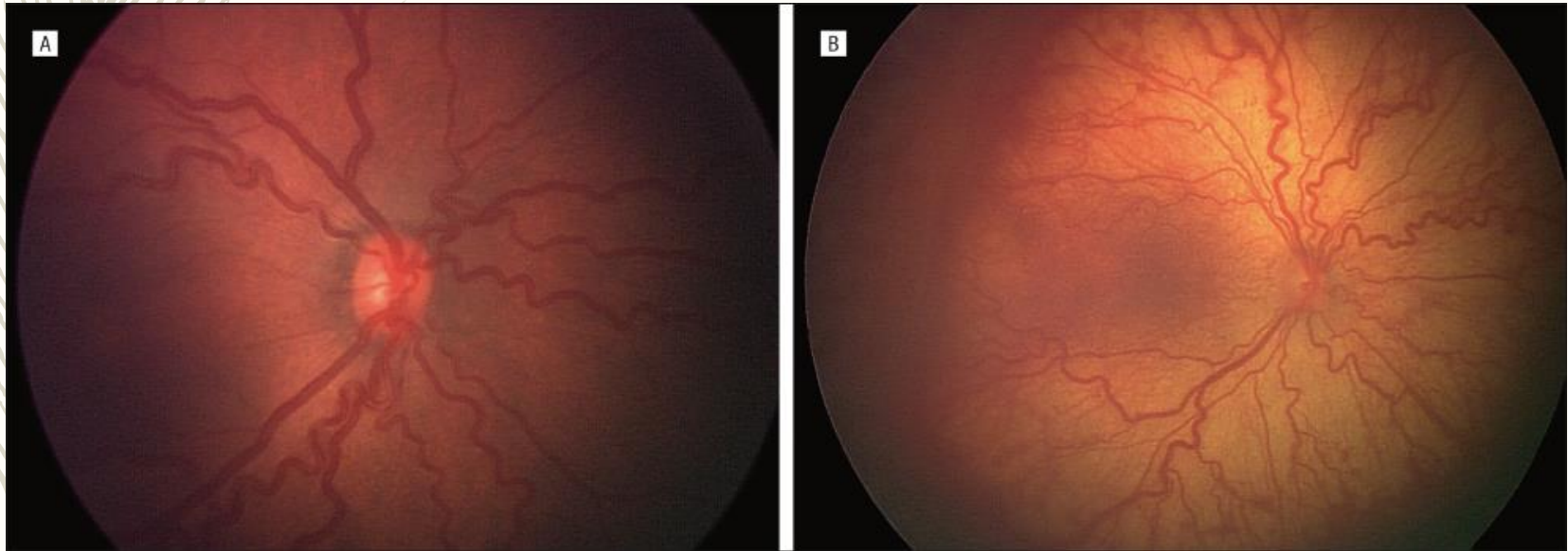
Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archopht.123.7.991



