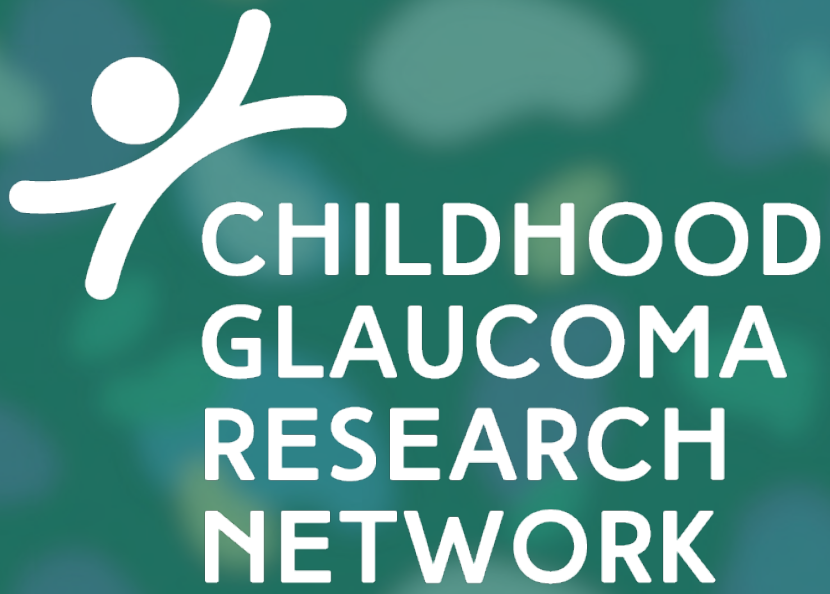
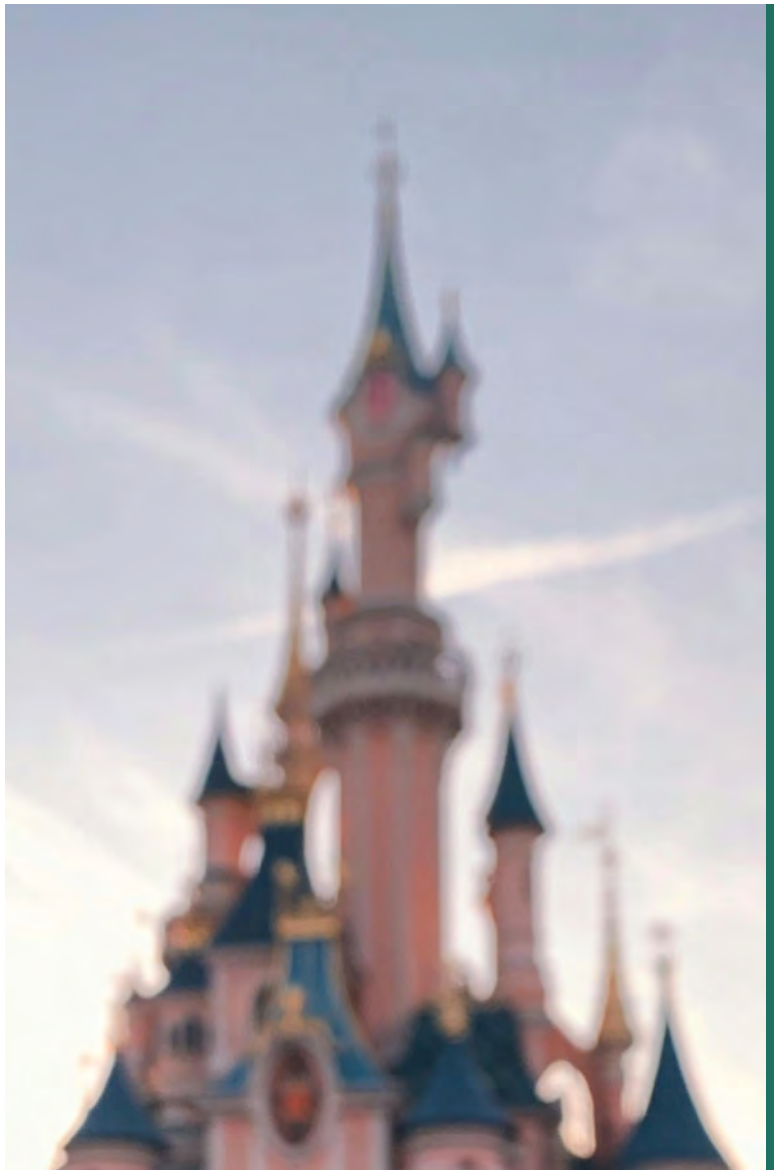

CHILDHOOD
GLAUCOMA
RESEARCH
NETWORK

CHILDHOOD GLAUCOMA RESEARCH NETWORK

AMERICAN ACADEMY™ OF OPHTHALMOLOGY

AAO 2025 Orlando, FL

Annual Meeting & Breakfast



AGENDA

CGRN

Alana Grajewski – Opening Remarks

Elena Bitrian - Education Update

Sylvia Groth – Impactful Publications of 2025

Christiane Rolim – A care pathway for childhood glaucoma detection and monitoring in Brazil: How advances in primary and tertiary care integration could improve existing barriers

Manju Anilkumar - Barriers to Follow-up in Children with Glaucoma in Tamil Nadu

Jamie Brandt - NAPGS Update

Closing Remarks

CGRN Education Group

AAO 2025
OCTOBER 17th-20th
Pediatric Glaucoma Events of Interest

DATE	EVENT
Saturday 11:30-12:45 Location: W306	**Challenging Interactive Cases in Childhood Glaucoma** Session: 242 / Instruction Course *OPEN TO ALL*
Sunday 06:30 - 08:00	**CGRN Annual Meeting & Breakfast** Hyatt Regency Orlando, Celebration Rm. / *OPEN TO ALL*
Sunday 09:45 - 11:00 Location: W106	**Mastering Childhood Glaucoma Surgical Techniques** Session: LEC 128 / Skills Transfer *OPEN TO ALL*
Sunday 14:00 - 15:15 Location: W307CD	**Managing Surgical Complications in Anterior Segment Dysgenesis** Session: 649 / Instruction Course *OPEN TO ALL*
Monday 10:30 - 12:00 Location: W109B	**Mastering Childhood Glaucoma Surgical Techniques** Session: LAB 128A / Skills Transfer *REGISTRATION REQUIRED*

CGRN Education Group

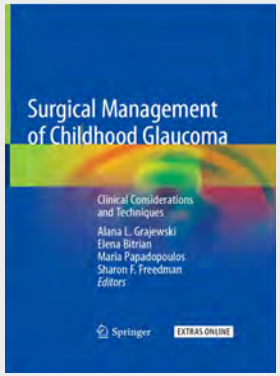
Teaching the Next Generation **at AAO 2025**

Zeynep Aktas
Manju Anilkumar
Ray Areaux
Rafaa Bagbi
Elena Bitrian
Brenda Bohnsack
James Brandt
Ta Chen Peter Chang
Abdelrahman Elhuesseini
Monica Garcia Huerta
Alana Grajewski
Sylvia Groth
Karen Joos
Gorka Sesma
Daniel Vu

Do you have an interest in building your CV, being an instructor at AAO, and receiving Academy Credits? For 13 years CGRN has produced a DryWet Lab® that introduces pediatric glaucoma surgical techniques. This popular Skills Transfer Course is consistently SOLD OUT and is a hands-on opportunity to reach attendees from around the globe.

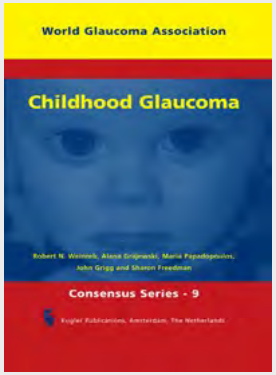
corzamedical
GLAUKOS TRANSFORMING VISION
meridian medical
NEW WORLD MEDICAL Humanity's Vision Is Our Focus
BIONIKO MODELS

CGRN Education Group



Coming in 2026

2nd Edition



Coming in 2027

2nd Edition

CGRN WORLDWIDE

UPDATE YOUR CONTACT

&

PRACTICE INFORMATION

Scan here to become a member and to update your contact information

Collaboration • Advocacy • Education
childhoodglaucoma.com

MEMBERSHIP IS FREE AND OPEN TO ALL

DETECTION - REFERRAL – FOLLOW-UP

THE PROBLEM

239 MILLION CHILDREN
LIVE WITH POOR VISION

1.4 MILLION CHILDREN
ARE BLIND FROM DISEASE

2 MILLION CHILDREN
ARE CATEGORIZED AS BLIND DUE TO
UNCORRECTED REFRACTIVE ERROR

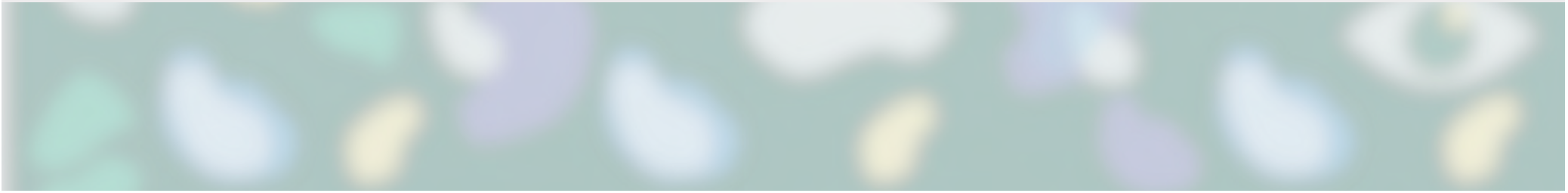
THE PROBLEM

BY THE TIME THE CHILD IS REFERRED TO A SPECIALIST, THE PROBLEM IS OFTEN TOO FAR ADVANCED, AND OUTCOMES ARE NOT AS GOOD AS THEY SHOULD BE.

DETECTION

FORMAL EYE SCREENING BEFORE THE AGE OF 5 YEARS DOES NOT EXIST IN MOST OF THE WORLD

Newborn vaccine protocols are widely available around the world in free polyclinic healthcare settings. These encounters are predictable and well attended. Our screening strategy ‘seamlessly incorporates’ onto an established and accepted vaccine schedule. This allows for up to 7 screening opportunities before the child begins school.



CBO
CONSELHO BRASILEIRO DE OFTALMOLOGIA

CARE PATHWAY FOR CHILDREN WITH EYE DISEASES IN BRAZIL:

HOW A REFERRAL NETWORK COULD IMPROVE EXISTING BARRIERS?

CHRISTIANE ROLIM DE MOURA
PRESIDENT SBOP
christiane.rolim@sbop.com

CHILDHOOD GLAUCOMA RESEARCH NETWORK

DISCLOSURES

None

Brazilian Council of Ophthalmology
(Wilma Lelis Barboza Acácio, MD, PhD)

Ana Flavia Belfort, MD

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BRAZIL

DEMOGRAFIC DATA
JULY2025

+213 M
HABITANTS

+8.5 M
KM²

27 FED. UNITS
26 states and one Federal District

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http://w3.di.ibge.gov.br/DIGAB/NormasPoliticasTutoriais/PoliticasAcesso.aspx

BRAZIL

HEALTH SYSTEM

+75%
PUBLIC

SUPLEMENTARY HEALTH

PRIVATE

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http://w3.di.ibge.gov.br/DIGAB/NormasPoliticasTutoriais/PoliticasAcesso.aspx

SISTEMA ÚNICO DE SAÚDE (PUBLIC)

- **CREATED IN 1988**

1. UNIVERSALITY

- Every citizen has the right to healthcare, regardless of income, origin, or location.

2. EQUITY

- Providing more to those who need it most; addressing disparities in access and outcomes.

3. COMPREHENSIVENESS (INTEGRALITY)

- Healthcare must address prevention, diagnosis, treatment, and rehabilitation as a continuum.

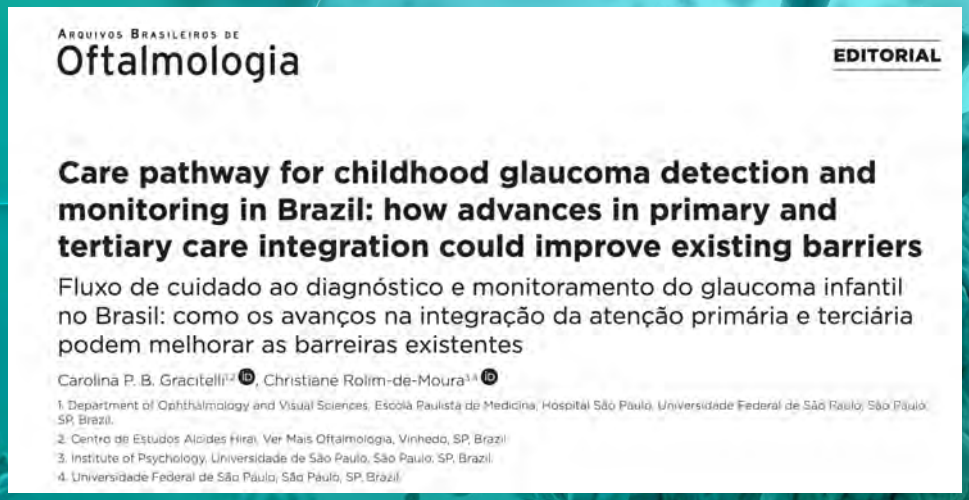
BARRIERS FOR FIGHTING AGAINST CHILDHOOD BLINDNESS IN THE COUNTRY

- Lack of **reliable data on causes and prevalences** of childhood visual deficiency
- **Lack of information** of rehabilitation
- Lack of **pediatric ophthalmologists**
- Lack of **adequate educational** solutions for children with visual impairment

BARRIES RELATED TO THE ARRIVAL TO TERTIARY CARE SERVICES
(DISTANCE, FEAR, COSTS)

CHILDHOOD GLAUCOMA RESEARCH NETWORK

DURING PANDEMIC (2020 - 2022)


Arquivos Brasileiros de Oftalmologia

EDITORIAL

Care pathway for childhood glaucoma detection and monitoring in Brazil: how advances in primary and tertiary care integration could improve existing barriers

Fluxo de cuidado ao diagnóstico e monitoramento do glaucoma infantil no Brasil: como os avanços na integração da atenção primária e terciária podem melhorar as barreiras existentes

Carolina P. B. Gracitelli[1,4], Christiane Rolim-de-Moura[1,4]

1. Department of Ophthalmology and Visual Sciences, Escola Paulista de Medicina, Hospital São Paulo, Universidade Federal de São Paulo, São Paulo, SP, Brazil.
2. Centro de Estudos Alcides Hirai, Ver Mais Oftalmologia, Vinhedo, SP, Brazil.
3. Institute of Psychology, Universidade de São Paulo, São Paulo, SP, Brazil.
4. Universidade Federal de São Paulo, São Paulo, SP, Brazil.

http://dx.doi.org/10.5935/0004-2749.202100102 | Arq Bras Oftalmol. 2021;84(4):V-VII

CONNECTING FOR CARE

WHEN SEEING DEPENDS UPON POSTAL CODE

CONGENITAL CATARACT

CHILDHOOD GLAUCOMA

RETINOBLASTOMA

CHILDHOOD GLAUCOMA RESEARCH NETWORK

REFERAL CENTERS

WHERE ARE THEY?

