10th ANNIVERSARY

# Prevent Blindness

## Focus on Eye Health National Summit

# OUR CHANGING VISION

A Virtual Interactive Event

July 14–15, 2021

Focus on Eye Health Summit:
Our Changing Vision

# Global Retinopathy of Prematurity (ROP) Program Development: Opportunities for Innovation, Education, Advocacy, and Collaboration

**R.V. Paul Chan, MD, MSc, MBA**
Illinois Eye and Ear Infirmary
University of Illinois at Chicago

Prevent Blindness
Focus on Eye Health National Summit

Illinois Eye AND EAR INFIRMARY

UIC THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE
CHICAGO PEORIA ROCKFORD URBANA

# Disclosures

**I will be discussing the off-label use of anti-VEGF agents**

**I have the following financial interests or relationships to disclose:**

Alcon Laboratories, Inc.: Consultant/Advisor

Phoenix Technology: Scientific Advisory Board

**Grant Support:**

Research to Prevent Blindness

National Institutes of Health

United States Agency for International Development (USAID)

National Science Foundation

Novartis and Alcon (XOVA)

iNsight Foundation

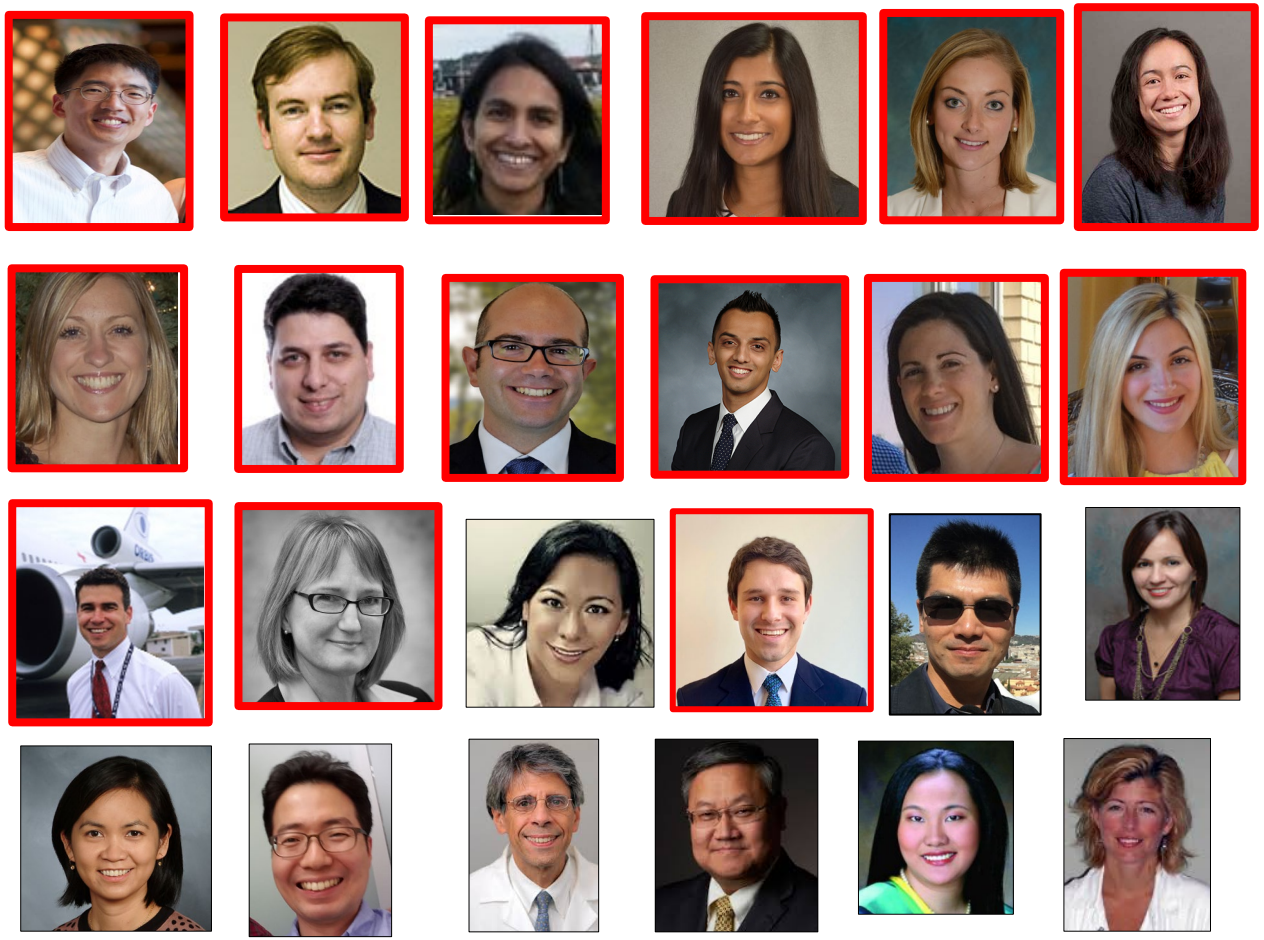
Knights Templar Eye Foundation

# Acknowledgements

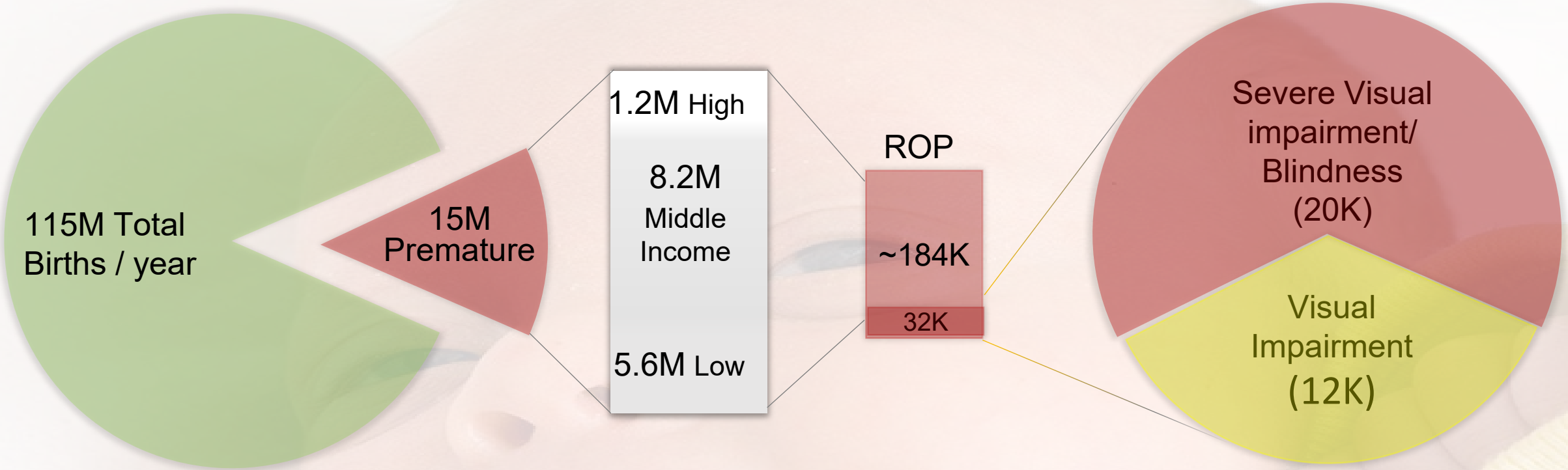

- **Emily Cole, Nita Valikodath, Tala Al-Khaled, Luis Acaba-Berrocal, Margaret Chervinko, Lauren Kalinoski, Karyn Jonas, Dina Johnson, Felix Chau, Angelica Scanzera, Xincheng Yao, Simon Ma, Taeyoon Son, Devrim Toslak, Joelle Hallak, Darvin Yi, Peter Macintosh, Michael Shapiro, Marilyn Miller** (UIC)
- **Michael Chiang** (NEI), **Susan Ostmo, J. Peter Campbell, Sang Kim, Michael Ryan, Ryan Swan, Aaron Coyner, Jimmy Chen** (OHSU)
- **Jayashree Kalpathy-Cramer, James Brown, Praveer Singh** (Harvard), **Deniz Erdogmus, Stratis Ioannidis** (Northeastern)
- **D. Hunter Cherwek, Chimgee Chuluunkhuu, Nathan Congdon** (Orbis International), **Dale Davis, Sagun KC, Asha Basnyat, Nick Kourgialis and Kathy Spahn** (HKI), **Will Goldring** (State33)
- **Sanyam Bajimaya** (Nepal), **Battsetseg Baljinnyam, Tsengelmaa Chuluunbat** (Mongolia), **Parag Shah, Narendran Venkatapathy** (India), **Vivien Yap** (WCMC), **Leslie MacKeen** (Toronto), **Wei-Chi Wu** (Taiwan), **Rachelle Anzures** (Philippines), **Maria Ana Martinez-Castellanos and Hugo Quiroz-Mercado** (APEC), **Camila Ventura** (Brazil)
- **Audina Berrocal** (BPEI), **Aaron Nagiel and Thomas Lee** (CHLA), **Jim Reynolds** (Buffalo), **Kim Drenser and Antonio Capone** (Beaumont), **Jason Horowitz** (Columbia), **Anton Orlin and Mrinali Gupta** (WCMC), **Samir N. Patel** (Wills Eye)


