

# Final Results from the HORIZON Trial:

5-year Follow up of a Schlemm's Canal  
Microstent Combined with Cataract  
Surgery in Primary Open Angle Glaucoma

Cathleen M. McCabe, MD

The Eye Associates

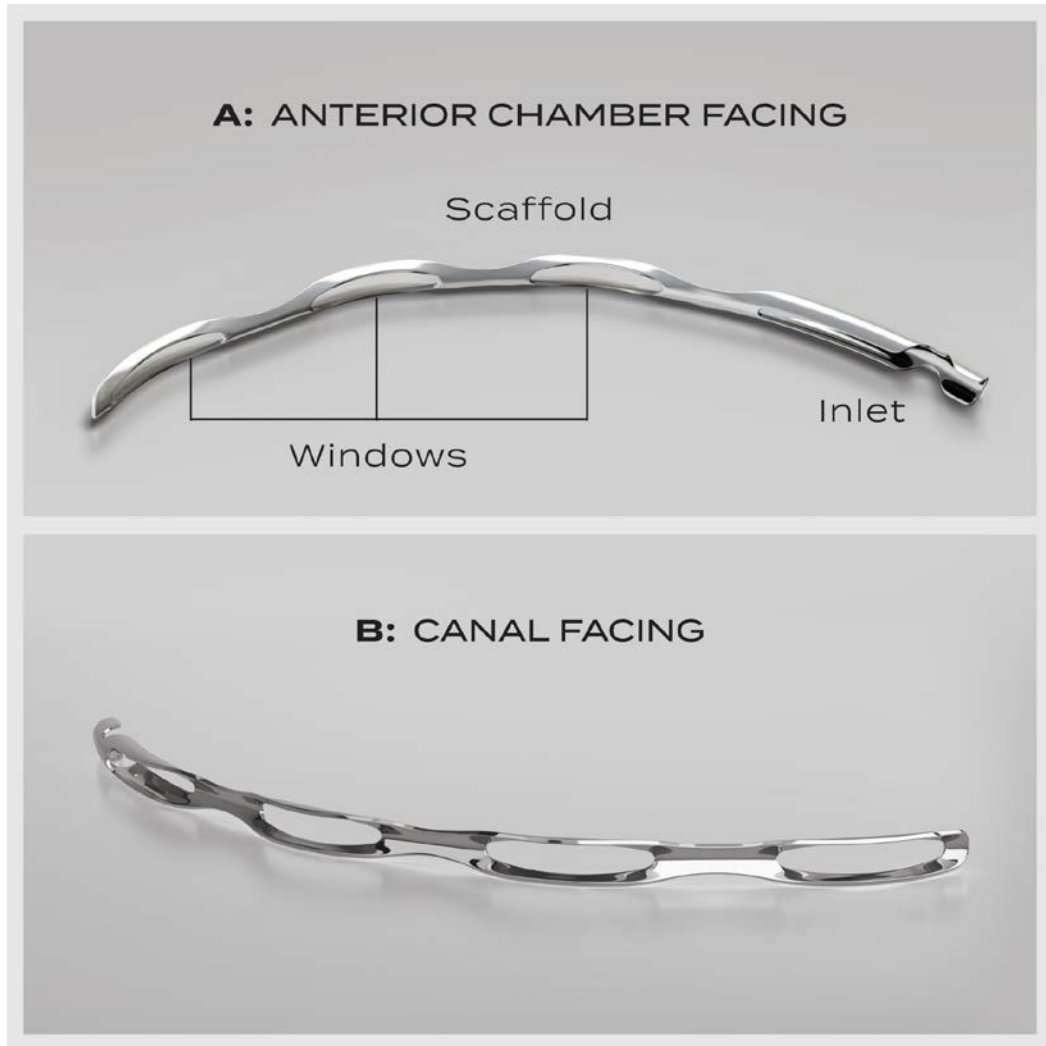
Bradenton, FL USA

# Financial Disclosures

- Alcon
- Aerie Pharmaceuticals
- Bausch and Lomb
- Johnson and Johnson Vision
- Allergan
- Novartis
- Sun Pharmaceuticals
- **Ivantis**
- Glaukos
- Dompe
- Visus
- Quidel
- Eyevance
- Ziess
- Omeros
- Ocular Therapeutix
- EyePoint Pharmaceuticals
- Sight Sciences
- Engage Technologies Group
- Science Based Health
- Imprimis
- Ora
- Tarsus
- Orasis
- Lensar