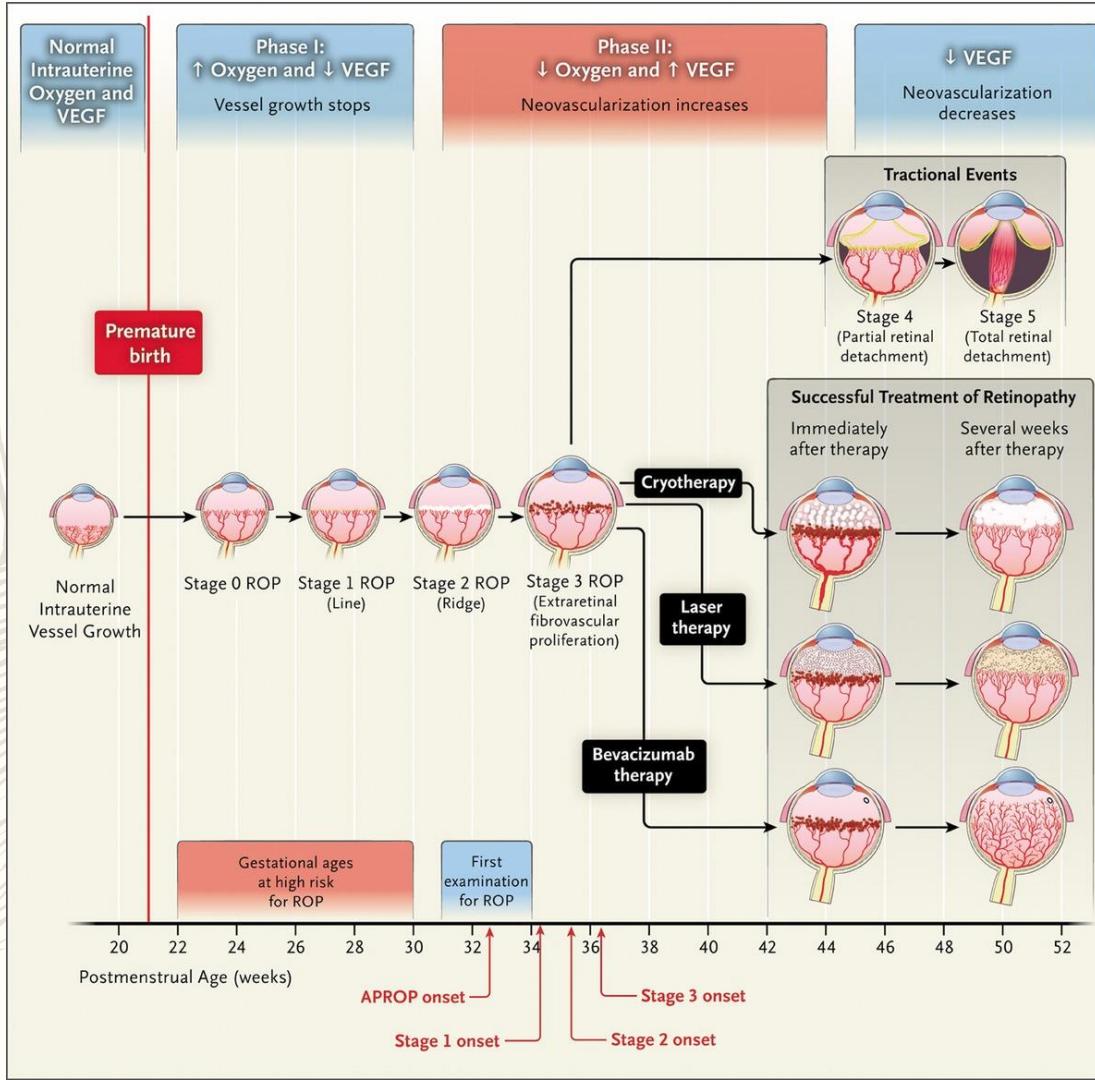
stage 5

From: **The International Classification of Retinopathy of Prematurity Revisited**

Arch Ophthalmol. 2005;123(7):991-999. doi:10.1001/archopht.123.7.991



plus disease





ROP Screening & Diagnosis



screening

- AAO:
 - GA <30 weeks or
 - BW <1500 grams
- In developing countries: in India
 - GA $\leq$ 34 weeks and/or
 - a BW $\leq$ 2000 g





First exam

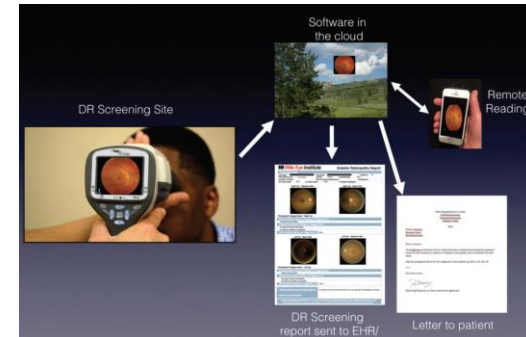
- at least 4 weeks postnatal age or at least 31 weeks postmenstrual age
- micropreemies (BW <750 g <26th week)
- in developing countries: BW <1200 g GA <28 weeks



early screening initiation: at 2–3 weeks postnatal
in developing countries: GA <28 weeks
or a BW <1200 g