- Methods:
  - Through payment code
  - Direct contact with Service Director
  - Questionnaire

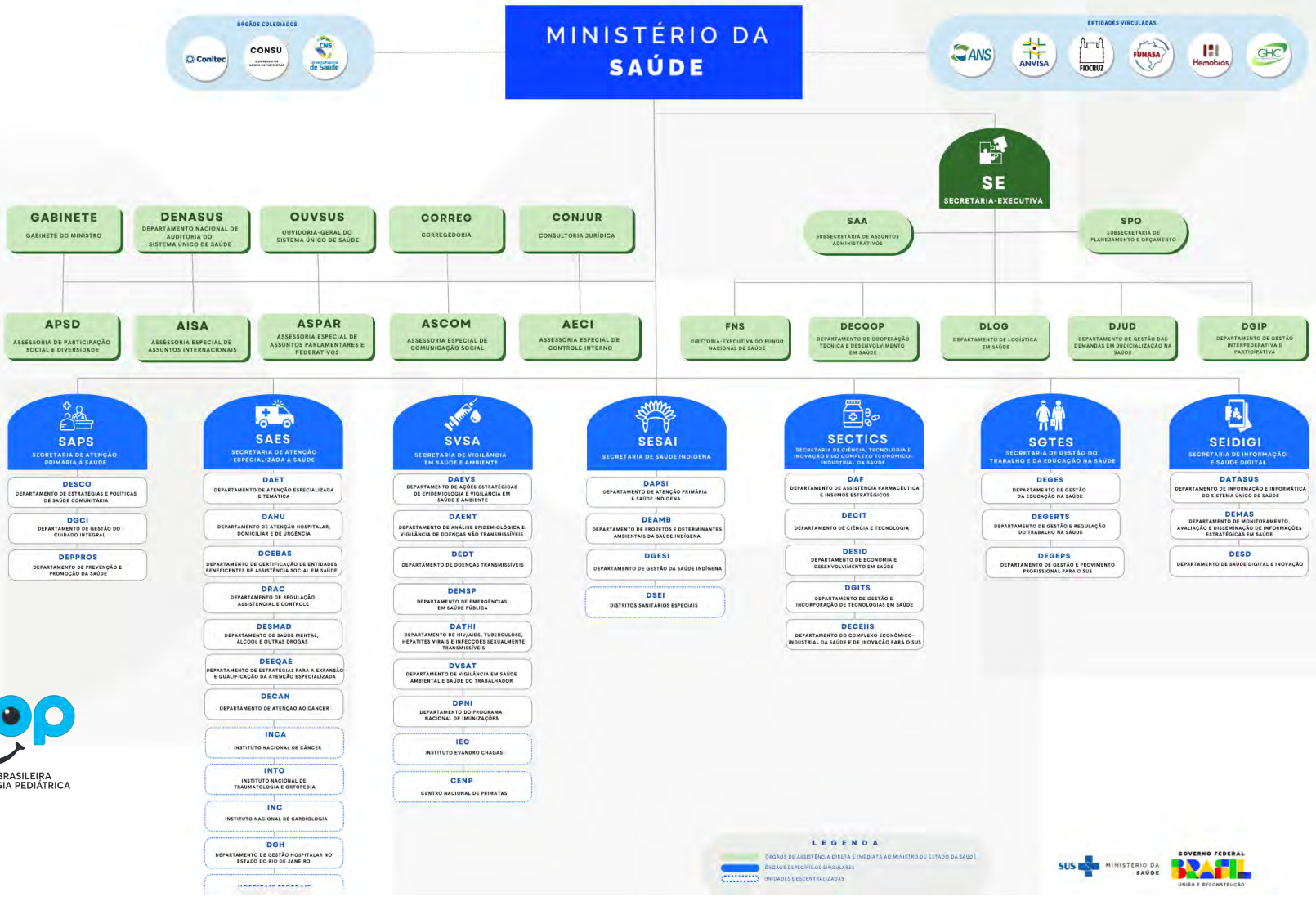
HOW DO THEY WORK

- Profile

REFERRAL NETWORK

MINISTERIO DA SAUDE

Estrutura organizacional básica - Decreto nº 11.798, de 28 de novembro de 2023,
Alterado pelo Decreto Nº 12.489, de 4 de junho de 2025



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SUS MINISTÉRIO DA SAÚDE

GOVERNO FEDERAL BRASIL UNIÃO E RECONSTRUÇÃO

CHILDHOOD GLAUCOMA RESEARCH NETWORK

DEPARTMENT OF INFORMATION AND INFORMATICS

SOCIEDADE BRASILEIRA
DE OFTALMOLOGIA PEDIÁTRICA

CHILDHOOD
GLAUCOMA
RESEARCH
NETWORK

DATA FROM SUS:
LEGALLY AVAILABLE
(Information Access Law (LAI) - Lei nº 12.527/2011

CHILDHOOD GLAUCOMA RESEARCH NETWORK

PART I:
WHERE ARE THEY?

TOTAL:
39 CENTERS

10 CENTERS:
ALL

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CHILDHOOD GLAUCOMA RESEARCH NETWORK

CONGENITAL CATARACT

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RETINOBLASTOMA

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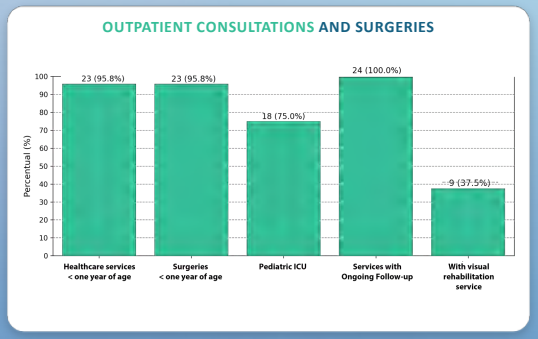
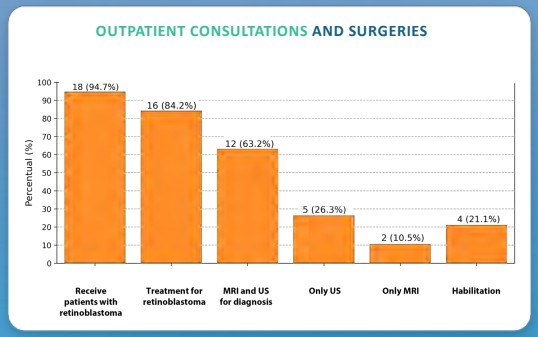
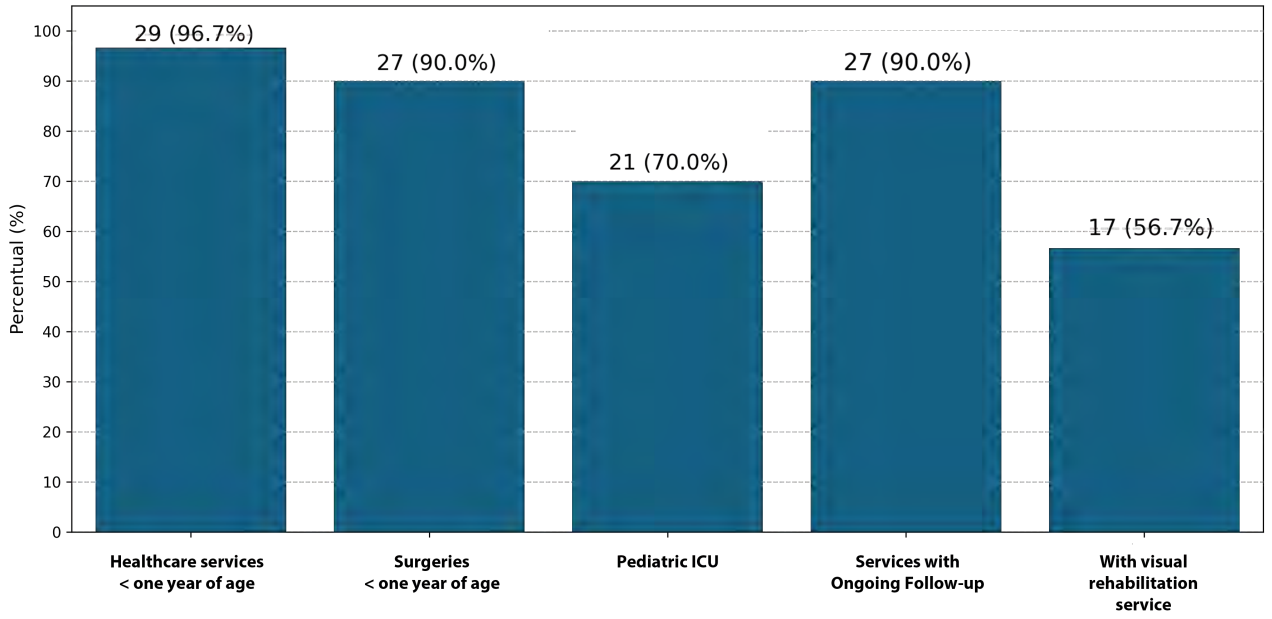
CHILDHOOD GLAUCOMA RESEARCH NETWORK

SERVICES CHARACTERISTICS





OUTPATIENT CONSULTATIONS AND SURGERIES



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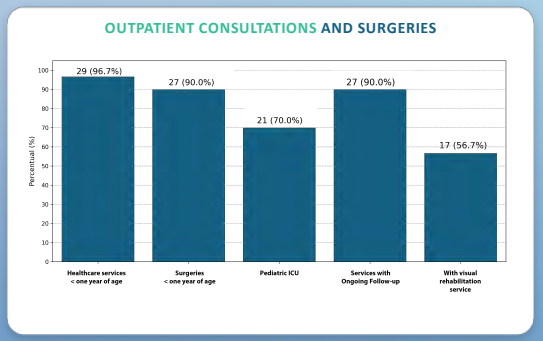
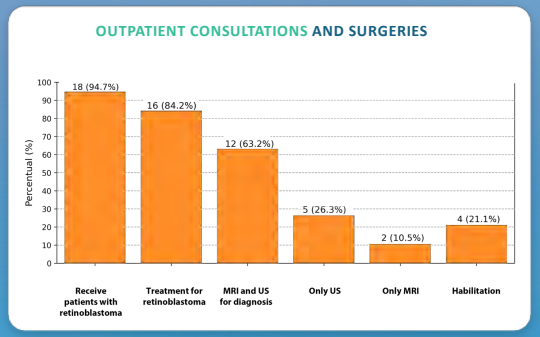
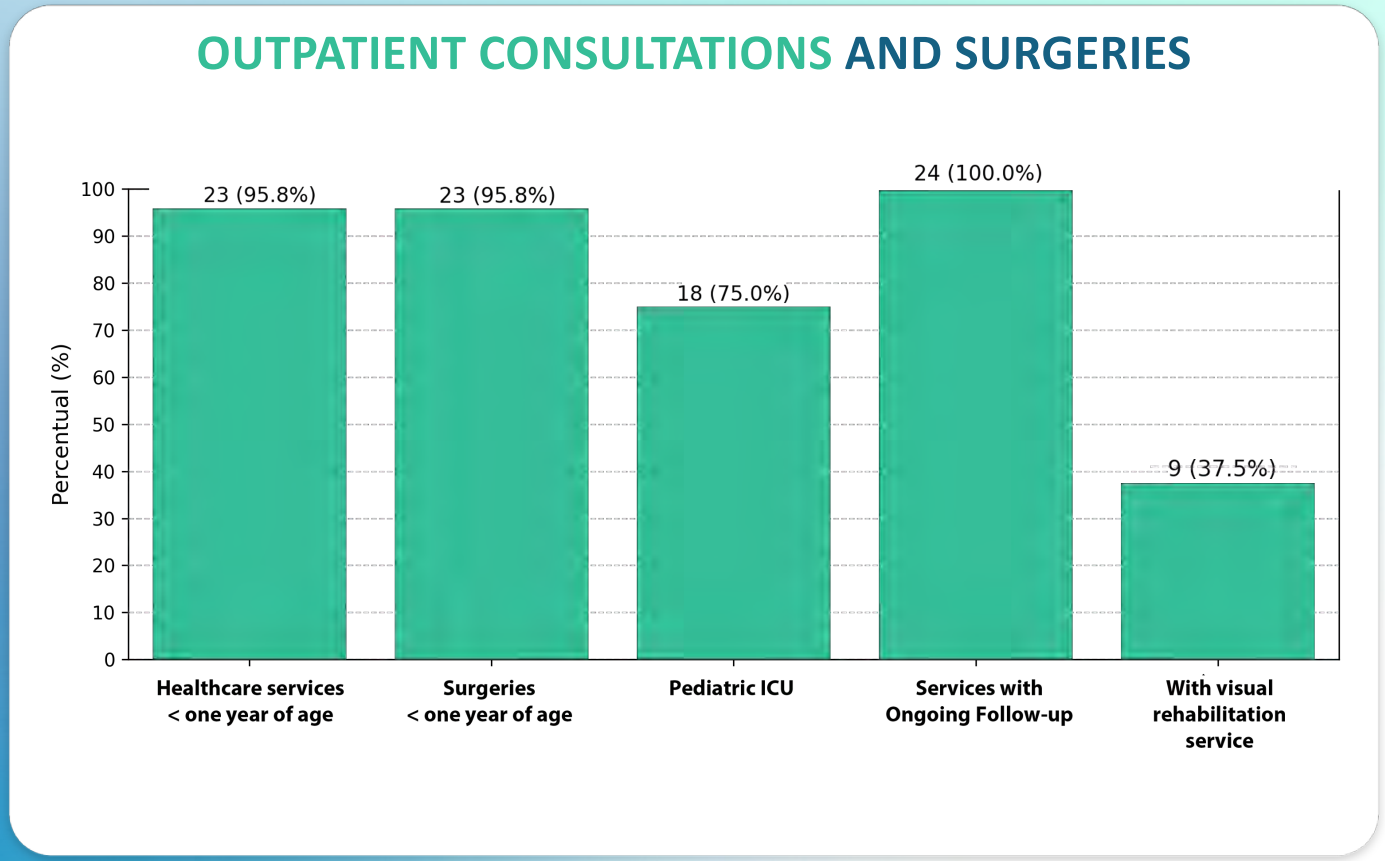
CHILDHOOD GLAUCOMA RESEARCH NETWORK