# Schlemm's Canal Microstent (Hydrus)



- Flexible, biocompatible 8 mm length Microstent
- Made-out of nitinol (highly biocompatible material used in cardiovascular stents)
- Contoured to match canal curvature
- Three open windows face anterior chamber
- The canal-facing surface is completely open for unobstructed collector channel access

# Schlemm's Canal Microstent Tri-Modal Mechanism of Action



## 90° Span:

The only MIGS implant to span approximately 90° of Schlemm's canal, ensuring access to collector channels in the nasal region.



## Open Scaffold Design:

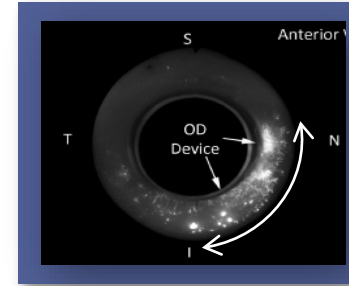
The first MIGS device to precisely dilate and scaffold Schlemm's canal, gently expanding the cross sectional area without obstructing outflow access to collector channel ostia.<sup>3</sup>



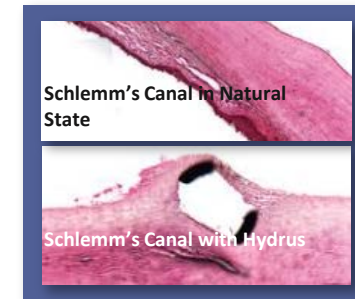
## Bypass:

The Hydrus Microstent bypasses the trabecular meshwork to restore flow of aqueous from the anterior chamber through the inlet of the microstent into Schlemm's canal.