i-ROP
Imaging and Informatics in Retinopathy of Prematurity

GEN-ROP
The Global Education Network for ROP



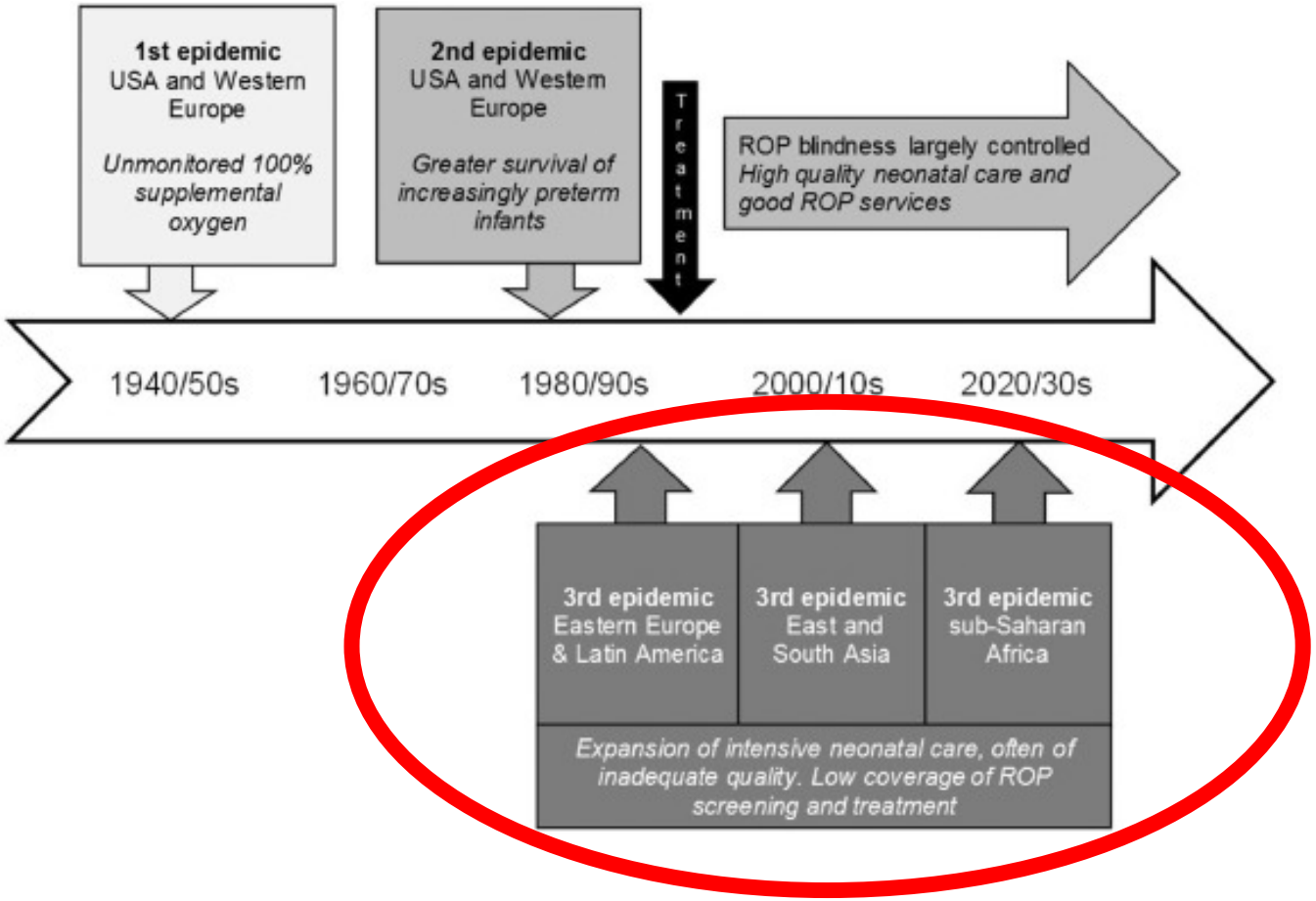
# Global ROP Program Development
# ROP is a Worldwide Problem




Blencowe et al. Pediatr Res 2013; 74(Suppl 1); 35-49.
Quinn GE. Eye Brain 2016; 8:31-6.

Slide courtesy of Dr. Jayashree Kalpathy-Cramer

# Global ROP Program Development
# Blindness from ROP is Nearly Always Preventable

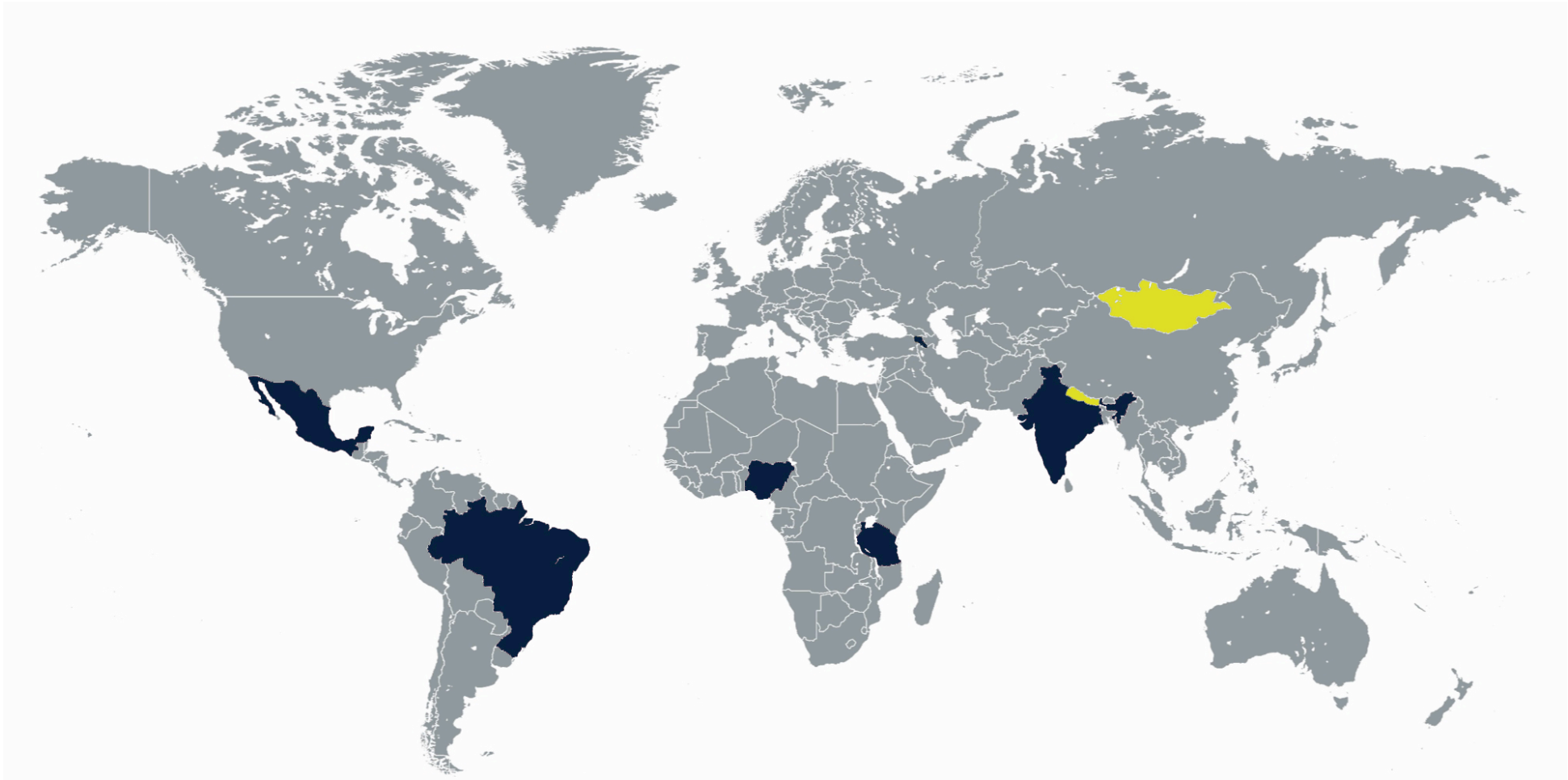



- 3rd Epidemic of ROP in Lower and Middle income countries (LMIC)
  - Economic development and increased NICU capacity
- Heavier and older babies are developing ROP
  - May be related to unregulated oxygen management
- Most cases of severe visual impairment secondary to ROP are preventable

Slide courtesy of J. Peter Campbell

Gilbert et al, Epidemiology of ROP update – Africa is the new frontier. Seminars in Perinatology, 2019