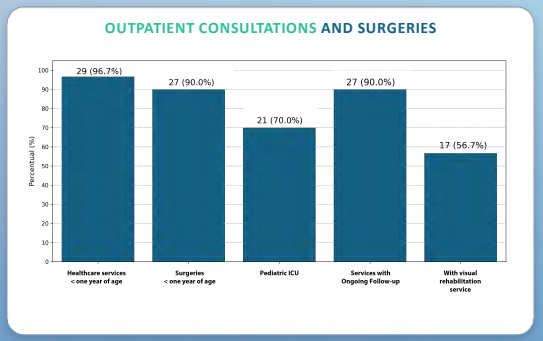
SERVICES CHARACTERISTICS

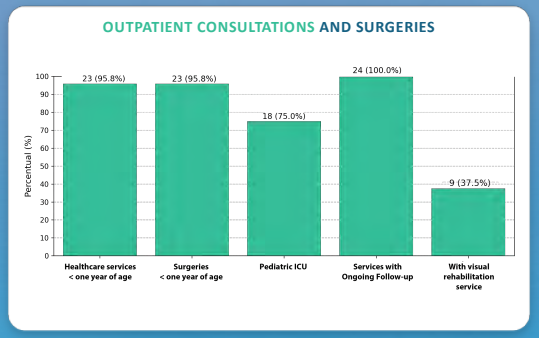




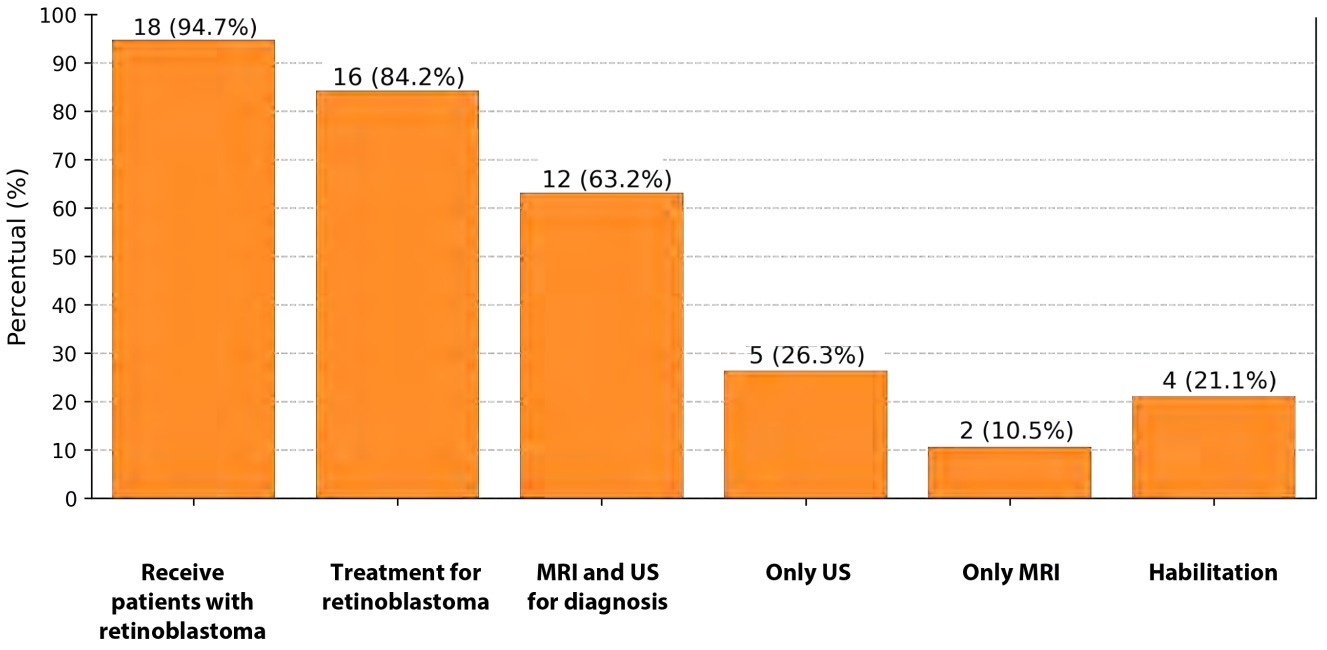


SERVICES CHARACTERISTICS



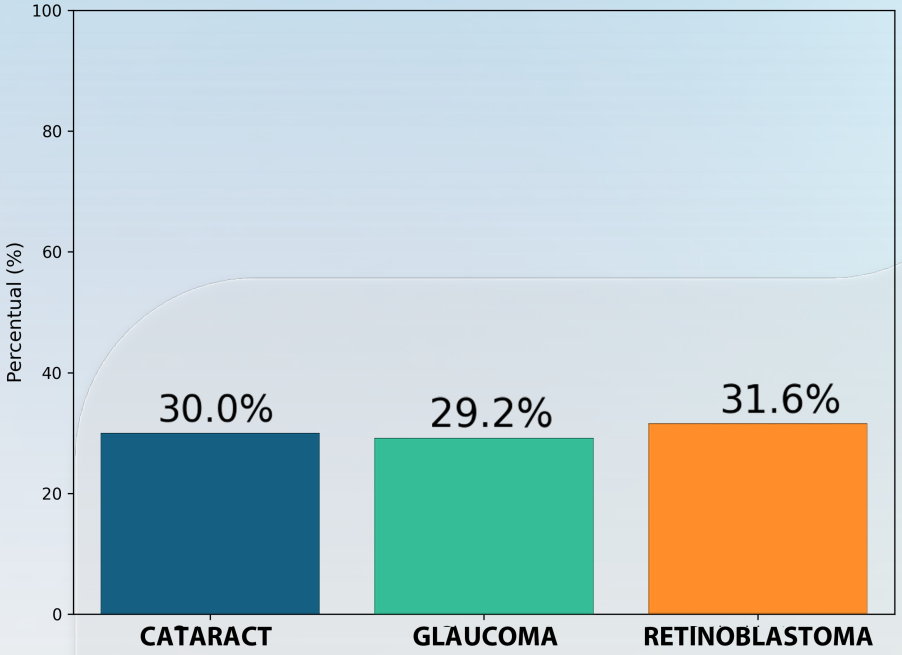


OUTPATIENT CONSULTATIONS AND SURGERIES

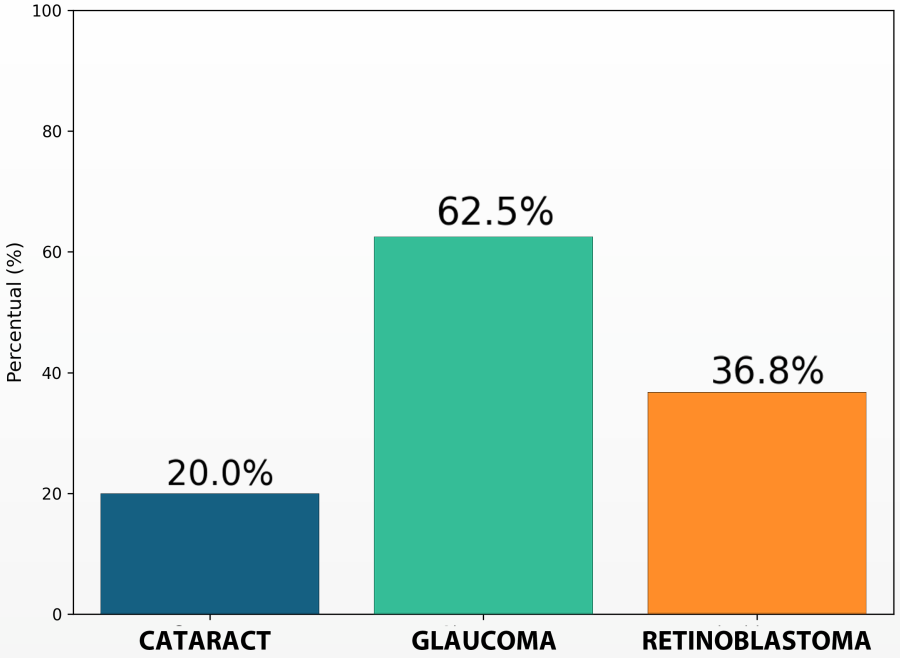


LIMITATIONS

LIMITATION – TRAINED PERSONNEL



LIMITATION – EQUIPMENT



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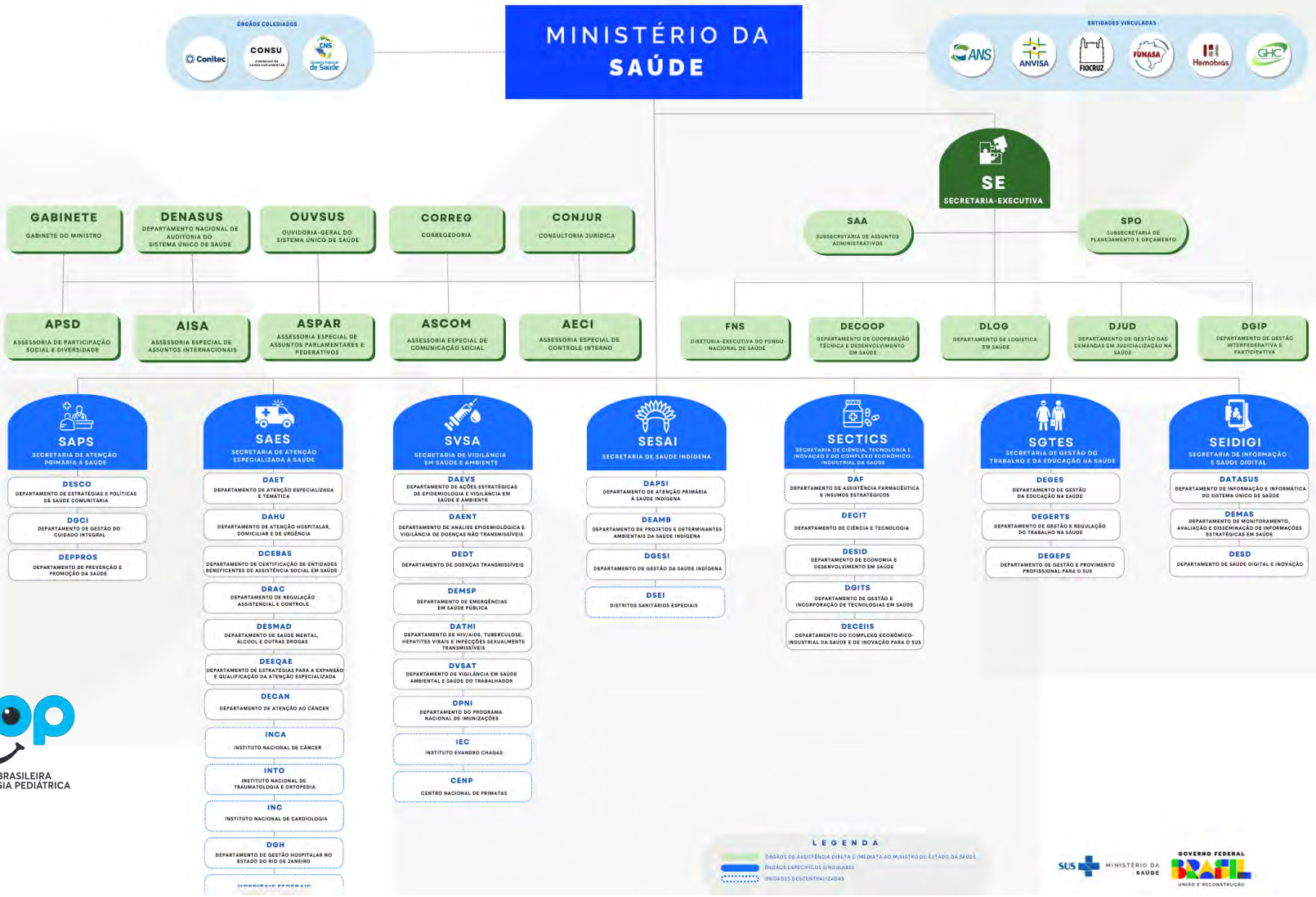
Alterado pelo Decreto Nº 12.489, de 4 de junho de 2025