ROP screening and diagnosis

- ▶ Only 5% to 10% develop sight-threatening ROP.
- ▶ ROP screening:
 - ▶ bedside ophthalmoscopic screening
 - ▶ telemedicine using digital fundus imaging
- ▶ barriers to ensuring consistent screening (especially in low- and middle-income countries)
 - ▶ inadequate equipment and training
 - ▶ personnel shortages
 - ▶ inconsistent examinations between clinicians and/or institutions





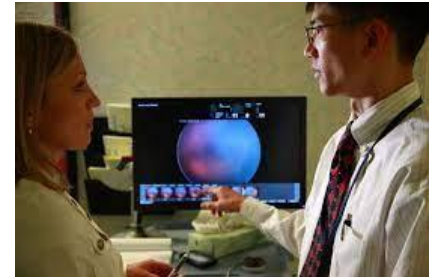
Indirect binocular ophthalmoscopy along with concomitant scleral indentation



telemedicine



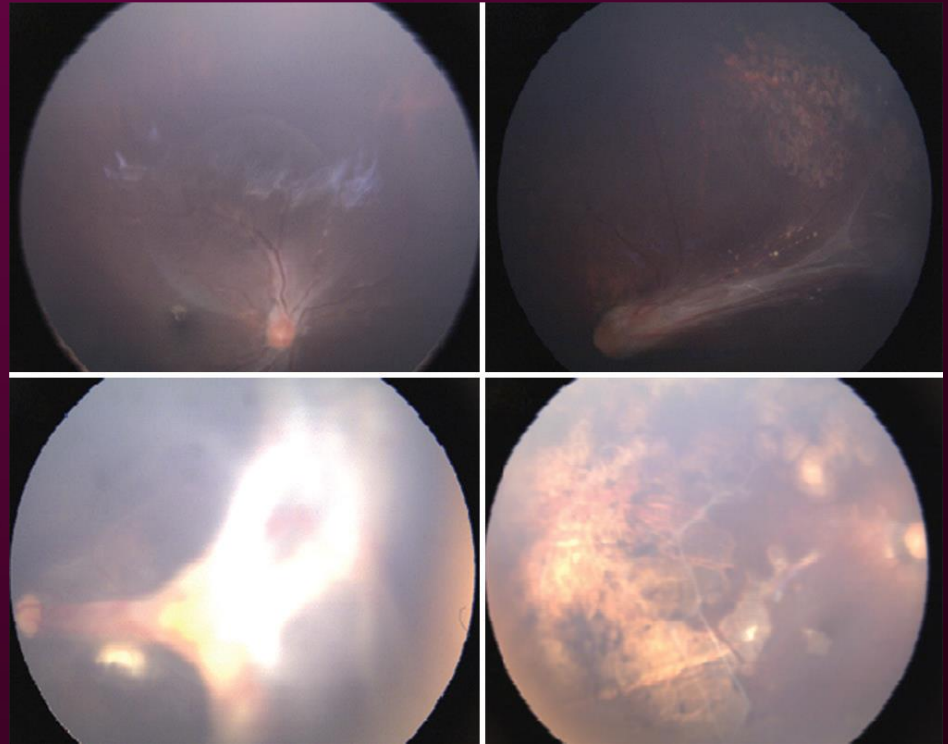
- ▶ Especially in regions where there are too few trained or willing ophthalmologists to manage ROP
- ▶ 100% sensitivity, 99.8% specificity,
- ▶ can allow a single provider to screen babies over a large geographic area.
- ▶ also enabled for the first time large databases (essential step for the development of AI)