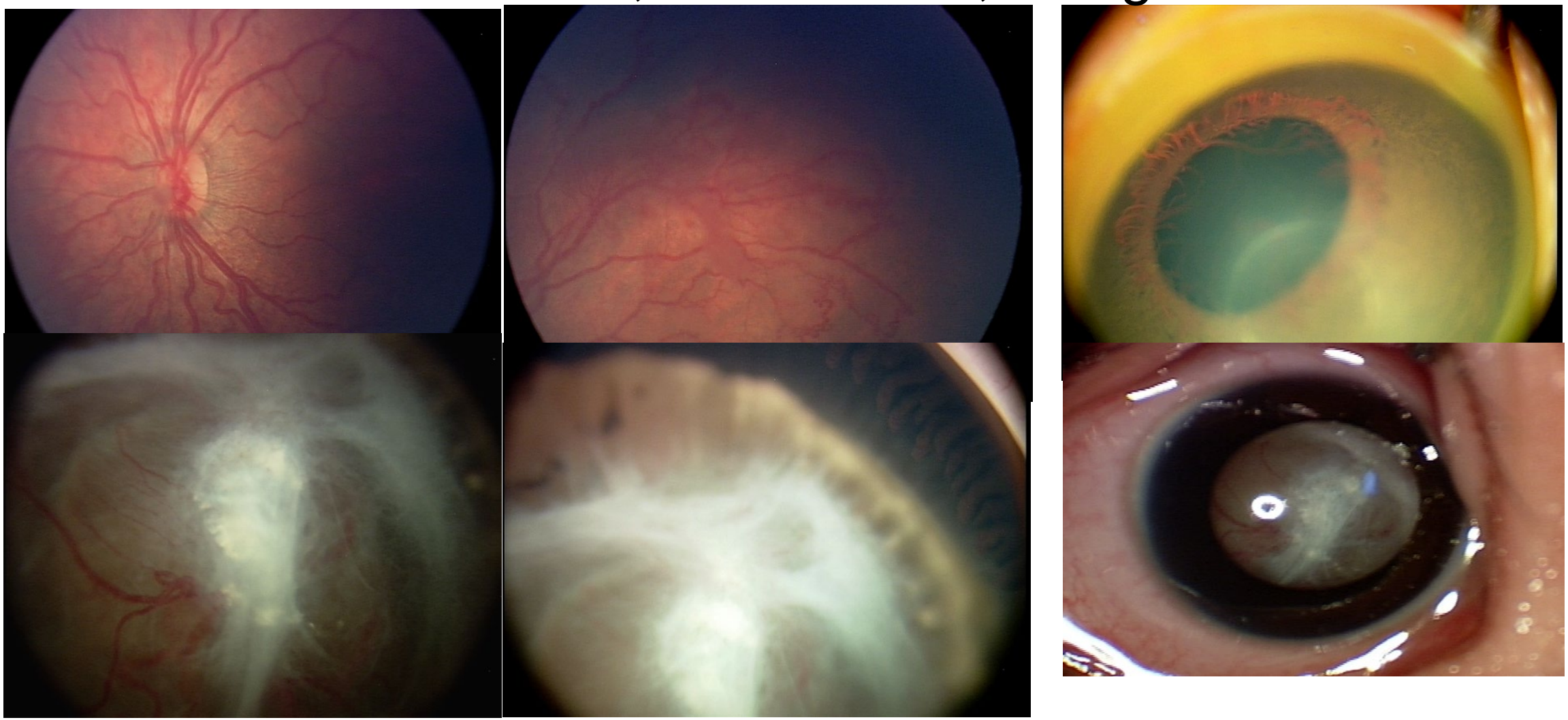
# Global ROP Program Development Collaboration and Education 2006 to 2021



# Global ROP Program Development
# ORBIS International, Ulaanbaatar, Mongolia – 2011

- Evaluate the ROP burden in Mongolia
- No ROP screening protocols at the time
- Identify what is locally needed to manage ROP

# Global ROP Program Development
# ORBIS International, Ulaanbaatar, Mongolia – 2011

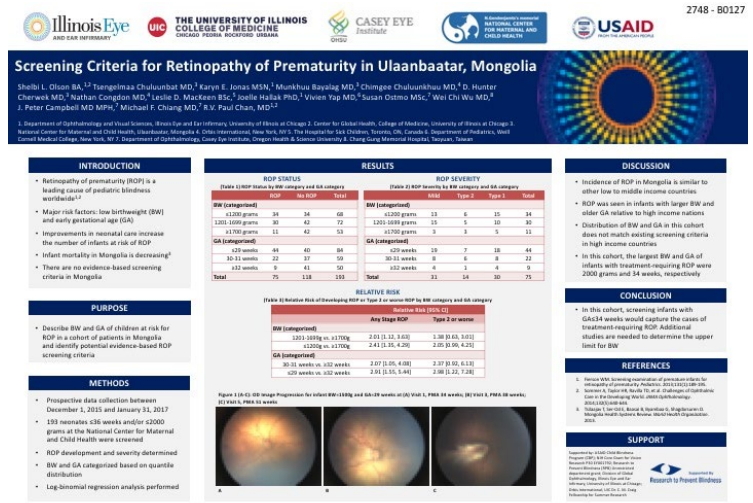


# Global ROP Program Development

## ORBIS International and National Center for Women and Children, Mongolia – September 2016

### Development of Screening Criteria for Retinopathy of Prematurity in Ulaanbaatar, Mongolia, Using a Web-based Data Management System

*Shelbi L. Olson, MD; Tsengelmaa Chuluunbat, MD; Emily D. Cole, MD, MPH; Karyn E. Jonas, MSN; Munkhuu Bayalag, MD; Chimgee Chuluunkhuu, MD; Nita G. Valikodath, MD; D. Hunter Cherwek, MD; Nathan Congdon, MD, MPH; Leslie D. MacKeen, BSc; Joelle Hallak, PhD; Vivien Yap, MD; Susan Ostmo, MSc; Wei Chi Wu, MD; J. Peter Campbell, MD, MPH; Michael F. Chiang, MD; R. V. Paul Chan, MD*




**Purpose:** To describe a process for identifying birth weight (BW) and gestational age (GA) screening guidelines in Mongolia.

**Methods:** This was a prospective cohort study in a tertiary care hospital in Ulaanbaatar, Mongolia, of 193 premature infants with GA of 36 weeks or younger and/or BW of 2,000 g or less) with regression analysis to determine associations between BW and GA and the development of retinopathy of prematurity (ROP).

**Results:** As BW and GA decreased, the relative risk of developing ROP increased. The relative risk of developing any stage of ROP in infants born at 29 weeks or younger was 2.91 (95% CI: 1.55 to 5.44; $P < .001$] compared to older infants. The relative risk of developing any type of ROP in infants with BW of less than 1,200 g was 2.41 (95% CI: 1.35 to 4.29; $P = .003$] and developing type 2 or worse ROP was 2.05 (95% CI: 0.99 to 4.25; $P = .05$).

**Conclusions:** Infants in Mongolia with heavier BW and older GA who fall outside of current United States screening guidelines of GA of 30 weeks or younger and/or BW of 1,500 g or less developed clinically relevant ROP.

[*J Pediatr Ophthalmol Strabismus*. 2020;57(5):333-339.]

- Collaborated with neonatology, ophthalmology, nursing, and Orbis International to implement ROP screening program in Mongolia
- Collaborated to develop the infrastructure to manage children at risk for ROP in Mongolia

Olson SL, Chuluunbat T, Cole ED, Jonas KE, Bayalag M, Chuluunkhuu C, Valikodath NG, Cherwek DH, Congdon N, MacKeen LD, Hallak J, Yap V, Ostmo S, Wu WC, Campbell JP, Chiang MF, Chan RVP, Development of screening criteria for retinopathy of prematurity in Ulaanbaatar, Mongolia utilizing a web-based data management system, *Journal of Pediatric Ophthalmology & Strabismus*, 2020

# Global ROP Program Development
# Kathmandu, Nepal – 2017

Tilganga | INSTITUTE OF OPHTHALMOLOGY

HELEN KELLER INTL

USAID
FROM THE AMERICAN PEOPLE



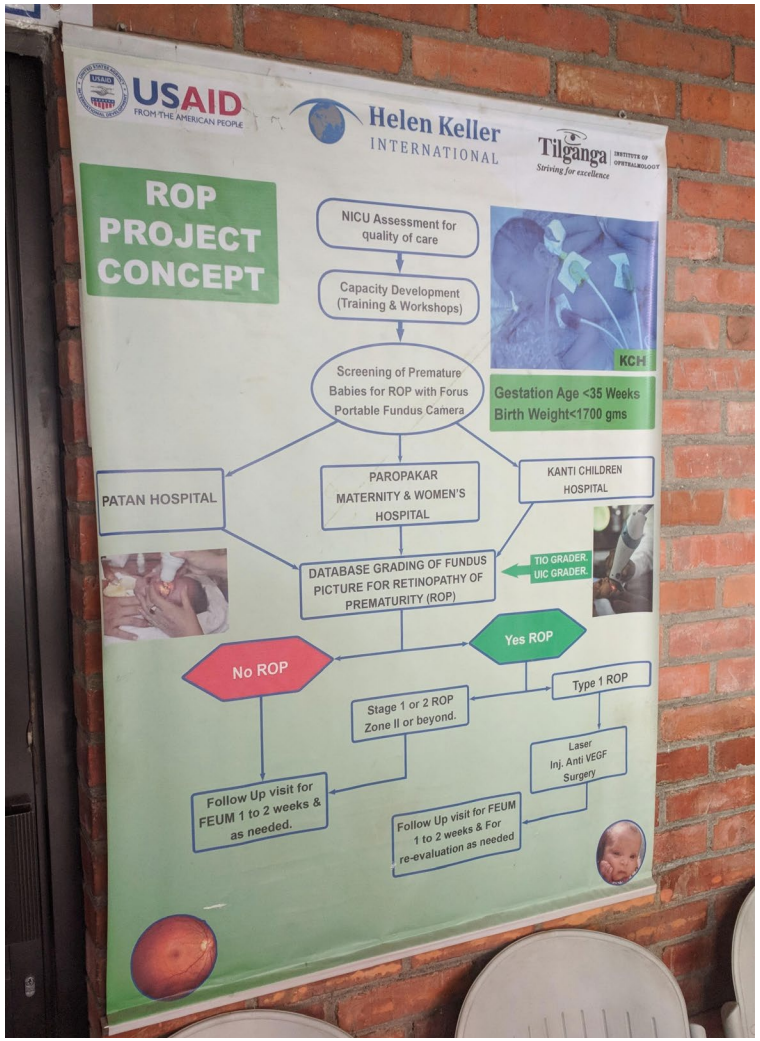


Illinois Eye AND EAR INFIRMARY

UIC THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE CHICAGO PEORIA ROCKFORD URBANA