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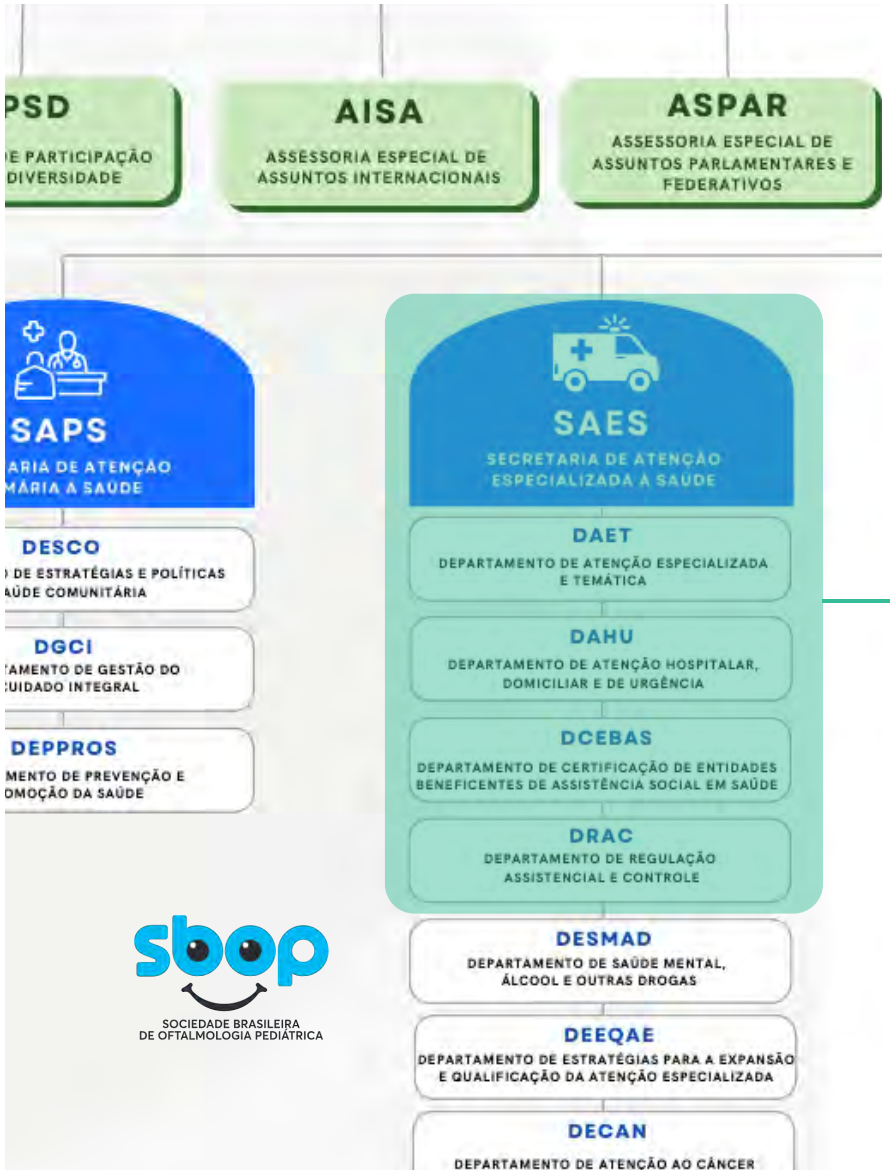

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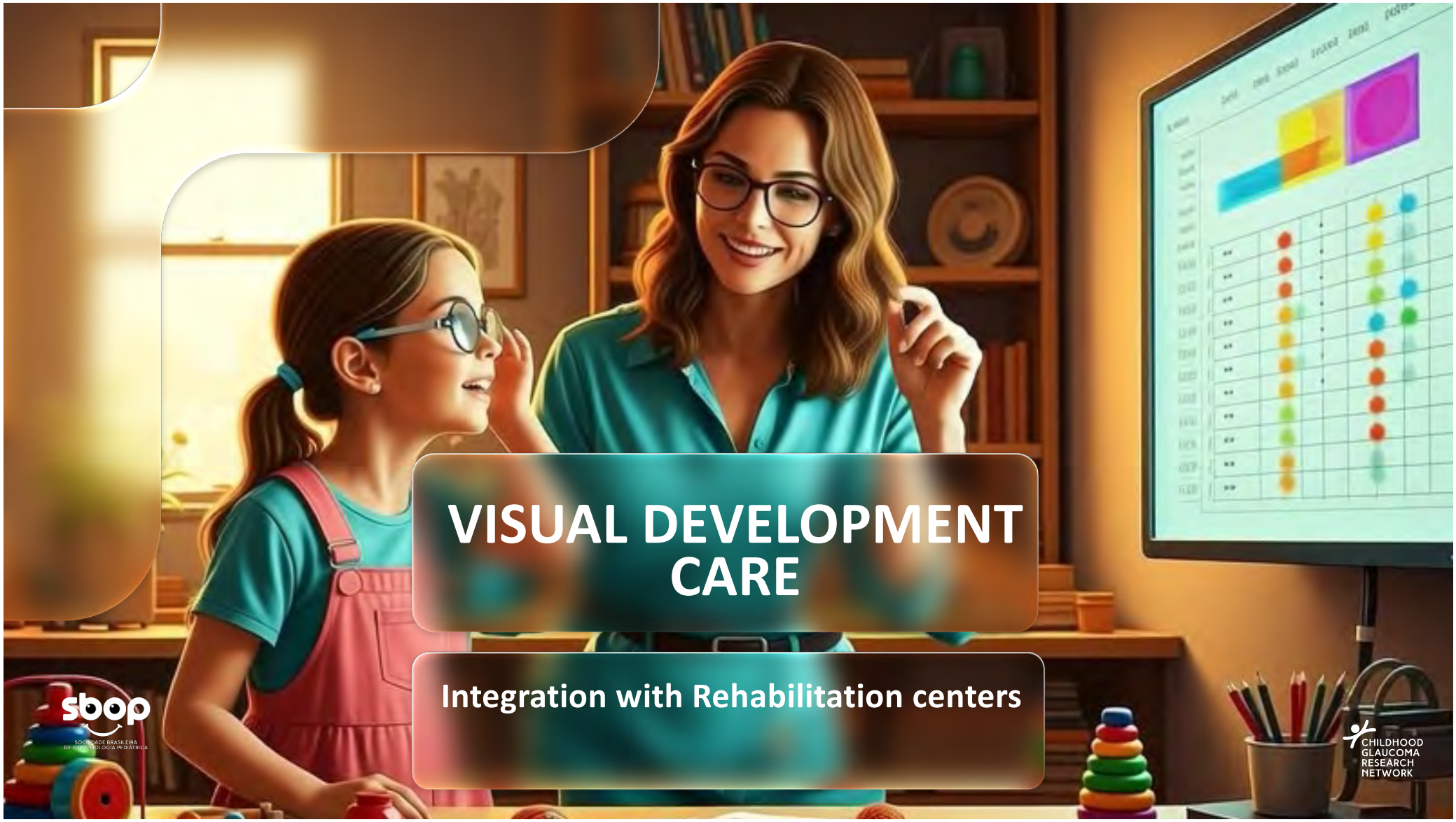
SECRETARY OF SPECIAL ATTENTION IN HEALTH CARE

CHILDHOOD GLAUCOMA RESEARCH NETWORK

REFERRAL NETWORK FOR OUT-OF-HOME TREATMENT (OHT IT)

AND TO CONNECT THE PATIENT WITH THE NETWORK

- Portaria SAS/MS n° 55, de 24 de fevereiro de 1999 - Portaria GM/MS n° 1.559, de 1o de agosto de 2008


VISUAL DEVELOPMENT CARE
Integration with Rehabilitation centers
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INFORMATION
PUBLIC POLICIES
ENGAGEMENT
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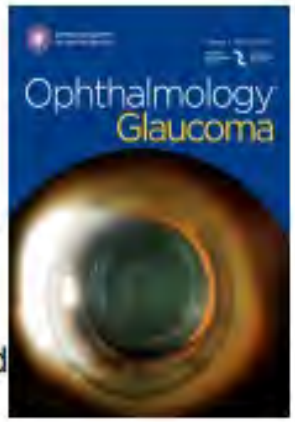
Identifying Barriers and improving Adherence to Follow up of Childhood Glaucoma in South India

Dr. Manju Anilkumar
Medical Consultant
Glaucoma Services
Aravind Eye Hospital, Madurai

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Journal Pre-proof



Identifying Barriers and Improving Adherence to Follow-up of Childhood Glaucoma in South India

Dr Manju R. Pillai, DNB, Senior Consultant, Dr George Varghese Puthuran, MS, Head of Glaucoma Services, Prof. David S. Friedman, MD, PhD, MPH, Mr Vijayakumar Valaguru, MSW, Senior Faculty, Mr. Raheem Rahmathullah, B.A, Mr. Santhosha P. Ganesh, MSW, Operations Manager, Dr. Janani Rajendran, MS, Medical Consultant, Paediatric Ophthalmology, Ms. Iswarya Mani, M.Sc Biostatistics, Biostatistician, Dr. Ramasamy Krishnadas, DNB, Senior Consultant, Miss. Maria Papadopoulos, MB BS, FRCOphth, Consultant Ophthalmic Surgeon

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CHILDHOOD GLAUCOMA RESEARCH NETWORK

Am J Ophthalmol. 2019 September ; 205: 106–114. doi:10.1016/j.ajo.2019.05.003.

Caregiver Burden in Primary Congenital Glaucoma

Aditi Kantipuly[1,*], **Manju R Pillai**[2,*], **Sujani Shroff**[2], **Rakhee Khatiwala**[2], **Ganesh V Raman**[3], **S R Krishnadas**[2], **Alan Lee Robin**[4,5,6], **Joshua R Ehrlich**[4,7]

[1]Department of Medicine, McGill University Department, Montreal, Quebec, Canada

[2]Aravind Eye Hospital, Madurai, Tamil Nadu, India

[3]Aravind Eye Hospital, Coimbatore, Tamil Nadu, India

[4]Department of Ophthalmology and Visual Sciences, University of Michigan, Ann Arbor, MI USA

[5]Department of Ophthalmology and International Health, Johns Hopkins University, Baltimore, MD, USA

[6]Vice President, American Glaucoma Society, USA

[7]Institute for Healthcare Policy and Innovation, University of Michigan, Ann Arbor, MI, USA

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Multicenter Study > Ophthalmol Glaucoma. 2020 Mar-Apr;3(2):145-157.
doi: 10.1016/j.ogla.2019.12.007. Epub 2020 Jan 3.

International Study of Childhood Glaucoma

Maria Papadopoulos [1], Elizabeth A Vanner [2], Alana L Grajewski [2];
International Study of Childhood Glaucoma – Childhood Glaucoma Research Network Study Group

Collaborators, Affiliations – collapse

Collaborators

International Study of Childhood Glaucoma – Childhood Glaucoma Research Network Study Group: Arijit Mithra, Manju Pillai, Swati Upadhyaya, Ganesh Venkataraman, Ta Chen Peter Chang, Alana Grajewski, Elizabeth Hodapp, Velota Sung, Orna Geyer, Alvit Wolf, Ellen Mitchell, Ken Nischal, Sharon Freedman, Allen Beck, Annette Giangiacomo, Anne Coleman, Arif Khan, Anil Mandal, Sirisha Senthil, John Brookes, Peng Tee Khaw, Maria Papadopoulos, Jocelyn Chua, Ching Lin Ho, James Brandt, Vera Essuman, Ray Areaux, Elena Bitrian, Alana Grajewski, Franz Grehn, Thomas Klink, Karen Joos

Affiliations

1 Glaucoma Service, NIHR Biomedical Research Centre at Moorfields Eye Hospital and UCL Institute of Ophthalmology, London, United Kingdom. Electronic address: maria.papadopoulos1@nhs.net.
2 Bascom Palmer Eye Institute, Miami, Florida.

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Background

International Study of Childhood Glaucoma (1)

- 441 children newly diagnosed glaucoma enrolled from 17 international centres
- ≈ 60% children came from 2 centres in India (Aravind Eye Hosp & LV Prasad Eye Institute)
- **however, 47.5% of Indian children had no or < 6 months of follow-up outcome data**

Definition of Adherence

- Adherent to follow up = returned within 90 days of recommended FU
- Non-Adherent to follow up = returned within 90-180 days of recommended FU
- Lost to follow up = returned >180 days of recommended follow up or not at all

1. Papadopoulos, M, Vanner EA, Grajewski AG, International Study of Childhood Glaucoma / CGRN Study Group. *Ophthalmol Glaucoma*, 2020

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CHILDHOOD GLAUCOMA RESEARCH NETWORK

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
5 year period: Jan 2014 – Jan 2019	Glaucoma suspects
Diagnosis of progressive Childhood Glaucoma both primary and secondary as per CGRN classification	Any patient who was treated for short duration, e.g. iritis, following trauma/ surgery with IOP spike
Within 200km of Aravind Eye Hospital	Patients from another state

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Questionnaire - House visit

1. Patient details
2. Types of Home and Asset details
3. General health, job and activities of father/mother/guardian
4. Patient general health questions (PHQ-9)
5. Caregivers QOL

Patients Family details

Use of medications and routine eye exams

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Questionnaire - Hospital

6 Patient details

7 Care givers information

8 Glaucoma Service utilization

9 Education, Occupation and income and Health issues if any

Knowledge of glaucoma

Perceptions about attending follow-up

Barriers to seek eye care

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Barriers to Follow Up Questionnaire - Hospital

10 Travel to Hospital

11 Cost of glaucoma medication and Follow-up visits

12 Potential strategies to facilitate regular follow up & increase awareness

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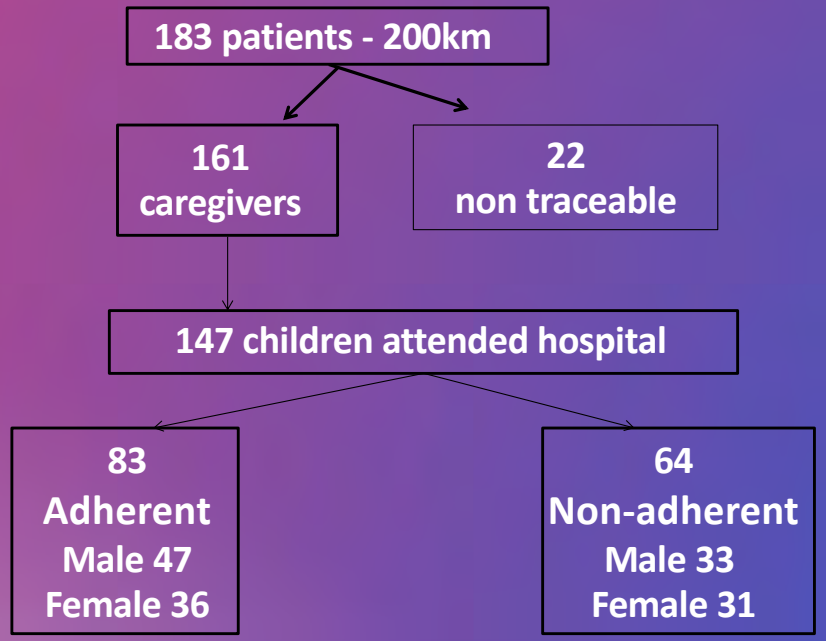
Results



Mean age 10.1 ± 4.3 years

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

ARAVIND
EYE CARE SYSTEM

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GLAUCOMA
RESEARCH
NETWORK

Aravind Publication

Ophthalmology Glaucoma July 2025 **IF: 3.2**

Identifying Barriers and Improving Adherence to Follow-up of Childhood Glaucoma in South India

Manju R Pillai, Puthuran GV, Friedman DS, Vijayakumar V, Rahmathullah R, Santhosha P Ganesh, Janani R, Iswarya M, Krishnadas R, Papadopoulos M

Original Article

Aim: To understand predictors and barriers of adherence to follow-up and identify strategies to improve follow-up in childhood glaucoma.