## Span<sup>1</sup>



## Scaffold<sup>2</sup>



## Bypass<sup>3</sup>

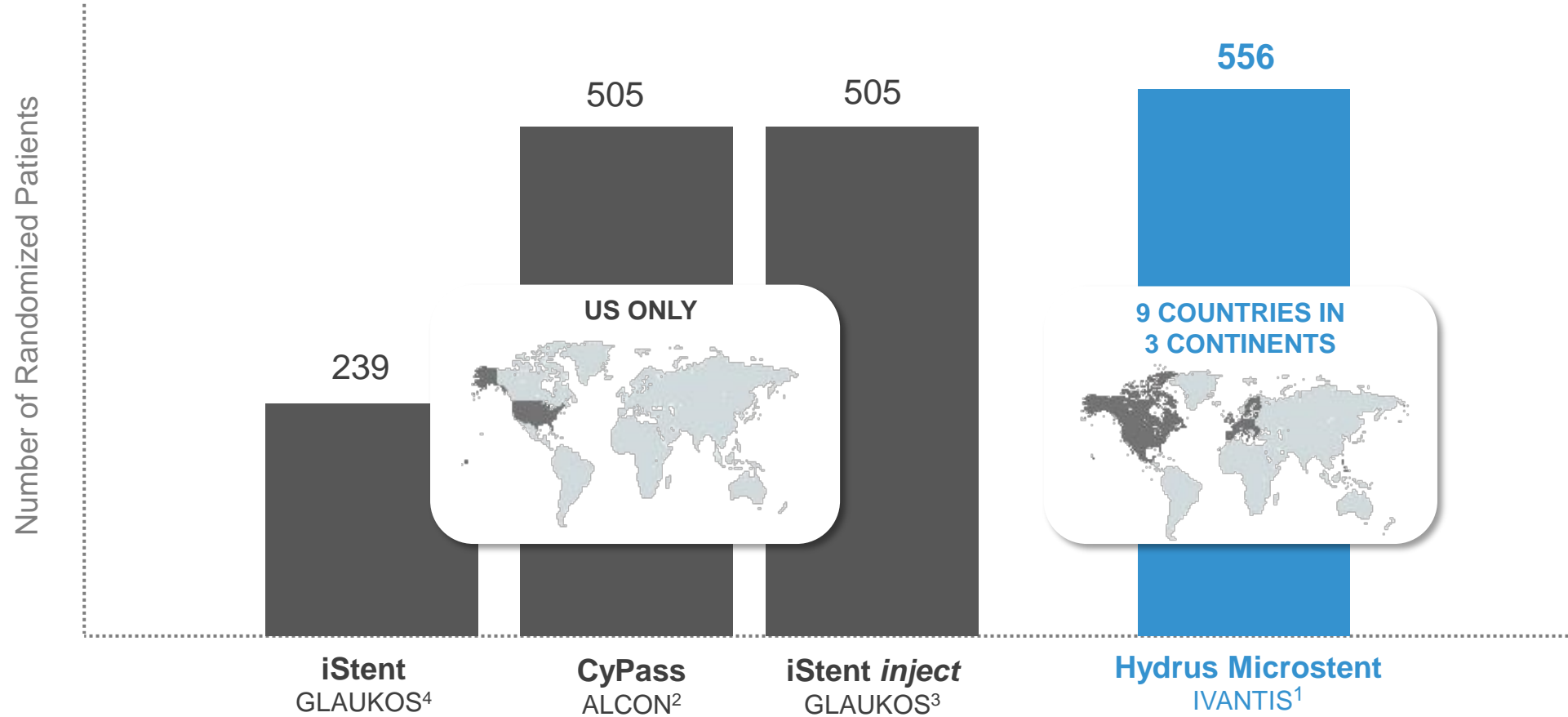


1. Gong H, Johnstone M, et al. Poster #115 American Glaucoma Society, New York 2012.  
 2. Hays CL, Toris CB, et al. Invest Ophthalmol Vis Sci. 2014;55:1893-1900.  
 3. Pfeiffer N, Samuelson TW, et al. Ophthalmology 2015;122:1283-1293

Not intended to show exact volume or path of fluid flow

# HORIZON: Largest MIGS Pivotal Trial

## ENROLLED US PIVOTAL TRIALS (MIGS + Cataract Surgery vs. Cataract Surgery Alone)



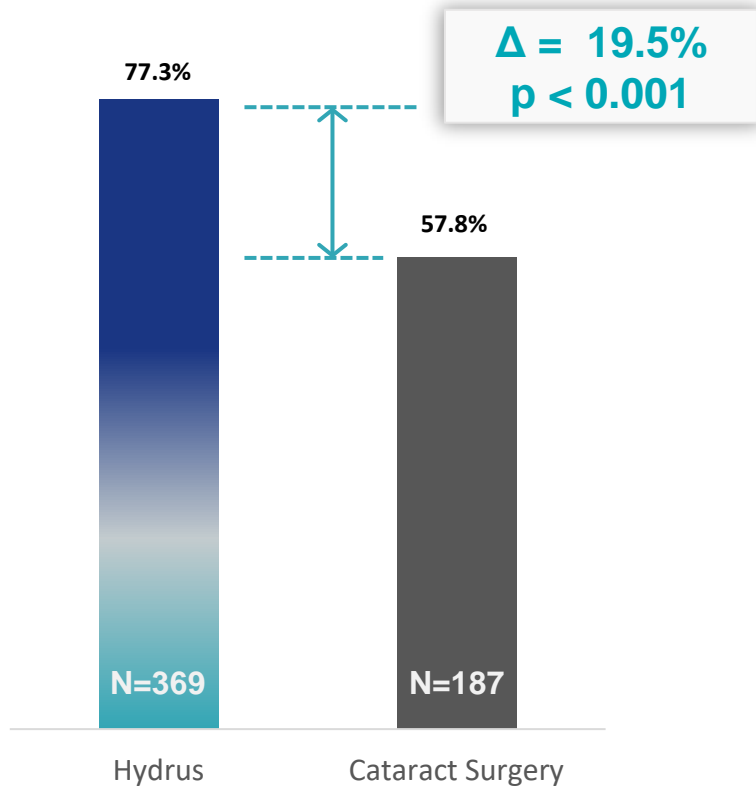
1. US Food and Drug Administration. Summary of Safety and Effectiveness Data (SSED): Ivantis Hydrus® Microstent. US Food and Drug Administration website. [https://www.accessdata.fda.gov/cdrh\\_docs/pdf17/P170034B.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf17/P170034B.pdf). Published August 10, 2018.  
 2. US Food and Drug Administration. Summary of Safety and Effectiveness Data (SSED): CyPass® System (Model 241-S) . US Food and Drug Administration website [https://www.accessdata.fda.gov/cdrh\\_docs/pdf15/P150037B.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf15/P150037B.pdf). Published July 29, 2016..  
 3. US Food and Drug Administration. Summary of Safety and Effectiveness Data (SSED): iStent inject Trabecular Micro-Bypass System. US Food and Drug Administration website. [https://www.accessdata.fda.gov/cdrh\\_docs/pdf17/P170043b.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf17/P170043b.pdf). Published June 21, 2018.  
 4. US Food and Drug Administration. Summary of Safety and Effectiveness Data (SSED): Glaukos iStent® Trabecular Micro-Bypass System. US Food and Drug Administration website. [https://www.accessdata.fda.gov/cdrh\\_docs/pdf8/P080030B.pdf](https://www.accessdata.fda.gov/cdrh_docs/pdf8/P080030B.pdf). Published June 25, 2012)