Prevent Blindness
Focus on Eye Health National Summit

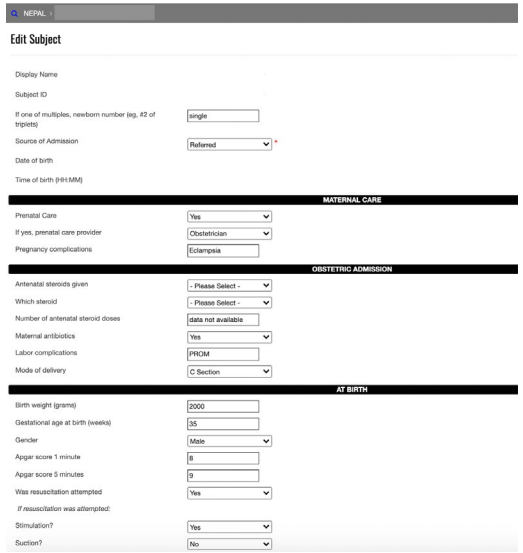
# Global ROP Program Development
# Kathmandu, Nepal – 2017

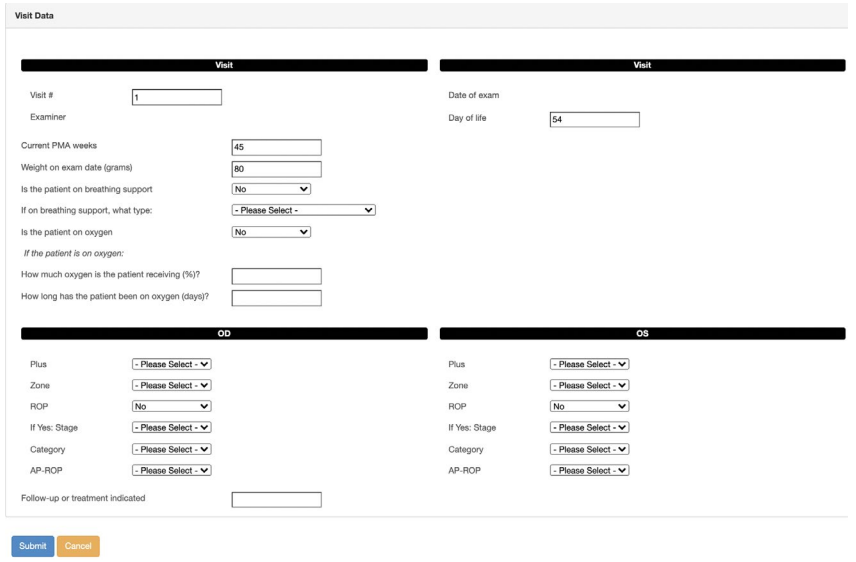



1. Expansion to district-level hospital

2. Integration of mobile phone technology

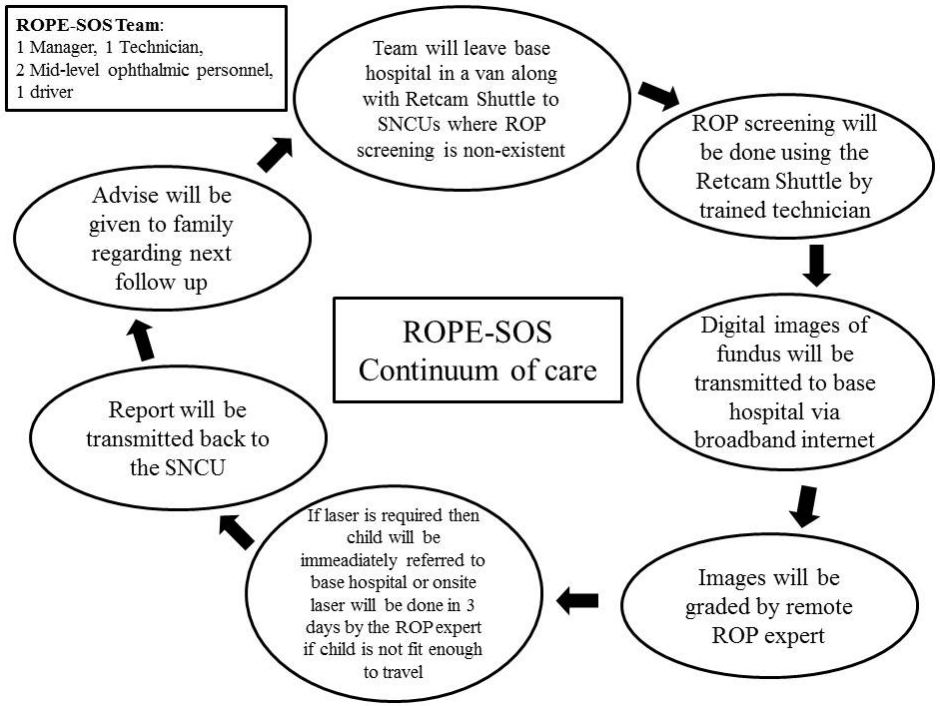
3. Artificial intelligence assisted diagnosis



# Global ROP Program Development
# Aravind Eye Hospital, Coimbatore, India
# ROP Eradication – Save Our Sight Project (ROPE-SOS)

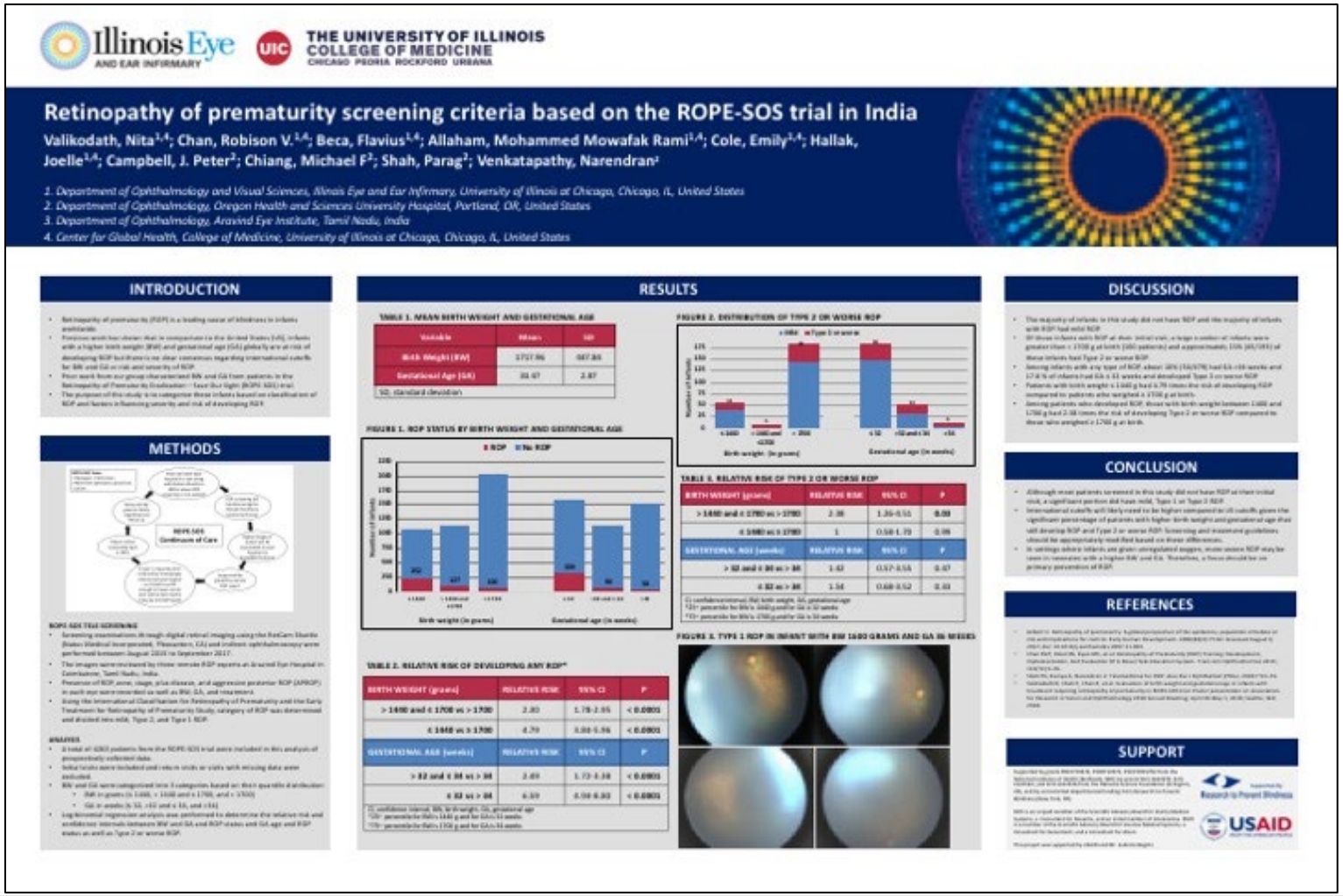
## Retinopathy of Prematurity Eradication – Save Our Sight (ROPE-SOS)