Methods: Cross-sectional study.
Home visits were conducted with consenting caregivers to collect information on socioeconomic status, education, occupation, activities, and quality of life. Adherence was defined as returning within 6 months of the recommended follow-up, caregivers were invited to bring affected children to base hospital for an evaluation.

Study Patients: Caregivers of children with glaucoma diagnosed between January 2014 and January 2019 residing within 200 km of the base hospital. Out of 147 caregivers who were interviewed in their homes, 142 reported to the base hospital with the child and were included in the analysis.

Results:

- Caregivers of adherent children were more likely to be better educated (68.3% vs. 42.9% having at least high school education, p=0.018); they were more frequently from urban areas (19% vs. 8%, p=0.084), and more caregivers belonged to upper middle class (17.7% vs. 6.3%, p=0.027).
- Multivariable logistic regression adjusting for these factors showed that children who had undergone glaucoma surgery were 3.02 times more likely (95%CI=1.21-7.54) to be adherent.
- Travel distance to the hospital was not associated with adherence. Caregivers reported that cost incentives towards travel and medical expenses would encourage follow-up.

Conclusion: Only half the children with childhood glaucoma remained adherent to follow up. Lack of prior surgery followed by lower socioeconomic status were the key risk factors. Financial assistance may help improve long term follow-up.

Centre : MDU
Pub. No : 73

ALICE

ARAVIND EYE CARE SYSTEM

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Success Story – 1

3 year old girl child
164 km from the base hospital.
C/O Big eyes and watering

→ Non- Compliant for 3 years

→ Reached out to her through this study

- Initially, she was hitting against objects while walking around
- she could walk around well after surgery and with appropriate glasses

ARAVIND EYE CARE SYSTEM

Success Story – 2

Diagnosed with childhood glaucoma and was treated 10 yrs back

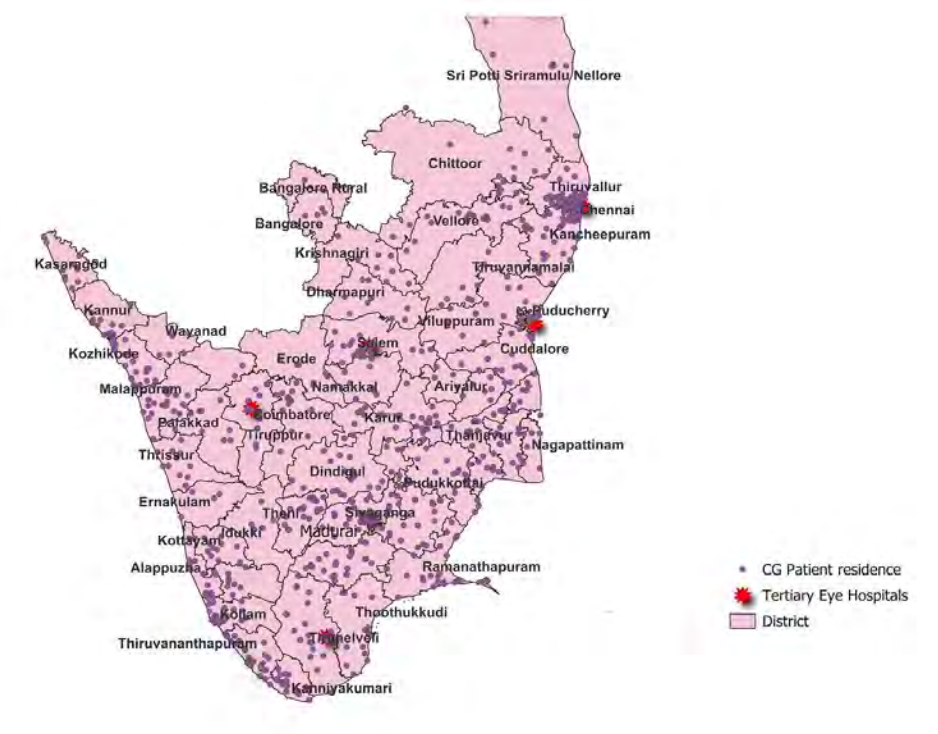
→ Lost his parents and lost follow up due to financial restrain

→ Was reached through this study and VR Sx = AADI Implantation done

→ Now has functional vision and attending blind school

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Multicentric Analysis : different tertiary eye care centres of AEH



1078 diagnosed cases of childhood glaucoma were included, classified based on CGRN classification

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

AEH Study

- In this study we classified Childhood Glaucoma and Subtypes according to CGRN and their Demographic and Clinical Profile in Children presenting to Multiple Tertiary Eye Care Centers across Tamil Nadu.
- **1078** Children Diagnosed with Childhood Glaucoma - Primary Congenital Glaucoma Constituted **48.4%,** and Secondary Glaucoma Constituted **51.6%.**
- Majority of Primary Glaucoma are PCG **(45%)** and JOAG **(3.4%**), the incidence of PCG in published reports ranged from **19** To **47%**
- Among the secondary Glaucomas majority were Non-Acquired Ocular Anomalies - Glaucoma after cataract surgery **(36,7%)** , associated with ocular anomalies.
  3.4% are Glaucoma associated with Trauma.

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CHILDHOOD GLAUCOMA RESEARCH NETWORK

AEH Study (Cond..)

- In our study mean age at Presentation of Childhood Glaucoma Is **8.25 +/- 6** Years, majority of children with PCG Presented as Early as 2 Days to 6 Months age.
- In our group male preponderance is more with ratio of **1.35:1**.
- In the published studies Glaucoma In Aphakia and Pseudophakia Ranged from **9.1 To 20%**

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CHILDHOOD GLAUCOMA RESEARCH NETWORK

Conclusion

- Non-Adherent Children
  - Individualized **Counseling** For A Regular Follow Up
  - Sending **Reminder** For The Hospital Visit
  - Supporting Them In The Base Hospital With **Appropriate Treatment And Medications** At Free Of Cost
  - As Distance And Cost Are Significant Barriers, **Capacity Of Nearest Community Center Could Be Increased** Including Tele-consultation With Base Hospital
  - Caregiver And Patient **Education**

EG.MEDIA ADVERTISEMENT (RADIO, TV, NEWSPAPER) 83% USEFUL

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

Conclusion (contd..)

1. To conduct sibling screening of children diagnosed with primary childhood glaucoma for detailed clinical evaluation and early detection.
2. To Facilitate genetic screening for children with primary childhood Glaucoma and their families to understand hereditary patterns and support early diagnosis.
3. To support treatment and rehabilitation of children from Low Socio-economic backgrounds who are already diagnosed with progressive glaucoma.

ARAVIND EYE CARE SYSTEM

CHILDHOOD GLAUCOMA RESEARCH NETWORK

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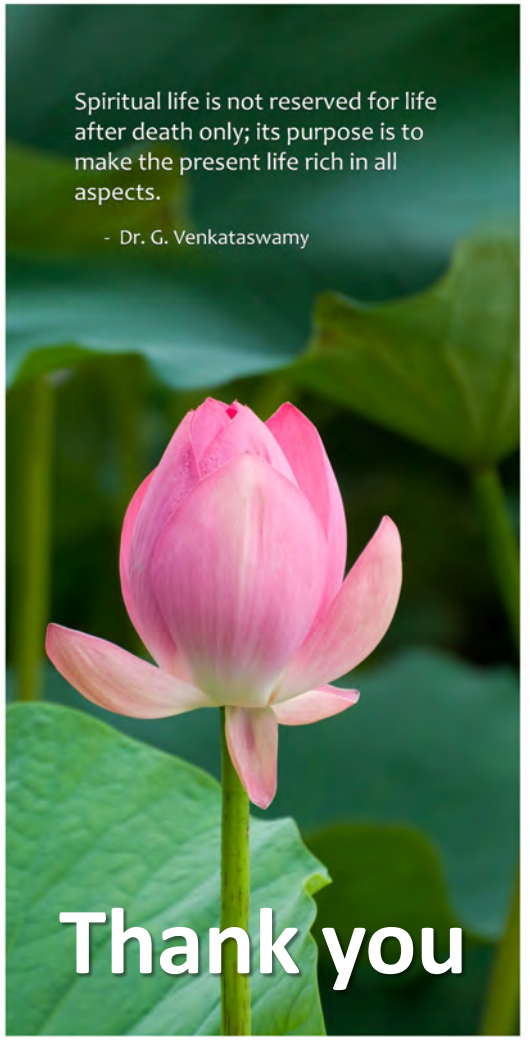
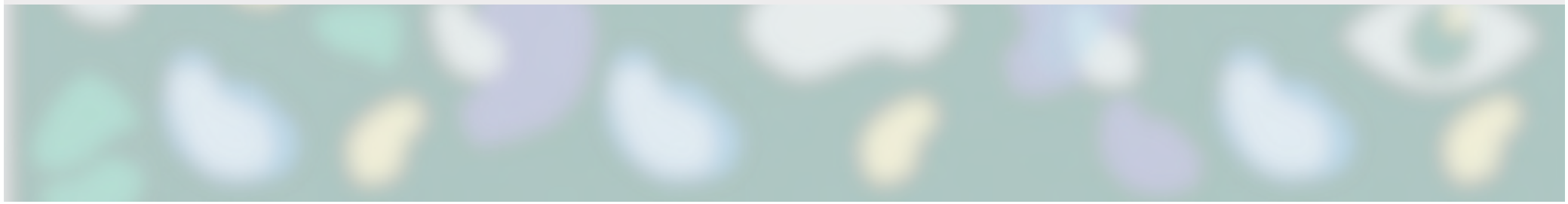
- Dr. Chinmayee P
- Mr. Logesh
- Mr. Santhosh Ganesh
- Ms. Roselin



TRADITION



napcgs NORTH AMERICAN PEDIATRIC GLAUCOMA SOCIETY

Interesting Papers in Pediatric Glaucoma in 2025

Sylvia L. Groth, MD, MSCI
Associate Professor of Ophthalmology, Vanderbilt University
Associate Vice Chair of Clinical Affairs, Department of Ophthalmology
Vanderbilt University Medical Center

DISCLOSURES

- No relevant disclosures

Paper Review Outline

- Silicon Oil: how much does SO increase glaucoma
- Preserflo: Implant of Preserflo in children
- OCT biomarkers: Clinic-based biomarkers for pediatric glaucomas
- Registry: Looking at a rare disease internationally
- Trauma: which trauma cases end up with glaucoma

Silicone Oil and Glaucoma-Related Adverse Events in Pediatric Vitreoretinal Surgery

Meghan Sharma, MD, MPH,[1] *Laura Huertas, MPH,*[2] *David J. Taylor Gonzalez, MD,*[3] *Roya Garakani, DO, OD,*[1] *Audina M. Berrocal, MD,*[2] *Ta C. Chang, MD*[2]

- Assesses the risk of glaucoma-related adverse events in VR surgery using SO
- 186 patients

Purpose: This study aims to assess the risk of glaucoma-related adverse events (GRAEs) in pediatric patients following silicone oil use in vitreoretinal (VR) surgery, positing that silicone oil exposure increases GRAE risk.

Design: A single-center retrospective cohort study at a tertiary care facility.

Participants: Pediatric patients aged 0 to 18 years who underwent VR surgery between April 2019 and April 2021 were included. Patients with previously diagnosed glaucoma or who had undergone glaucoma surgery were excluded.

Methods: Review of medical records for intraoperative use of silicone oil and postoperative occurrence of GRAE, defined as elevated intraocular pressure (>21 mmHg), initiation of pressure-lowering medications, performance of pressure-lowering surgery, or a diagnosis of childhood glaucoma based on the Childhood Glaucoma Research Network criteria.

Main Outcome Measures: Survival analysis of GRAE between patients exposed vs. not exposed to silicone oil during VR surgery.

Results: Of the 186 pediatric patients analyzed, 64 (34.4%) were exposed to silicone oil, and 102 developed GRAE (54.8%). Median survival time to GRAE was 2.0 months (95% confidence interval [CI]: 0.3, 7.7) for silicone oil exposure in patients vs. 25.3 months (95% CI: 3.6, N/A) for patients not exposed to silicone oil ($P = 0.0045$). Patients exposed to silicone oil had a 52% increased risk of GRAE compared to those not exposed to silicone oil when adjusted for age at VR surgery (hazard ratio: 1.52 [95% CI: 1.01, 2.28], $P = 0.0425$).

Conclusions: In this exploratory study, GRAE was commonly observed following pediatric VR surgery, particularly in patients exposed to silicone oil. These findings underscore the importance of careful glaucoma surveillance following VR surgery in children.