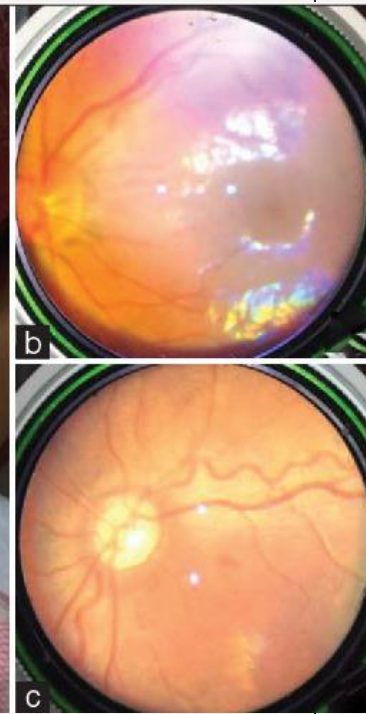
RetCam III

- 130° field of view
- resolution of 1600*1800
- 125,000 USD



Smartphone-Based Cameras

more simple, portable, cost-effective, and user-friendly
devices for screening,
which can be easily used in rural peripheries

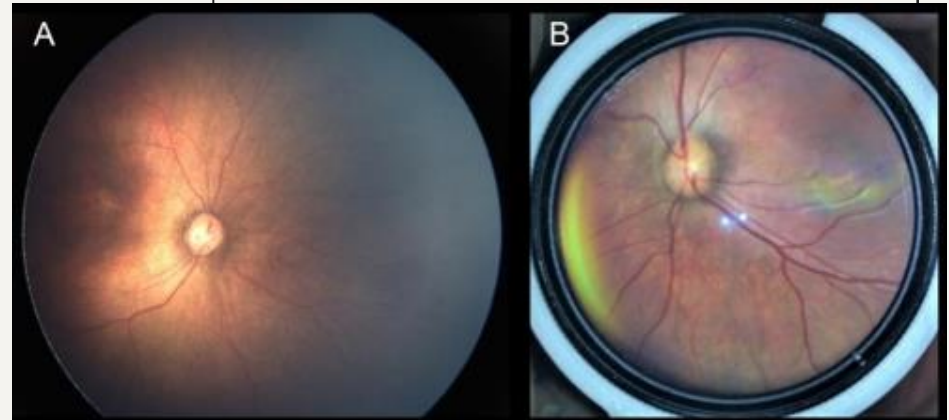




Article

Comparison of RetCam and Smartphone-Based Photography for Retinopathy of Prematurity Screening

Jui-Yen Lin ^{1,2}, Eugene Yu-Chuan Kang ^{1,2}, Alay S. Banker ³, Kuan-Jen Chen ^{1,2}, Yih-Shiou Hwang ^{1,2}, Chi-Chun Lai ^{1,2}, Jhen-Ling Huang ⁴ and Wei-Chi Wu ^{1,2,*}



- In conclusion, although the smartphone-based fundus photography showed moderate agreement for determining the presence or absence of plus disease, it failed to identify the zone and stage of ROP.





ROP Treatment

A close-up photograph of a baby's hand being held by an adult's hand. The baby's hand is small and pinkish, with fingers slightly curled. The adult's hand is larger and has a more tanned complexion. The background is a soft, out-of-focus pink and white, with several concentric circles of varying shades of pink and white overlaid on the right side. The text "Non-Pharmacologic Treatment: Laser Therapy" is written in white, sans-serif font across the lower right portion of the image.

Non-Pharmacologic Treatment: Laser Therapy

25 Cryotherapy for Retinopathy of Prematurity: Cryotherapy for Retinopathy of Prematurity (CRYO-ROP) Study

[Get access >](#)

Alan D. Penman, Kimberly W. Crowder, William M. Watkins

Cryotherapy has not been commonly used to treat ROP since late 1980s

Laser photocoagulation

- the most common established therapy for ROP

FINAL RESULTS OF THE EARLY TREATMENT FOR RETINOPATHY OF PREMATURITY (ETROP) RANDOMIZED TRIAL

BY William V. Good MD,* on behalf of the Early Treatment for Retinopathy of Prematurity Cooperative Group

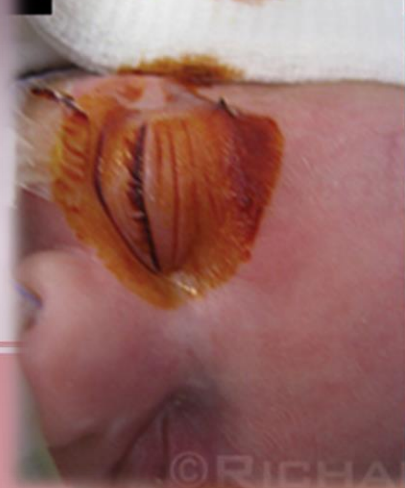
ABSTRACT

Purpose: To present the final results of the Early Treatment for Retinopathy of Prematurity Study.