Images courtesy of Dr. Narendran Venkatapathy

# Global ROP Program Development
# Aravind Eye Hospital, Coimbatore, India
# ROP Eradication – Save Our Sight Project (ROPE-SOS)



Illinois Eye AND EAR INFIRMARY | THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE CHICAGO PEORIA ROCKFORD URBANA

**Retinopathy of prematurity screening criteria based on the ROPE-SOS trial in India**


Valikodath, Nita[1,4]; Chan, Robison V.[1,4]; Beca, Flavius[1,4]; Allaham, Mohammed Mowafak Rami[1,4]; Cole, Emily[1,4]; Hallak, Joelle[1,4]; Campbell, J. Peter[2]; Chiang, Michael F[2]; Shah, Parag[3]; Venkatapathy, Narendran[3]

1. Department of Ophthalmology and Visual Sciences, Illinois Eye and Ear Infirmary, University of Illinois at Chicago, Chicago, IL, United States
2. Department of Ophthalmology, Oregon Health and Sciences University Hospital, Portland, OR, United States
3. Department of Ophthalmology, Aravind Eye Institute, Tamil Nadu, India
4. Center for Global Health, College of Medicine, University of Illinois at Chicago, Chicago, IL, United States


INTRODUCTION

METHODS

RESULTS

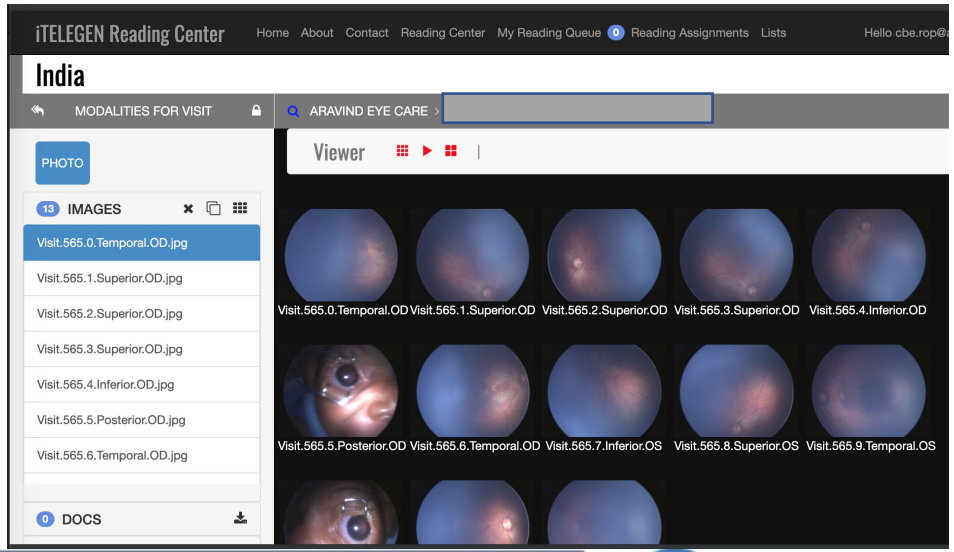
DISCUSSION

CONCLUSION

REFERENCES

SUPPORT

- Telemedicine screening for ROP
- Plans to investigate the use of AI for screening



# Addressing the Third Epidemic of Retinopathy of Prematurity Through Telemedicine and Technology: A Systematic Review

*Tala Al-Khaled, MD; Nita G. Valikodath, MD, MS; Samir N. Patel, MD; Emily Cole, MD, MPH; Margaret Chervinko, MLIS; Christina E. Douglas, MD; Andrew S.H. Tsai, MBBS; Wei-Chi Wu, MD, PhD; J. Peter Campbell, MD, MPH; Michael F. Chiang, MD; R. V. Paul Chan, MD, MSc, MBA*

## ABSTRACT

The rising prevalence of retinopathy of prematurity (ROP) in low- and middle-income countries has increased the need for screening at-risk infants. The purpose of this article was to review the impact of telemedicine and technology on ROP screening programs. Adhering to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, a systematic review was performed using PubMed, ProQuest, and Google Scholar bibliographic search engine. Terms searched included retinopathy of prematurity, telemedicine, and tele-ophthalmology. Data regarding internet access and gross domestic product per capita were obtained from the World Bank. Information was also obtained about internet access, speeds, and costs in low-income countries. There has been increasing integration of telemedicine and technology for ROP screening and management. Low-income countries are using available internet options and information and communications technology for ROP screening, which can aid in addressing the unique challenges faced by low-income countries. This provides a promising solution to the third epidemic of ROP by expanding and improving screening and management. Although telemedicine systems may serve as a cost-effective approach to facilitate delivery of health care, programs (especially in low- and middle-income countries) require national support to maintain its infrastructure. **[*J Pediatr Ophthalmol Strabismus*. 2021;58(4):261-269.]**