Glaucoma in Silicone Oil

- Older children
- Retina detachment vs subluxed lens/opacity

Table 2. Baseline Characteristics and Glaucoma Outcome in the Pediatric Vitreoretinal Surgery Cohort

	Sample N (%)	No Silicone Oil N (%)	Silicone Oil N (%)	P Value (Test Used)
Total	186 (100)	122 (65.6)	64 (34.4)	
Age (yrs), mean (SD)	8.1 (5.1)	7.2 (4.8)	9.8 (5.3)	0.0008‡ (IS t)
Preoperative IOP (mmHg), mean (SD)	14.8 (5.5)	15.2 (4.7)	13.9 (6.8)	0.2179 (IS t)
Laterality				0.4430 (chi)
Right eye	94 (50.8)	59 (48.8)	35 (54.7)	
Left eye	91 (49.2)	62 (51.2)	29 (45.3)	
Sex				0.8547 (chi)
Male	100 (53.8)	65 (53.3)	35 (54.7)	
Female	86 (46.2)	57 (46.7)	29 (45.3)	
Preoperative lens status				0.1111 (chi)
Phakic	161 (88.0)	109 (90.1)	52 (83.9)	
Aphakic	11 (6.0)	4 (3.3)	7 (11.3)	
Pseudophakic	11 (6.0)	8 (6.6)	3 (4.8)	
Indication for surgery				<0.0001‡ (chi)
Lens subluxation or opacity	73 (39.3)	69 (56.6)	4 (6.3)	
Retinal detachment	68 (36.6)	17 (13.9)	51 (79.7)	
Media opacity other than lens opacity	23 (12.4)	16 (13.1)	7 (10.9)	
Uveitis	3 (1.6)	2 (1.6)	1 (1.6)	
Inherited retinal diseases	10 (5.4)	10 (8.2)	0 (0.0)	
Other	9 (4.8)	8 (6.6)	1 (1.6)	
Glaucoma-related adverse events				0.0021† (chi)
Failed	102 (54.8)	57 (46.7)	45 (70.3)	
Censored	84 (45.2)	65 (53.3)	19 (29.7)	

chi = chi-square; IOP = intraocular pressure; IS t = independent sample *t* test; N = number; SD = standard deviation.
†$P < 0.01$.
‡$P < 0.001$.

Glaucoma in Silicone Oil

- Both groups failed fast

Table 3. Proportion of Failure for the Overall Cohort and Silicone Oil Exposure Cohort Over 4 Years

Time in Months	Failure Proportion: Overall Cohort	Failure Proportion: Silicone Oil Used
0	0.00%	0.00%
6	46.2%	54.6%
12	50.4%	64.5%
18	53.6%	71.3%
24	55.4%	71.3%
36	62.7%	73.7%
48	76.5%	100%

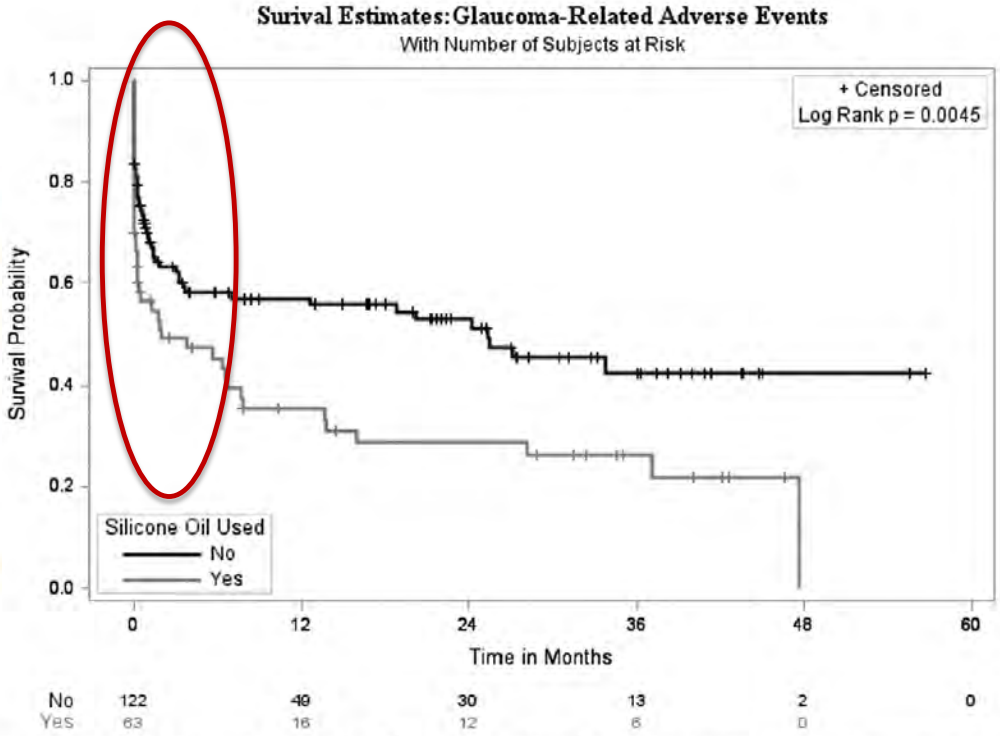


Figure 1. The median survival time to the development of GRAE was 2.0 months (95% CI: 0.3, 7.7) for silicone oil exposure in patients vs. 25.3 months (95% CI: 3.6, N/A; $P = 0.0045$) for patients not exposed to silicone oil. CI = confidence interval; GRAE = glaucoma-related adverse event.

Glaucoma in Silicone Oil

- Summary:
  - Frequent occurrence of glaucoma-related adverse events in patients with VR surgery, especially with SP
  - Need for careful monitoring of patients around the time of VR surgery

Efficacy and Safety of the Preserflo MicroShunt in Pediatric Glaucoma

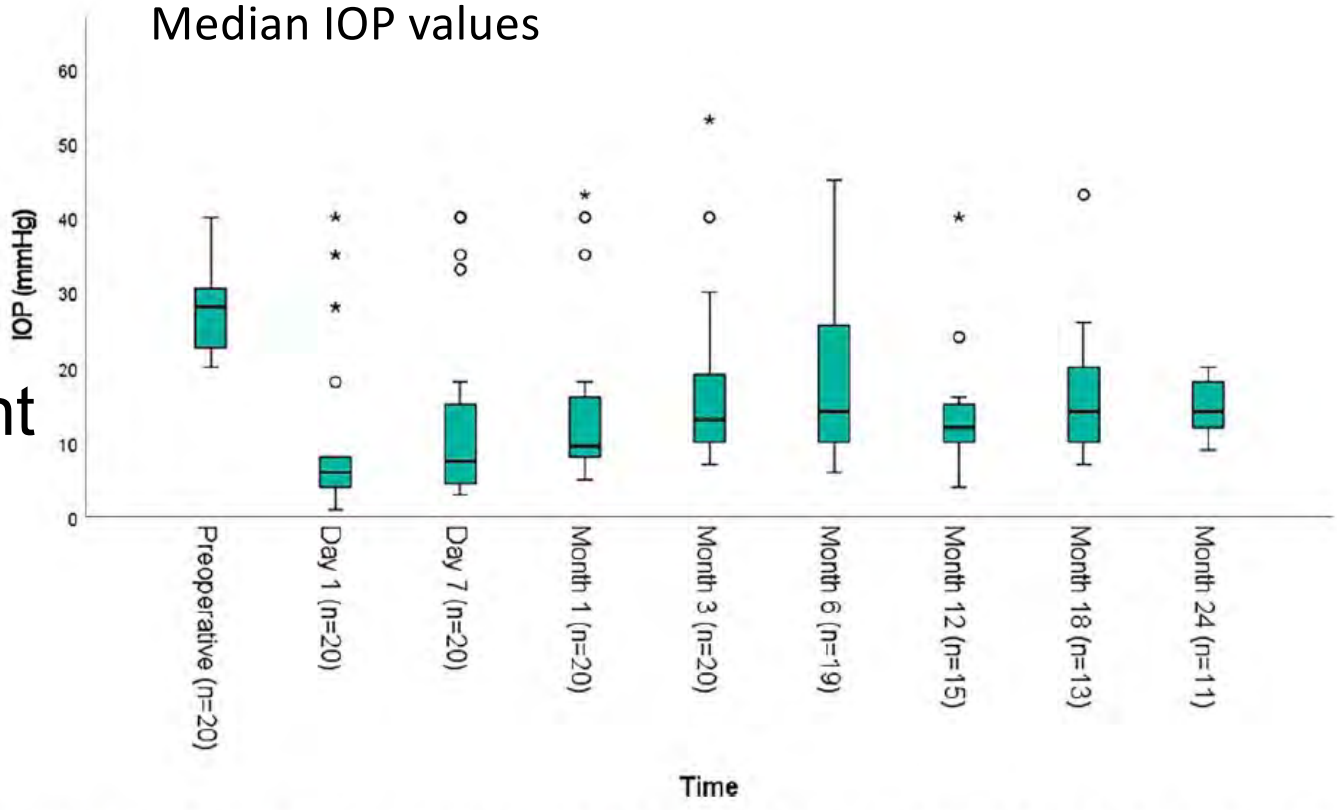
Susana R. Duarte, MD,† Afonso Lima-Cabrita, MD,*†*
Rafael C. Barão, MD,† André Barata, MD,*† Cristina Brito, MD,*†*
Ingeborg Stalmans, PhD,‡§ Sophie Lemmens, PhD,‡§
João B. Breda, PhD,‡‖¶ Luís A. Pinto, PhD,† and Filipa J. Teixeira, MD**

- 20 eyes of 20 patients
- Patients all had refractory glaucoma
- All had prior surgery
- Average f/u 18 months and 55% made it to 24 months
- Dr. Brandt pioneered PreserFlo in children

	Patients (n = 20), n (%)	Value
Age (y)		
Mean ± SD		11.7 ± 1.1
Median (IQR)		12.5 (8.0)
Range		6 mo–18 y
Patients by diagnosis		
Glaucoma associated with acquired conditions*	8 (40)	
Primary congenital glaucoma	5 (25)	
Glaucoma associated with nonacquired systemic disease/ syndrome†	3 (15)	
Glaucoma following cataract surgery	2 (10)	
Juvenile open angle glaucoma	2 (10)	
Patients by number of previous ocular surgeries		
0	8 (40)	
1	7 (35)	
2	3 (15)	
4	2 (10)	
Patients by type of previous glaucoma surgeries		
Trabeculotomy	6 (30)	
Trabeculectomy	2 (10)	
Tube/Bleb forming devices	2 (10)	
Cyclophotocoagulation	1 (5)	
Lens status at time of surgery		
Phakic	15 (75)	
Aphakic	2 (10)	
Pseudophakic	3 (15)	
Number of medications - Mean ± SD		2.9 ± 1.1
IOP (mm Hg) - Mean ± SD (range)		27.8 ± 1.3 (20–40)
BCVA (logMAR) - Mean ± SD		0.6 ± 0.1

PreserFlo

- 6 patients needed additional surgery
- 2 patients had shunt removed and replaced
- Some patients had very high IOP in f/u



PreserFlo

- No major adverse event happened outside of expected surgical glaucoma complications (hyphema, encapsulation, hypotony).
- Appears to be an effective tool for pediatric glaucoma surgery
- Did use MMC 0.4mg/ml sponges

JAMA Ophthalmology | Original Investigation

Utility of Swept-Source Anterior-Segment OCT as an In-Office Biomarker for Early Childhood Glaucoma

Sushmita Kaushik, MS; Ashok Kumar Singh, MS; Faisal Thattaruthody, MS; Vyshak Suresh, MS; Anchal Gera, MS; Shivangi Yadav, MBBS; Surinder Singh Pandav, MS

OBJECTIVE To evaluate use of SS-ASOCT in diagnosing pediatric patients as having early-onset childhood glaucoma vs not having glaucoma.

DESIGN, SETTING, AND PARTICIPANTS A prospective, comparative study including pediatric patients younger than 2 years of age who were referred to a tertiary care research and referral center in Northern India between June 2023 and July 2024. A diagnosis of early-onset childhood glaucoma was based on the clinical appearance of corneal clarity, intraocular pressure, buphthalmos, and optic disc evaluation.

MAIN OUTCOMES AND MEASURES Imaging was performed using SS-ASOCT with the "flying baby" technique to analyze the visibility of the TM structures, the angle opening distance (500 mm or 250 mm), and the angle recess area (250 mm^2 or 500 mm^2). Comparisons were made using analysis of variance. The area under the receiver operating characteristic curve was used to determine the discriminators for the nonglaucomatous angles. The best discriminatory parameters studied were subsequently tested in age-matched infants (controls) with congenital cloudy corneas without glaucoma based on an eye examination using an ophthalmoscope.