Methods: Infants with bilateral high-risk prethreshold retinopathy of prematurity (ROP) (n = 317) had one eye randomized to early retinal ablative treatment and the fellow eye managed conventionally (control eye). In asymmetric cases



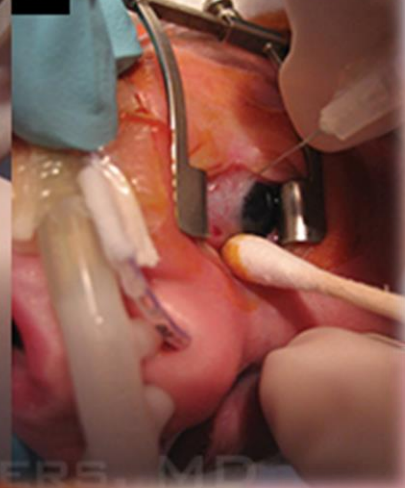
2A



2B

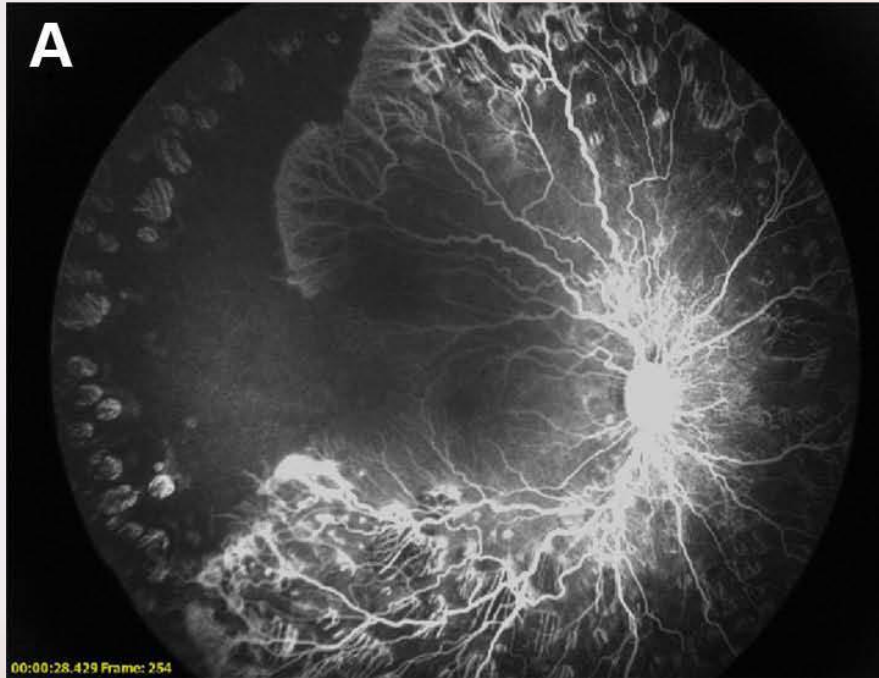


2C



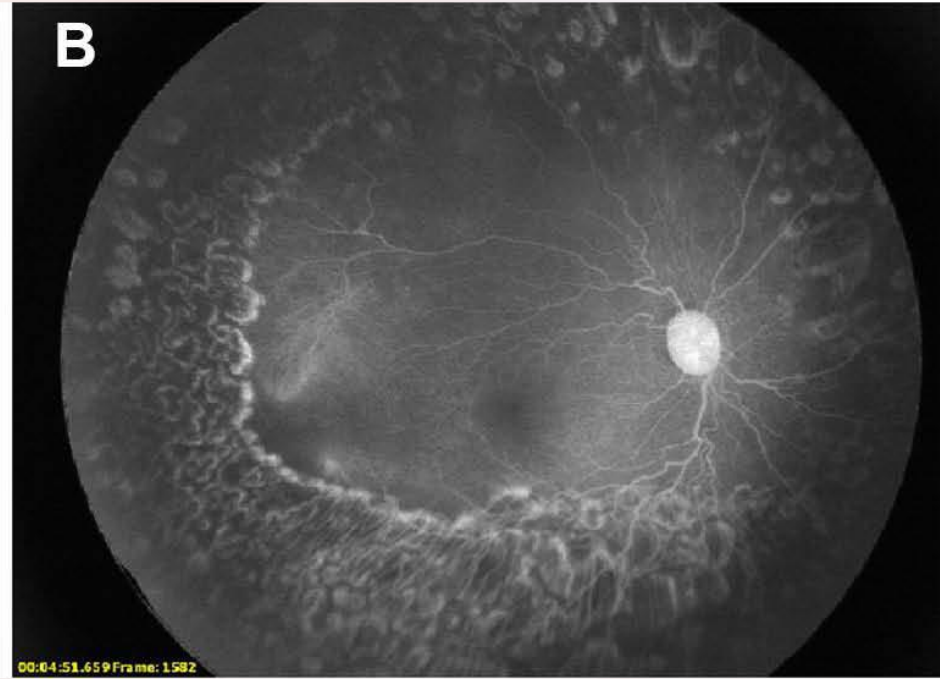
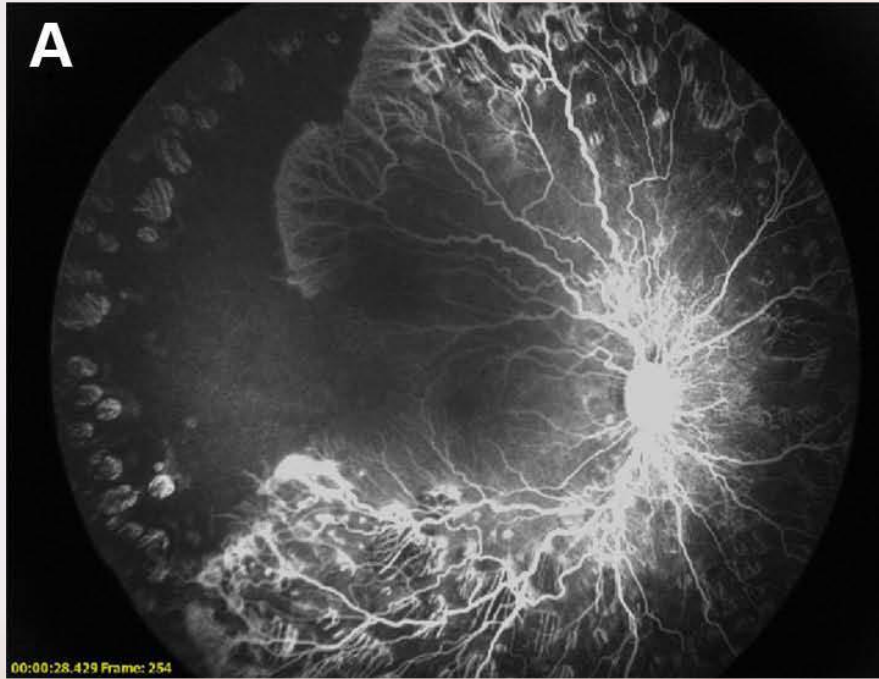
Pharmacologic Treatment Anti-VEGF Therapy

Take-home message



was injected ranibizumab and subsequently lasered

Take-home message



was injected ranibizumab and subsequently lasered

3-week follow-up

Take-home message



Regulatory and Medicolegal Issues



**ROP care is the highest medicolegal risk
within ophthalmology**

autonomous and assistive **AI systems**



The US Food and Drug Administration is rapidly innovating their methods

Take-home message

- Numbers to remember:
 - GA ≤ 34 weeks and/or
 - Birth Weight ≤ 2000 g
 - 4 weeks after birth





Thanks for your attention