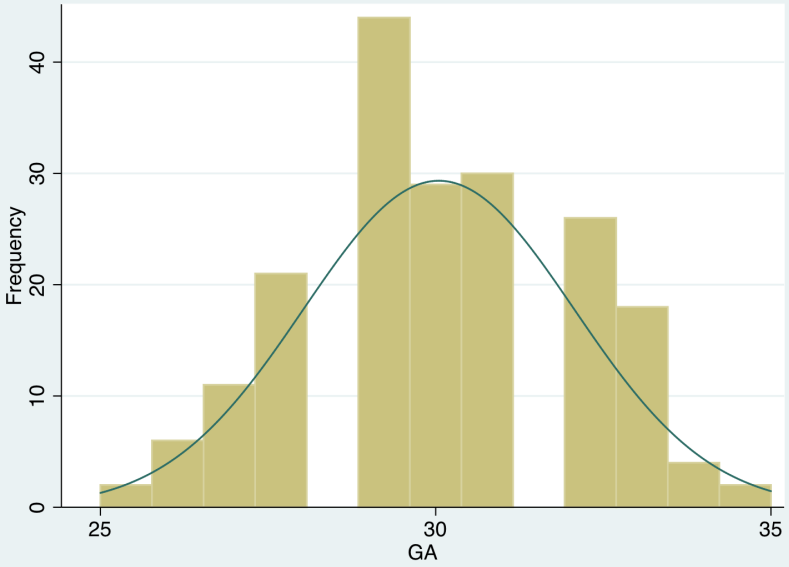
Economic Development

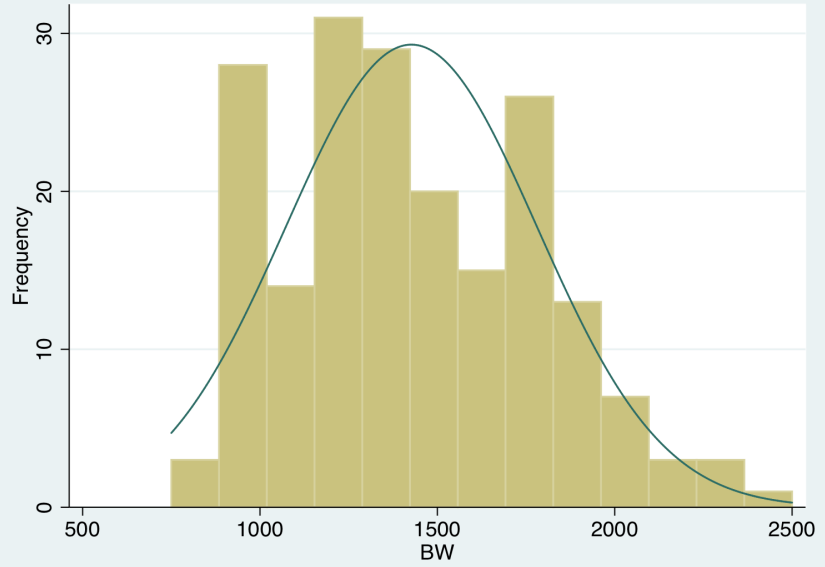
Telemedicine Infrastructure and ROP

**Table B**
**Framework of Previously Established ROP Telemedicine Programs**

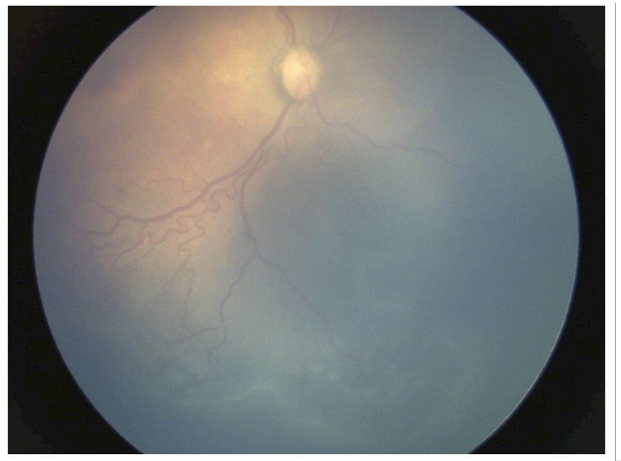
| Program Name / Location | Program Type | Institution Affiliation | Area Served | Equipment | Reading Software | Team of Professionals & Grading | Training | Gov't Involvement vs. Privatization | Addressing Longitudinal Care |
|---|---|---|---|---|---|---|---|---|---|
| **MIDDLE-INCOME COUNTRIES** | | | | | | | | | |
| **Aravind Retinopathy of Prematurity – Save Our Sight (ROPE-SOS)**[57,58] | Store & forward | Aravind Eye Hospital (AEH) | Tamil Nadu and Kerala, India | 120° to 130° field RetCam Shuttle* | Aravind Diabetic Retinopathy Screening software (broadband internet and 4G network)<br><br>iTeleGEN | Teams that visit NICUs to triage infants consist of: manager, 2 trained imaging technicians, ophthalmic assistant, driver<br><br>Images are sent to and evaluated by an ROP specialist; the report is provided to the field team in real time through broadband internet<br><br>Infants requiring treatment are transferred to AEH; ROP specialists travel to NICUs to treat unstable infants | Continued medical education programs in districts where screening occurs for neonatal nurses and neonatologists<br><br>Imaging technician training | Funded by USAID and grant from Dr. Subroto Bagchi | Routinely servicing 56 NICUs in Southern India, while reducing the need for ROP specialists to travel to perform examinations |
| **Armenian Eyecare Project (AECP)**[60,61] | Store & forward<br><br>Livestream videos via Internet | The Vision Center, Children's Hospital Los Angeles<br><br>Malayan Ophthalmological Centre, Yerevan, Armenia<br><br>Armenian EyeCare Project, Newport Beach, CA<br><br>Illinois Eye and Ear Infirmary, University of Illinois at Chicago<br><br>Casey Eye Institute, Oregon Health & Sciences University | Armenia | RetCam Shuttle with video-enabled endoscopy*<br><br>E4 Ophthalmic Endoscopy System for livestream of procedure via Internet*† | RetCam images are uploaded onto online account using Google Picasa (to date, now replaced with Google Photos)<br><br>Armenian providers input patient information onto spreadsheet for review by team of ROP specialists | Armenian ophthalmologists performed examinations and completed diagnosis and treatment plan<br><br>Neonatal nurses were trained to image fundus<br><br>Team of U.S. based ROP specialists reviewed the images and diagnoses<br><br>Images of pre- and post-op laser treatments were shared in order to evaluate effectiveness of the procedure | — | Ministry of Health in Armenia would cover costs of screening if AECP paid the ROP screeners for the first two years (as of 2011)<br><br>USAID has provided funding for an operating room dedicated to retinal procedures at a NICU in Armenia | Weekly rounding on patients was facilitated via images that were shared with the physicians on the project<br><br>Ability to manage ROP cases overseas without the need for travel<br><br>Served as a teaching opportunity for Armenian ophthalmologists |
| **Karnataka Internet Assisted Diagnosis of Retinopathy of Prematurity (KIDROP)**[61,62] | Mobile tele-ROP platform<br><br>Specialists at NNPIO view live & evaluate | Narayana Nethralaya Postgraduate Institute of Ophthalmology (NNPIO) in Bangalore | Rural & semi rural areas in Karnataka, India | 120° to 130° field RetCam Shuttle*<br><br>Laptop | i2i Telesolutions Tele-Care software†<br><br>Images sent to NNPIO via secure tele-ROP platform | Non-physician field team that triages infants includes: manager, 1-2 imaging technicians, driver<br><br>Field team uses color coding: red (type 1), orange (type 2), green (normal)<br><br>Pediatric retina specialists view images on smartphone | Technicians training assessed by 20-point accreditation score; measures ability to capture clear images, speed of capturing images, and accuracy in providing preliminary diagnosis<br><br>Level 1 (novice)–30-day training<br><br>Level 3–90-day training (accessible on "WISE-ROP" e-learning platform); function as substitute ROP specialist | Private-public partnership: Karnataka state government funding to expand coverage to 81 NICUs<br><br>Federal government putting forth a National Task Force | Diagnosis must be given to mother before she returns home<br><br>Field teams schedule follow up visits<br><br>REDROP calling system to schedule appointments<br><br>Cost of enrollment: <US$0.05<br><br>Travel expenses are covered when undergoing treatment |
| **Lima, Peru Study**[63] | JPEG image files stored on NIDEK platform and viewed via secure Internet database | Hospital National Edgardo Rebagliati Martins EsSalud | Lima, Peru | 30° field NIDEK NM200-D posterior pole retinal camera‡ | Before launch of website, images were sent by email<br><br>Online program utilizes a Narrow Field Digital Image Evaluation Report, which | Neonatal nurses capture digital fundus images<br><br>Technologist uploads and organizes images, along with patient history | Nurses orientation: 1 day of educational lectures, 3 mornings observing proper imaging by a skilled medical student, and 2 weeks of | — | — |

# Global ROP Program Development
# **iTeleGEN – Data Management and Telemedicine**




- Utilized cloud based platform for data management



# Global ROP Program Development
# **Tele-Education**

**THE GLOBAL EDUCATION NETWORK FOR RETINOPATHY OF PREMATURITY (GEN-ROP): DEVELOPMENT, IMPLEMENTATION, AND EVALUATION OF A NOVEL TELE-EDUCATION SYSTEM (AN AMERICAN OPHTHALMOLOGICAL SOCIETY THESIS)**

By R.V. Paul Chan MD, Samir N. Patel BS, Michael C. Ryan MS, Karyn E. Jonas BSN, Susan Ostmo MS, Alexander D. Port MD, Grace I. Sun MD, Andreas K. Lauer MD, and Michael F. Chiang, MD

## ABSTRACT

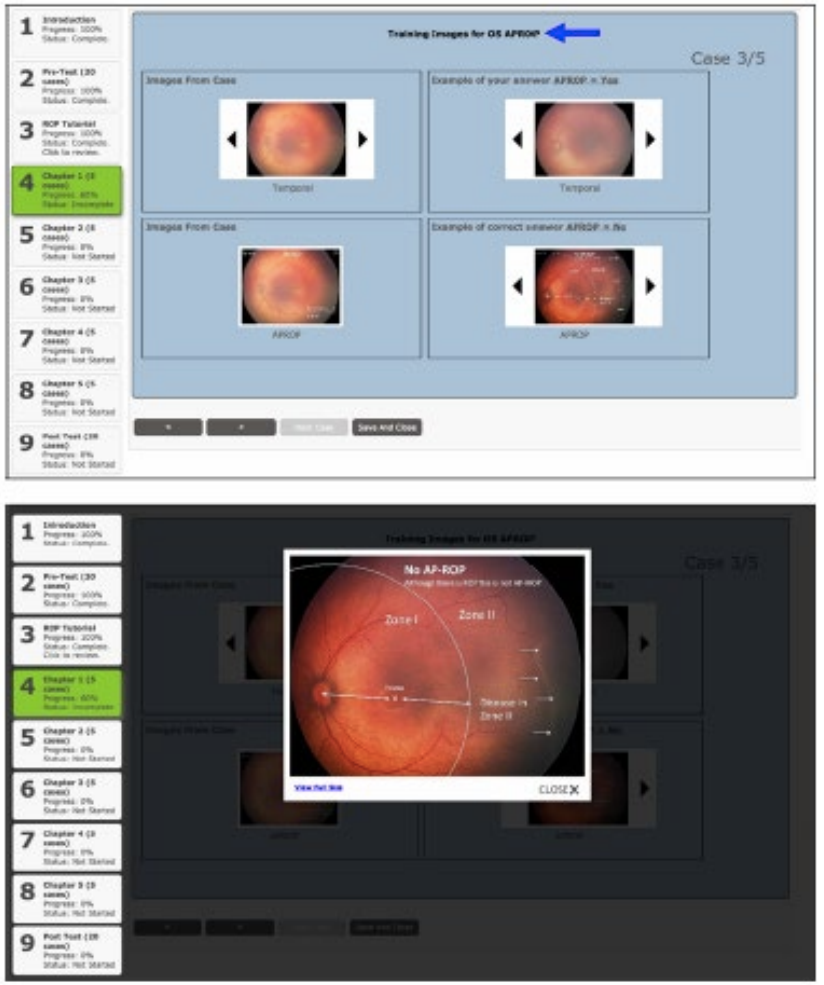
*Purpose:* To describe the design, implementation, and evaluation of a tele-education system developed to improve diagnostic competency in retinopathy of prematurity (ROP) by ophthalmology residents.