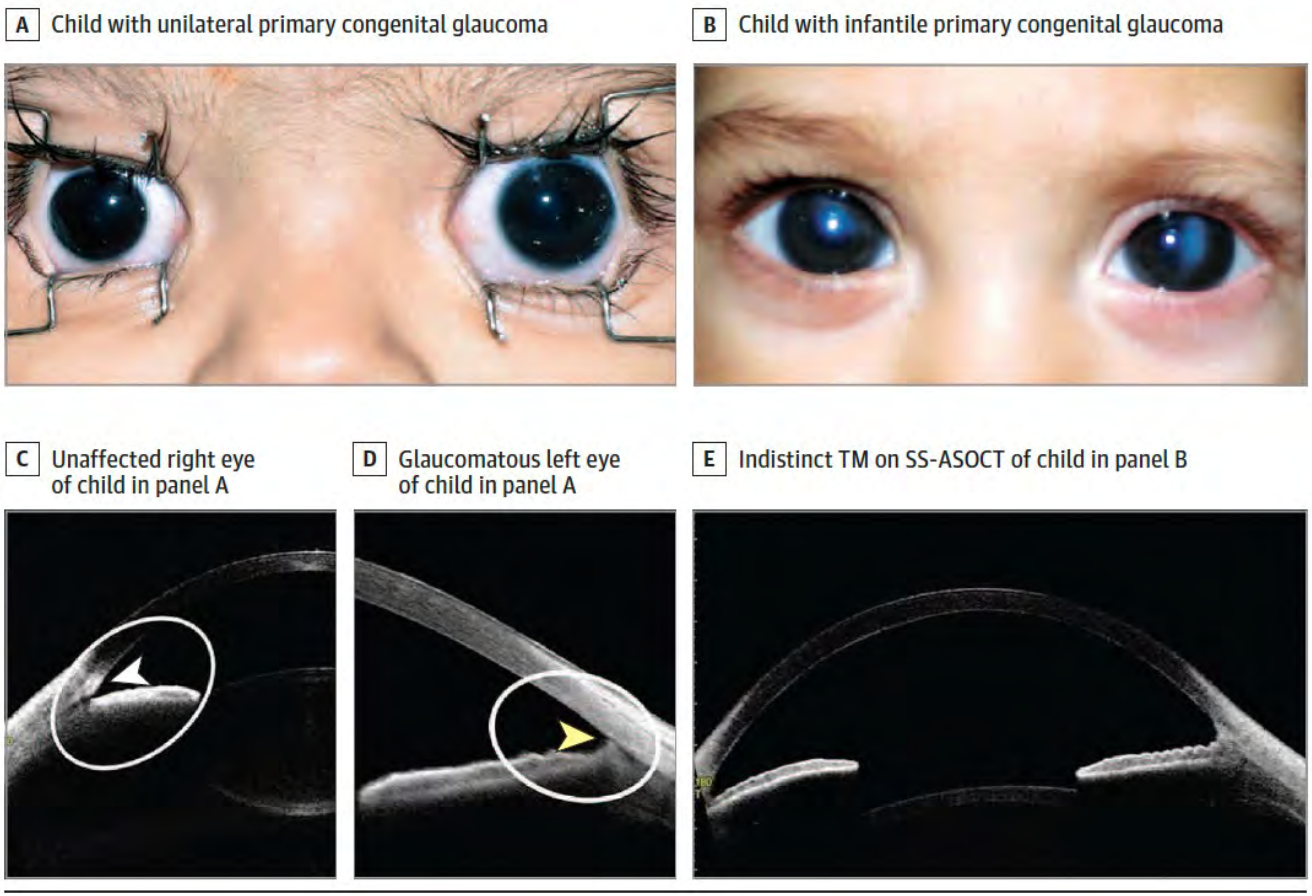
- Swept-source OCT
- In-office "flying baby"
- Looking for:
  - visibility of TM structures
  - Angle opening distance
  - Angle recess area

OCT Biomarkers

--30 children younger than 2 years old with early onset glaucoma
--23 age-matched controls

- Patient with unilateral glaucoma shows TM visible in unaffected eye, no TM in affected eye (left)

- No TM identified in either eye of PCG (right)



OCT Biomarkers

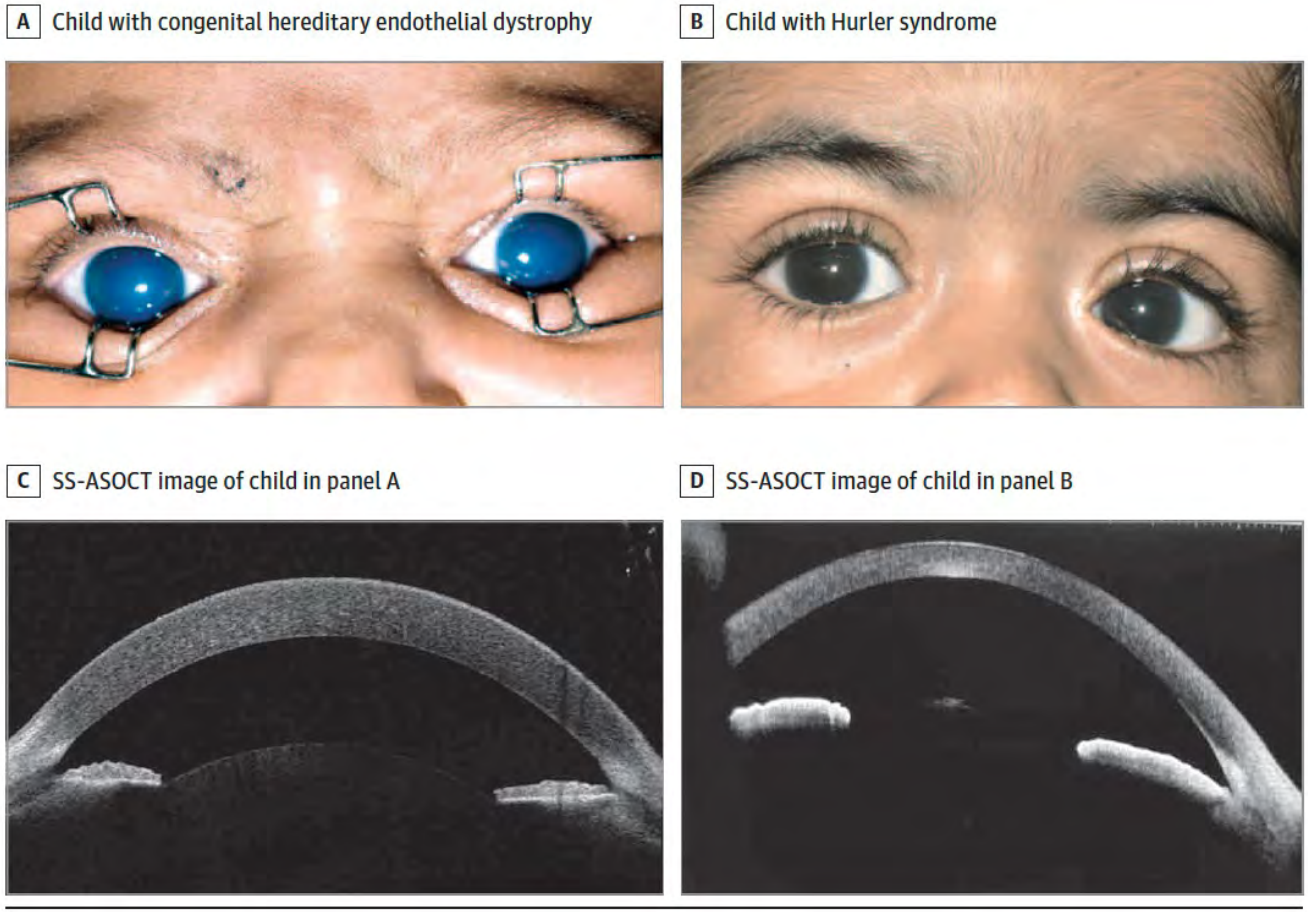
Table 1. Demographics and Baseline Characteristics

	Glaucoma (n = 30)	No glaucoma (n = 23)	Corneal opacity, no glaucoma (n = 9)[a]
Age at SS-ASOCT imaging, mean (SD), mo	18.6 (14.2)	17.3 (4.4)	12.8 (6.5)
Sex, No. (%)[b]			
Male	19 (63.3)	13 (56.5)	4 (44.4)
Female	11 (36.7)	10 (43.5)	5 (55.6)
Intraocular pressure, mean (SD), mm Hg	21.3 (9.8)	11.5 (2.8)	14.0 (3.4)
Corneal clarity grade, mean (SD)[c]	1.4 (1.2)	0	2.7 (0.4)
Optic disc, mean (SD), cup:disc ratio	0.55 (0.17)	0.07 (0.08)	0.14 (0.10)
Axial length, mean (SD), mm	22.79 (3.58)		18.75 (1.34)
Visibility of trabecular meshwork structures, No. (%)			
Clearly visible	8 (26.7)	23 (100)	9 (100)
Indistinct	13 (43.3)	0	0
Not visible	9 (33.3)	0	0
Angle opening distance,[d] mean (SD) [95% CI], mm			
500	0.64 (0.23) [0.46-0.62]	0.52 (0.13) [0.46-0.57]	0.43 (0.10) [0.36-0.49]
250	0.43 (0.18) [0.36-0.49]	0.32 (0.09) [0.28-0.36]	0.30 (0.08) [0.25-0.35]
Angle recess area,[d] mean (SD) [95% CI], mm^2			
500	0.26 (0.10) [0.22-0.29]	0.18 (0.05) [0.16-0.20]	0.22 (0.09) [0.16-0.28]
250	0.14 (0.17) [0.08-0.20]	0.07 (0.02) [0.06-0.08]	0.11 (0.12) [0.03-0.19]

OCT Biomarkers

--9 children with corneal opacities

- Patients with corneal opacities still able to identify TM structures indicating no glaucoma



OCT Biomarkers

- With the enhanced resolution of the SS-ASOCT images, we found that a clearly visible TM structure was the most useful distinguishing parameter between infants with nonglaucomatous eyes and those with glaucomatous eyes.
- The TM shadow was clearly visible in all nonglaucomatous eyes but was only clearly visible in 26.7% of glaucomatous eyes.

In Vivo Assessment of the Pediatric Trabecular Meshwork, Schlemm Canal, and Iridocorneal Angle Using Overhead-Mounted Optical Coherence Tomography

BO WANG, RIZUL NAITHANI, SAMUEL ALVAREZ, TANYA GLASER, AND SHARON F. FREEDMAN

- Goal is to describe the characteristics of TM, SC and angle
- 70 eyes, mix of normal glaucoma and cataract

Purpose: To describe the in vivo morphologic characteristics of the trabecular meshwork (TM), Schlemm canal (SC), and iridocorneal angle in pediatric patients with normal eyes, glaucoma, and cataract.

Design: Prospective cohort study.

Study population: A total of 41 children (70 eyes) were enrolled, comprising 28 normal eyes, 19 eyes with glaucoma, and 26 eyes with cataract (15 pre-, 11 post-lensectomy). Average age was 2.8 ± 3.0 years at imaging.

Methods: Pediatric patients undergoing clinically indicated examination under anesthesia underwent overhead-mounted optical coherence tomography (OCT) imaging of the outflow pathway. Images were then evaluated for abnormalities in the outflow pathway.

Main outcome measure: Presence of thickened TM, SC patency, any iridocorneal angle malformation, and episcleral vessel patency in normal eyes vs all other eyes.

AS-OCT

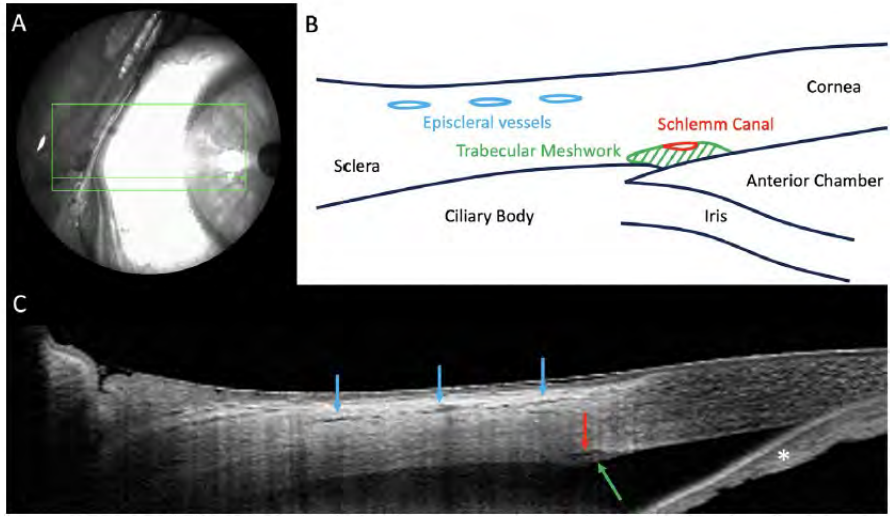
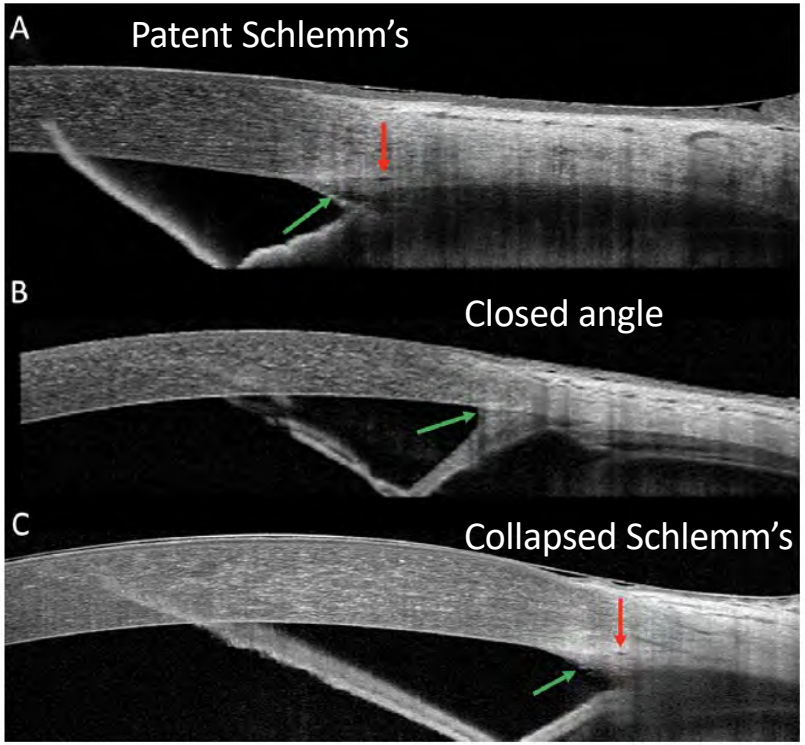


FIGURE 1. A. Location of scan pattern on near infrared en face scan. The green box indicates the location of the region of imaging. B. Diagram of the cross-sectional B-scan indicating the structures of interest. C. OCT B-scan in the normal eye of a child aged 2 years, showing imaging of anterior segment structures, trabecular meshwork (green arrow), patent Schlemm canal (red arrow), and patent episcleral vessels (light blue arrow). *Note the iris is flipped because of an artifact of imaging to optimize Schlemm canal imaging. OCT = optical coherence tomography.