# HORIZON: Principal Outcomes<sup>1</sup>

## Largest Treatment Effect of Any MIGS Device

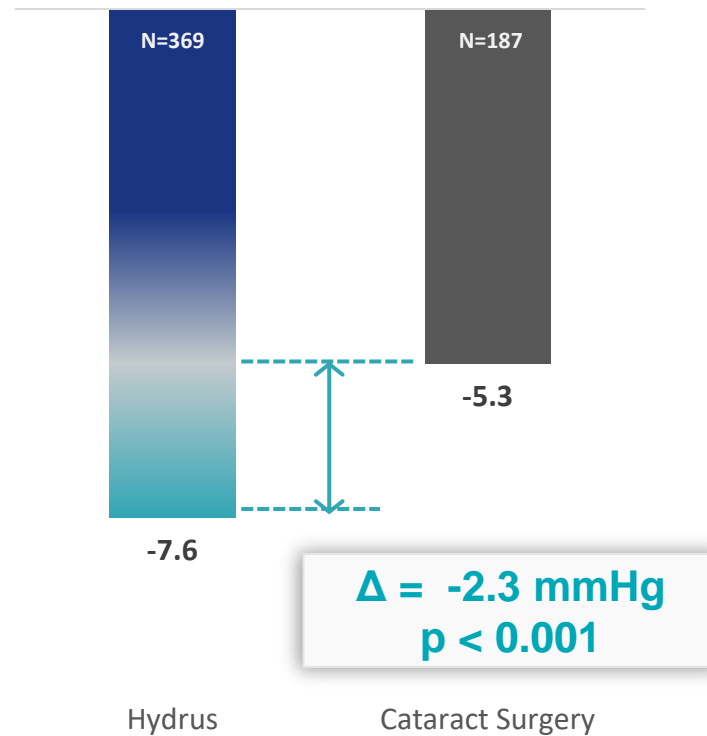
### IOP Reduction $\geq 20\%$

24 Months



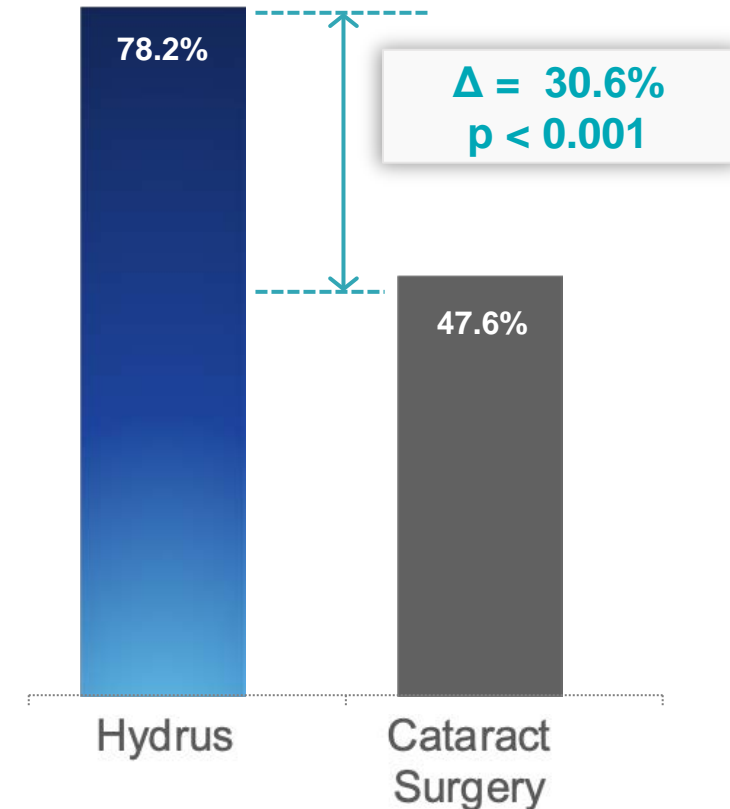
### Change in IOP

24 Months



### Medication Free

24 Months



1. Samuelson TW, et al. *Ophthalmology* 2019;123:29-37

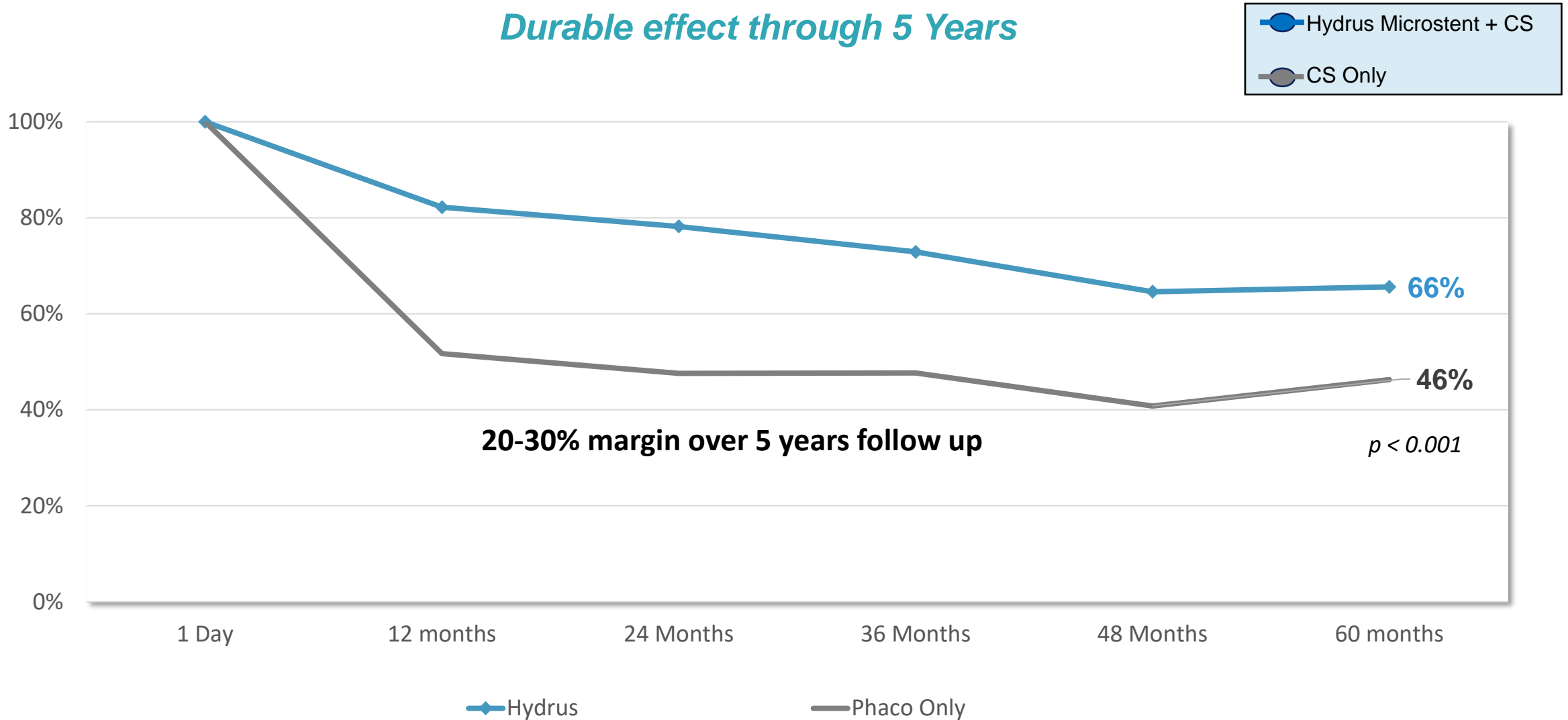
# HORIZON 3 – 5 Year Follow up

- HORIZON is unique: only MIGS pivotal study with 5-year continuous follow-up