*Methods:* A secure Web-based tele-education system was developed utilizing a repository of over 2,500 unique image sets of ROP. For each image set used in the system, a reference standard ROP diagnosis was established. Performance by ophthalmology residents (postgraduate years 2 to 4) from the United States and Canada in taking the ROP tele-education program was prospectively evaluated. Residents were presented with image-based clinical cases of ROP during a pretest, posttest, and training chapters. Accuracy and reliability of ROP diagnosis (eg, plus disease, zone, stage, category) were determined using sensitivity, specificity, and the kappa statistic calculations of the results from the pretest and posttest.

*Results:* Fifty-five ophthalmology residents were provided access to the ROP tele-education program. Thirty-one ophthalmology residents completed the program. When all training levels were analyzed together, a statistically significant increase was observed in sensitivity for the diagnosis of plus disease, zone, stage, category, and aggressive posterior ROP ($P<.05$). Statistically significant changes in specificity for identification of stage 2 or worse ($P=.027$) and pre-plus ($P=.028$) were observed.

*Conclusions:* A tele-education system for ROP education is effective in improving diagnostic accuracy of ROP by ophthalmology residents. This system may have utility in the setting of both healthcare and medical education reform by creating a validated method to certify telemedicine providers and educate the next generation of ophthalmologists.

*Trans Am Ophthalmol Soc 2015;113:T2[1-26].* 




Chan RVP, Patel SN, Ryan MC, Jonas KE, Ostmo S, Port AD, Sun GI, Lauer AK, Chiang MF, The Global Education Network for Retinopathy of Prematurity (GEN-ROP): Development, Implementation, and Evaluation of a Novel Tele-Education System, *Trans Am Ophthalmol Soc.* 2015;113:T2[1-26]

# Global ROP Program Development

## Tele-Mentoring

Ophthalmology is well positioned for Web-based learning

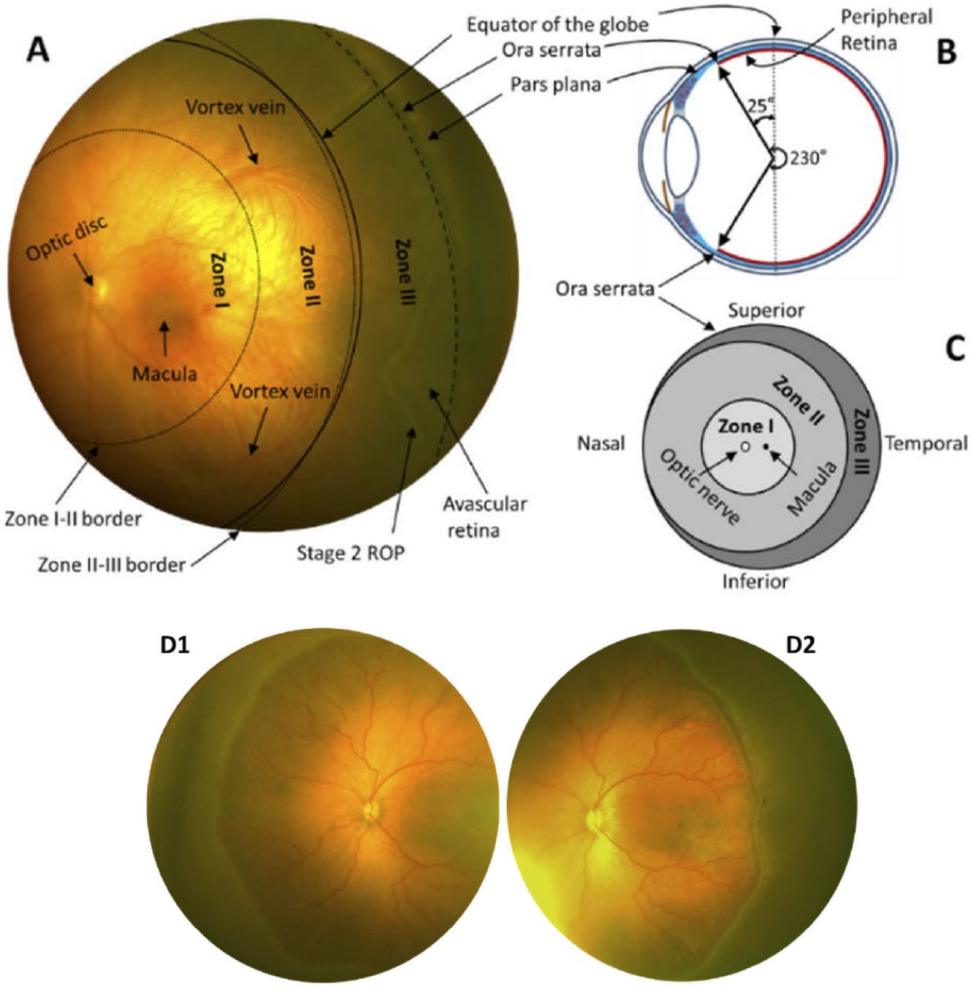
# Global ROP Program Development
# **Digital Imaging**

Research Article | Vol. 11, No. 1 / 1 January 2020 / *Biomedical Optics Express* 68

Biomedical Optics EXPRESS

## Trans-pars-planar illumination enables a 200° ultra-wide field pediatric fundus camera for easy examination of the retina

DEVRIM TOSLAK,[1,2] FELIX CHAU,[3] MUHAMMET KAZIM EROL,[2] CHANGGENG LIU,[1] R. V. PAUL CHAN,[3] TAEYOON SON,[1,4] AND XINCHENG YAO[1,3,*]



# Tech that detects cause of preemie blindness gets federal nod

## Artificial intelligence algorithm receives FDA breakthrough device status

By Franny White  January 30, 2020  Portland, Oregon

*Jonathan Brown of Keizer, Oregon kisses his son's hand as they wait for an eye appointment in 2017. Every year up to 16,000 prematurely born U.S. infants like Nathan, are affected by retinopathy of prematurity, a leading*

The FDA Breakthrough Device Program aims to accelerate development - and potentially approval - of medical devices for "more effective treatment or diagnosis of life-threatening or irreversibly debilitating diseases."

The algorithm, called the i-ROP DL system, diagnoses retinopathy of prematurity, or ROP. Every year up to 16,000 prematurely born U.S. infants are affected by the disorder, which causes abnormal blood vessel growth near the retina, the light-sensitive portion in the back of an eye. About 600 U.S. babies go blind from ROP annually, making it a leading cause of childhood blindness in the U.S. and worldwide. Musician Stevie Wonder is blind as a result of ROP.

The algorithm diagnoses the condition in images of infant eyes with comparable or better accuracy than today's standard method, which involves an examination by expertly trained ophthalmologists.

A 2018 study in *JAMA Ophthalmology* showed the technology diagnoses the condition 91% of the time, compared with 82% for trained ophthalmologists. Subsequent studies in 2019 described how the algorithm can be used to quantitatively measure the condition's severity and help physicians evaluate how well treatment is working against the disease.

Oregon Health & Science University and Massachusetts General Hospital led the technology's development, with support from Northeastern University and the University of Illinois at Chicago as well as the Imaging & Informatics in ROP (i-ROP) consortium.

OHSU and MGH are developing a commercialization plan for the technology, in the hope that it will be used by ophthalmologists and neonatologists worldwide to better diagnose and treat retinopathy of prematurity.

# Global ROP Program Development
# **Artificial Intelligence for ROP**
## i-ROP DL Performance – Aravind Eye Hospital in Coimbatore

ARAVIND EYE CARE SYSTEM

USAID FROM THE AMERICAN PEOPLE

## Applications of Artificial Intelligence for Retinopathy of Prematurity Screening

J. Peter Campbell, MD, MPH,[a,*] Praveer Singh, PhD,[b,*] Travis K. Redd, MD, MPH,[a] James M. Brown, PhD,[c] Parag K. Shah, DNB,[d] Prema Subramanian, DNB,[d] Renu Rajan, MD,[e] Nita Valikodath, MD,[f] Emily Cole, MD,[g] Susan Ostmo, MS,[a] R.V. Paul Chan, MD,[f] Narendran Venkatapathy, DNB,[d] Michael F. Chiang, MD,[a,g] Jayashree Kalpathy-Cramer, PhD[b]

abstract

**OBJECTIVES:** Childhood blindness from retinopathy of prematurity (ROP) is increasing as a result of improvements in neonatal care worldwide. We evaluate the effectiveness of artificial intelligence (AI)–based screening in an Indian ROP telemedicine program and whether differences in ROP severity between neonatal care units (NCUs) identified by using AI are related to differences in oxygen-titrating capability.

**METHODS:** External validation study of an existing AI-based quantitative severity scale for ROP on a data set of images from the Retinopathy of Prematurity Eradication Save Our Sight ROP telemedicine program in India. All images were assigned an ROP severity score (1–9) by using the Imaging and Informatics in Retinopathy of Prematurity Deep Learning system. We calculated the area under the receiver operating characteristic curve and sensitivity and specificity for treatment-requiring retinopathy of prematurity. Using multivariable linear regression, we evaluated the mean and median ROP severity in each NCU as a function of mean birth weight, gestational age, and the presence of oxygen blenders and pulse oxygenation monitors.