AS-OCT

TABLE 1. Age, Intraocular Pressure (IOP), and Anterior Segment Optical Coherence Tomography (OCT) Findings of the Different Diagnostic Groups

	Normal (Control)	Contralateral [a]	Childhood Glaucoma [b]	Pre–Cataract Surgery [c]	Post–Cataract Surgery [d]
Number of eyes	28	9	19	15	11
Age at imaging, y	2.5 ± 2.0	2.4 ± 2.4	3.7 ± 4.9	1.9 ± 2.3	5.0 ± 5.1
IOP at imaging, mm Hg	13.4 ± 2.9	13.0 ± 4.1	27.5 ± 10.7	13.8 ± 8.7	21.5 ± 12.0
OCT findings, n (%)					
TM abnormal (thickened)	0 (0)	1 (11.1)	9 (47.4)	9 (60)	5 (45.5)
SC patent	28 (100)	8 (88.9)	6 (31.6)	11 (73)	6 (54.5)
Angle abnormal	0 (0)	1 (11.1)	18 (94.7)	10 (66.7)	8 (72.7)
Episcleral vessels patent	28 (100)	9 (100)	19 (100)	14 (93.3)	11 (100)

- Patent SC was only seen in 32% of childhood glaucoma
- Visualization of outflow pathway may lead to better understanding of the disease

The Robison D. Harley, MD Childhood Glaucoma Research Network International Pediatric Glaucoma Registry

The First 872 Cases

Stephanie R. Beldick, MD, MSc,[1] Adam Rockter, BS,[1] Allen D. Beck, MD,[2] Alex V. Levin, MD, MHSc[1,3]

- Epidemiologic data from international registry
- Open-access database
- Descriptive of first 872 cases

Purpose: To report on epidemiologic data from an international, centralized pediatric glaucoma database of 872 patients, focusing on genetic and clinically significant factors.

Design: Database study utilizing retrospective analysis.

Subjects: Eight hundred seventy-two children, both female and male, were included in the database. After accounting for database coding errors, data from 865 patients with pediatric glaucoma were analyzed. Number of eyes analyzed fluctuated for each variable.

Methods: The registry is an open access, no charge, Research Electronic Data Capture database. Participating clinical centers input data with local Institutional Review Board approval and subsequently have access for research purposes. We retrospectively reviewed 872 patients, comparing demographics, family history, country, disease presentation, and Childhood Glaucoma Research Network diagnoses. Analyses for each variable were conducted in SPSS Software v.28.0. Chi-square analyses were performed for nominal data, and ordinal and continuous data were analyzed using Mann–Whitney test, analysis of variance, or Kruskal–Wallis tests with multiple comparisons.

Main Outcome Measures: Childhood Glaucoma Research Network glaucoma type and markers of clinical severity by country (laterality, cup-to-disc ratio [CTD], corneal diameter, opacification, edema; visual acuity [VA], intraocular pressure, Haab striae, axial length).

Results: Twenty clinical sites from 10 countries entered data. Centers in the USA, India, and Iran input the most data. In the USA, open-angle glaucoma following cataract surgery was most common, while in India and Iran it was primary congenital glaucoma neonatal onset. Bilateral disease was more frequent in India and Iran compared to the USA ($X^2 = 50.6$, $P < 0.001$). Clinical measures of severity were typically worse in India compared to the USA. This included increased CTD ($X^2 = 24.0$, $P = 0.002$), increased corneal diameter ($X^2 = 8.9$, $P = 0.01$), presence of corneal opacification ($X^2 = 10.7$, $P = 0.001$), presence of corneal edema ($X^2 = 11.7$, $P < 0.001$), and worse VA ($U = 873.5$, $P < 0.001$). Intraocular pressure and presence of Haab striae were not associated with country ($P > 0.05$), while axial length was increased in the USA by an average of 1.04 mm ($U = 5787$, $P = 0.002$).

Conclusions: This registry has potential to advance our understanding of pediatric glaucoma. Differences in family history, disease presentation, and glaucoma type suggest unique country phenotypes. Registry expansion may allow for insight into best practices for pediatric glaucoma.

Pediatric Glaucoma Registry

- Most cases from USA (462), India (132) and Iran (179)
- Powerful feature of this registry is the ability to investigate country-specific features of pediatric glaucoma.

- Most cases are those of PCG
- Can grow with future case submissions

Pediatric Glaucoma Registry

Table 1. Childhood Glaucoma Research Network Classifications of Patient Cohort

Glaucoma Classification	Number of Patients (Percent)			
	Entire Cohort	*USA*	*India*	*Iran*
Glaucoma Associated with acquired conditions. Angle-closure glaucoma (<50% open or acute angle closure)	3 (0.6)	2 (0.6)	0 (0)	0 (0)
Glaucoma associated with acquired conditions. Open-angle glaucoma (>50% open)	52 (9.8)	48 (14.1)	1 (1.3)	2 (6.3)
Glaucoma associated with nonacquired ocular anomalies	54 (10.2)	40 (11.7)	9 (11.4)	0 (0)
Glaucoma associated with nonacquired systemic disease or Syndrome	57 (10.8)	38 (11.1)	11 (13.9)	3 (9.4)
Glaucoma following cataract surgery. Angle-closure glaucoma (<50% open or acute angle closure)	15 (2.8)	12 (3.5)	0 (0)	0 (0)
Glaucoma following cataract surgery. Open-angle glaucoma (>50% open)	106 (20.0)	84 (24.6)	3 (3.8)	4 (12.5)
Juvenile open-angle glaucoma	34 (6.4)	28 (8.2)	3 (3.8)	2 (6.3)
Primary congenital glaucoma. Infantile onset (1-24 mos)	118 (22.3)	60 (17.6)	18 (22.8)	6 (18.8)
Primary congenital glaucoma. Late onset (>2 yrs)	18 (3.4)	7 (2.1)	3 (3.8)	0 (0)
Primary congenital glaucoma. Neonatal onset (<1 mo)	72 (13.6)	22 (6.5)	31 (39.2)	15 (46.9)

Article

Conversion to Glaucoma After Ocular Trauma in Pediatric Patients

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Abstract: Background: The outcomes of pediatric glaucoma suspects with a history of ocular trauma remains unknown; we describe the rate of conversion to glaucoma of this population of patients at a research-intensive academic center. Methods: We conducted a retrospective case series of pediatric patients with a history of open- or closed-globe trauma who were being monitored as pediatric glaucoma suspects at the Wilmer Eye Institute between 2005 and 2016. Results: A total of 62 eyes from 62 patients with a history of ocular trauma were identified with a median age at presentation of 9.7 years (7.8 years) and a median follow-up of 2.7 (5.8 years). There were 29 eyes (46.8%) with open-globe injuries and 33 eyes (53.2%) with closed-globe injuries. A higher proportion of eyes that sustained closed-globe injuries were started on topical therapy for persistent ocular hypertension than eyes that sustained open-globe injuries (36.4% versus 10.3%, $X^2 = 5.6976$, $p = 0.017$). Five eyes (8.1%) developed glaucoma during the follow-up period, all of which had a history of closed-globe injury (15.2%, $X^2 = 4.7794$, $p = 0.029$). Four eyes of these eyes underwent glaucoma-related surgical intervention. Most eyes (3/5, 60%) that went on to develop post-traumatic glaucoma had undergone additional and/or concurrent intraocular surgical interventions to address sequelae of ocular trauma, such as traumatic cataract and retinal detachment. Conclusions: All eyes that developed glaucomatous damage or underwent glaucoma-related surgical intervention in this cohort of patients with a history of ocular trauma were those that had sustained close-globe injuries. No eyes that sustained open-globe injury progressed to glaucoma.

- Describe the rate of conversion of hx of trauma to glaucoma
- 62 eyes with hx of ocular trauma
- Split between open globe (29) vs closed globe (33)
- Median 2.7 years of f/u

Trauma

	All Eyes	Open-Globe Injury	Closed-Globe Injury	*p*
Total eyes	62	29	33	
Eyes with elevated IOP requiring pharmacologic treatment (%) *	15 (24.2)	3 (10.3)	12 (36.4)	0.017
Eyes meeting criteria for conversion to glaucoma (%) *	5 (8.1)	0 (0)	5 (15.2)	0.029
Eyes requiring surgical intervention for glaucoma	4 (6.5)	0 (0)	4 (12.1)	0.053

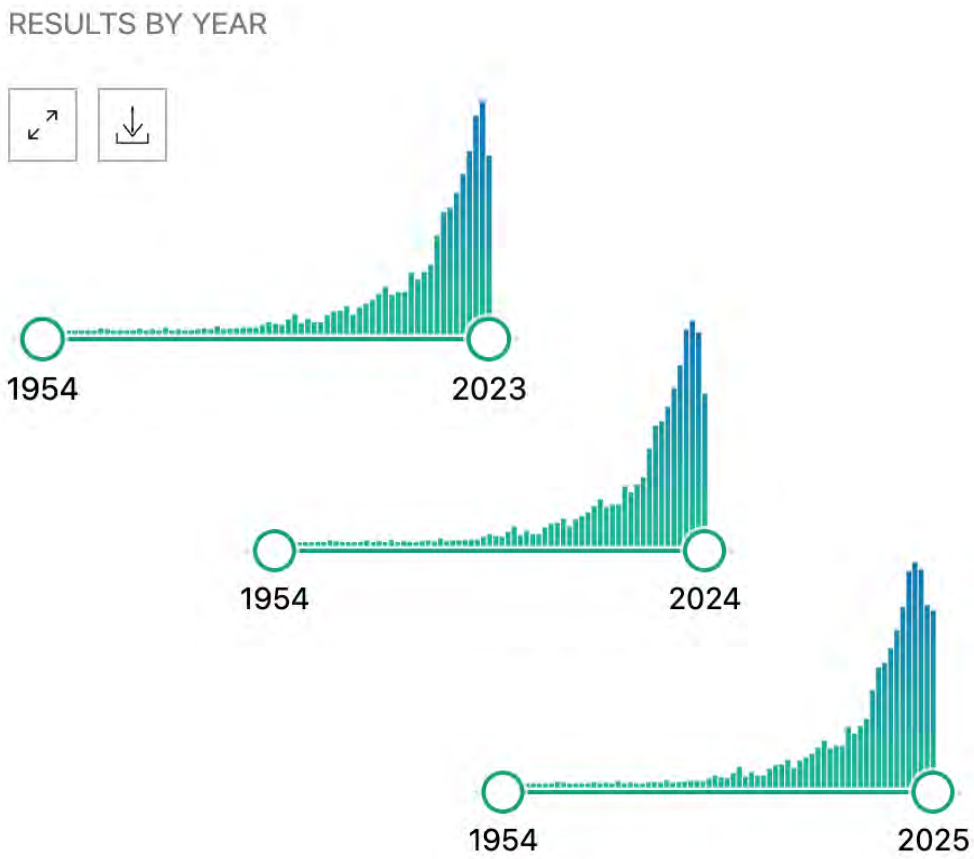
An asterisk (*) denotes categories in which there was a significant difference in the specified value between eyes with open-globe injury and eyes with closed-globe injury.

- Elevated IOP/glaucoma more common in closed-globe injuries
- Over 1 in 7 eyes that had sustained closed-globe injury went on to develop glaucomatous damage and/or undergo glaucoma-related surgical intervention over a median follow-up of nearly three years.

Summary

Continued increase of

Pediatric glaucoma studies!



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NORTH AMERICAN PEDIATRIC GLAUCOMA SOCIETY

Thank You!

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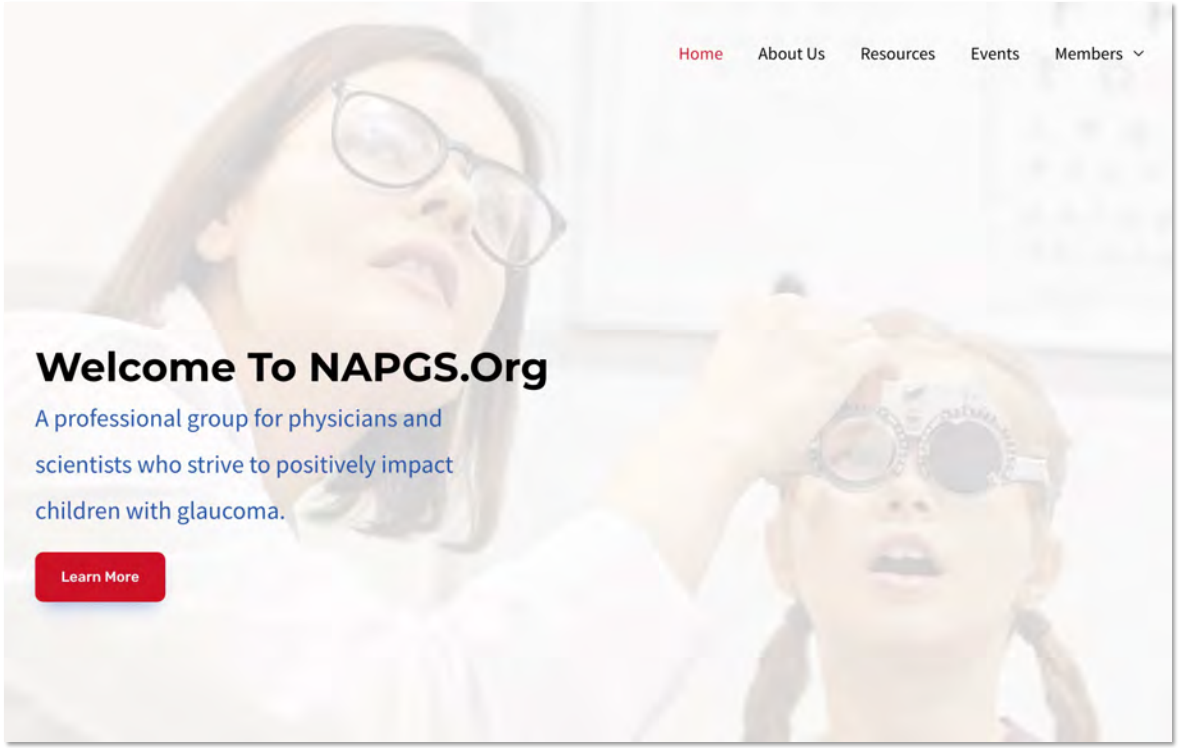

About Us

The North American Pediatric Glaucoma Society is a professional group of physicians and scientists, expert in the diagnosis and management of pediatric glaucoma and anterior segment anomalies. The NAPGS grew out of discussions among members of the Pediatric Glaucoma Committee of the American Glaucoma Society. The group recognized that both pediatric ophthalmologists and glaucoma specialists who take care of childhood glaucoma generally do not attend the same meetings. This presented the opportunity to form a group for North American childhood glaucoma clinicians and researchers to discuss challenging cases, present research, and collaborate.

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