**RESULTS:** The area under the receiver operating characteristic curve for detection of treatment-requiring retinopathy of prematurity was 0.98, with 100% sensitivity and 78% specificity. We found higher median (interquartile range) ROP severity in NCUs without oxygen blenders and pulse oxygenation monitors, most apparent in bigger infants (>1500 g and 31 weeks' gestation: 2.7 [2.5–3.0] vs 3.1 [2.4–3.8]; $P$ = .007, with adjustment for birth weight and gestational age).

**CONCLUSIONS:** Integration of AI into ROP screening programs may lead to improved access to care for secondary prevention of ROP and may facilitate assessment of disease epidemiology and NCU resources.

The key findings are the following:

(1) At the individual eye examination level, the system revealed high diagnostic accuracy as a screening device for treatment requiring ROP

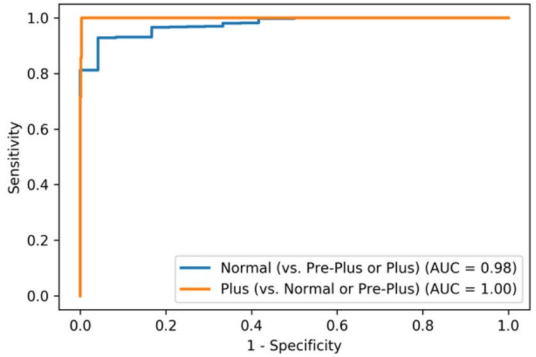
(2) At the population level, looking at individual NCUs, the ROP severity was higher in NCUs that did not have the resources to monitor and titrate oxygen.

Proof of principle that AI may be used to improve the efficiency of ROP screening and also as an epidemiological tool for monitoring NCU-level ROP severity across geography and time.

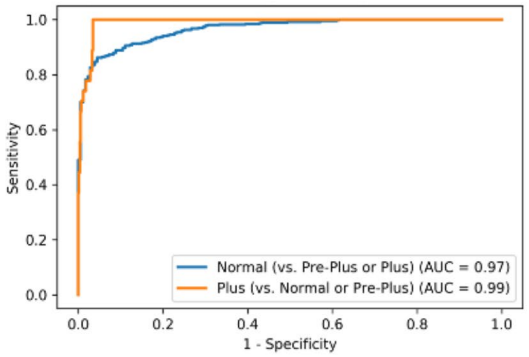
Campbell JP, Singh P, Redd TK, Brown JM, Shah PK, Subramanian P, Rajan R, Valikodath N, Cole E, Ostmo S, Chan RVP, Venkatapathy N, Chiang MF, Kalpathy-Cramer J. Applications of Artificial Intelligence for Retinopathy of Prematurity Screening. Pediatrics. 2021 Mar;147(3)

# Global ROP Program Development
# **Artificial Intelligence for ROP**
## i-ROP DL Performance – Mongolia and Nepal

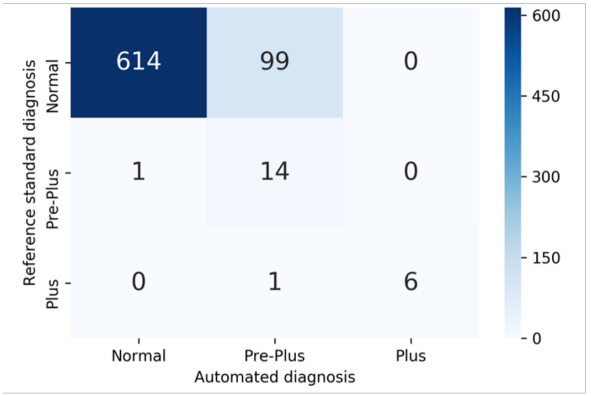
A) Nepal



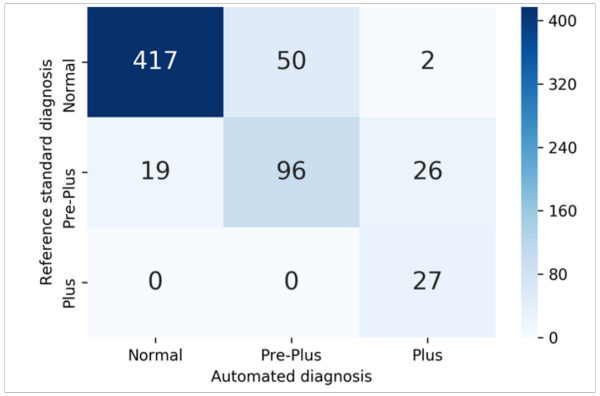

B) Mongolia




A) Nepal




B) Mongolia




Unpublished Data

The key findings are the following:

(1) The system performed well on plus disease diagnosis in Nepal and Mongolia despite being trained on data from North America.

(2) Performance was as high on images from the Forus camera system compared to the Retcam, despite being trained on the Retcam.

(3) The vascular severity score correlated well with overall ICROP severity and may be a useful epidemiologic and educational tool to compare assessment of disease severity across populations, and to standardize assessment of disease severity.

# Global ROP Program Development Summary

- **Strong Global Partners**
  - Aravind Eye Hospital
  - Tilganga Eye Institute
  - National Center for Children and Maternal Health
  - Orbis International
  - Helen Keller International
- **Adequate Internet Infrastructure**
- **Education: Telemedicine, Tele-Education, and Tele-Surgery**
- **Artificial Intelligence and Digital Imaging**
- **Economic Development**

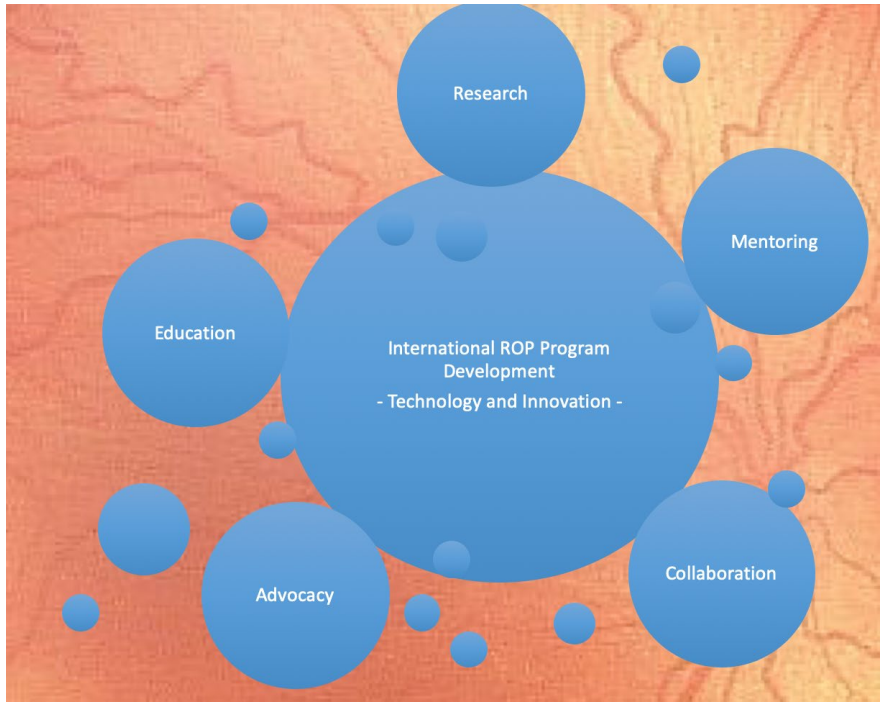
- **Improved coordination Between Ophthalmology and Neonatology**
- **Sustainability and Financial Incentives**
- **Data Management**
- **Private Health Information and Security**
- **Workforce**
- **Technical and Engineering Support**
- **Software Compatibility**
- **Patient Follow Up**

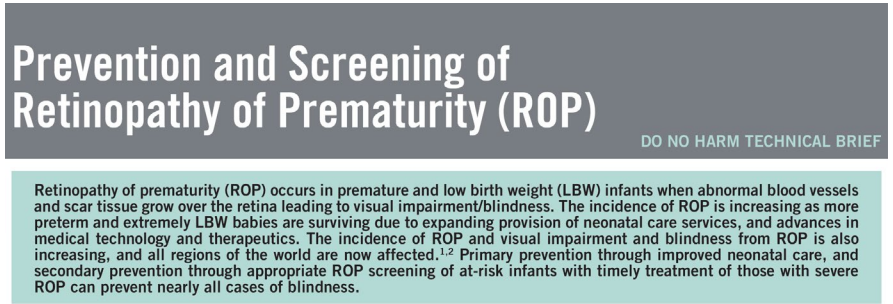
# Global ROP Program Development Summary

1. **Prevention of ROP is the ultimate goal**
   - ROP care takes a multidisciplinary team
   - Primary and secondary prevention

2. **Ophthalmology and technological innovation for improving access to care**
   - Address potential gaps in health equity
   - Education important for managing ROP through ”low-tech” solutions e.g. screening with indirect ophthalmoscopy
   - Pediatric vision screening programs
   - Low vision services
   - Neurodevelopmental issues and cerebral visual impairment

3. **Advocacy and strong partnerships to train leaders**
   - Leadership development programs – American Academy of Ophthalmology (AAO), Pan-American Association of Ophthalmology (PAAO), Asia-Pacific Academy of Ophthalmology (APAO), European Society of Ophthalmology (SOE)



Prevent Blindness

Focus on Eye Health
National Summit

# Our Changing Vision