  - 80% study follow-up of patients at 5 years
- Primary endpoint assessment was based on washed out IOP at 24 months... medication wash out was discontinued after for practical reasons
- Long term effectiveness based on:
  - Medication free
  - Failure rates (progression to surgery)
  - Safety findings (vision, ECD, and adverse events)

# HORIZON: Medication Free<sup>1</sup>

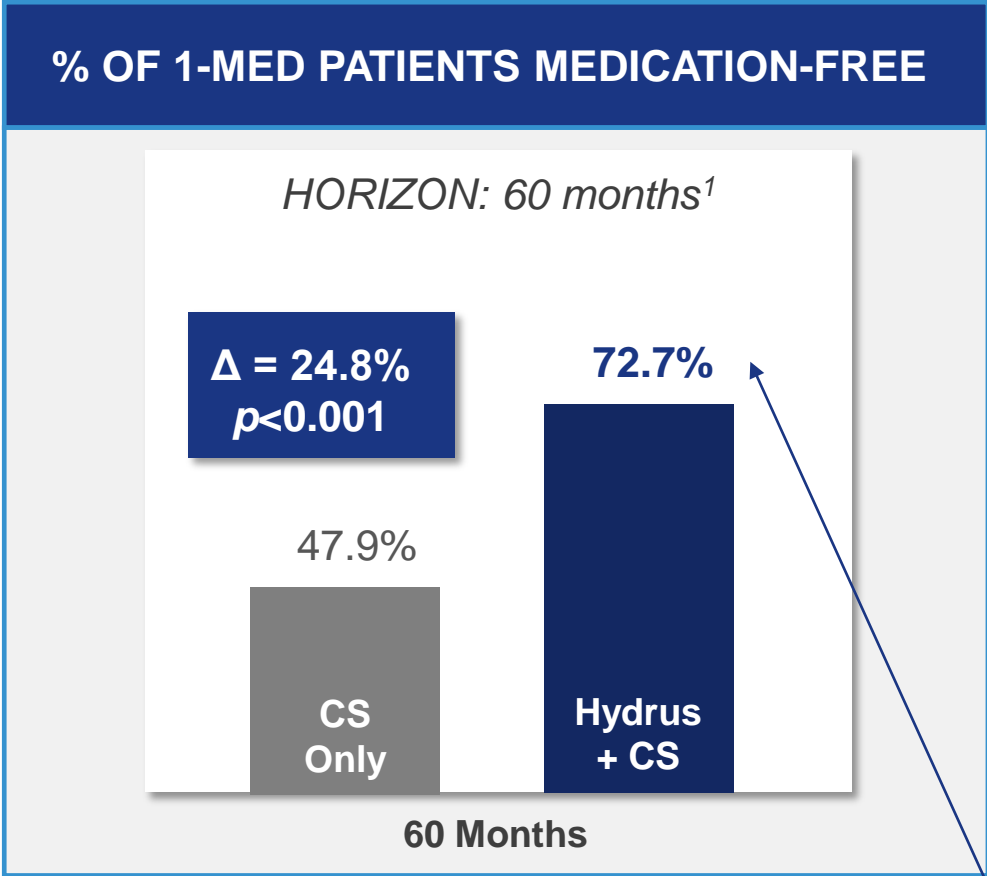
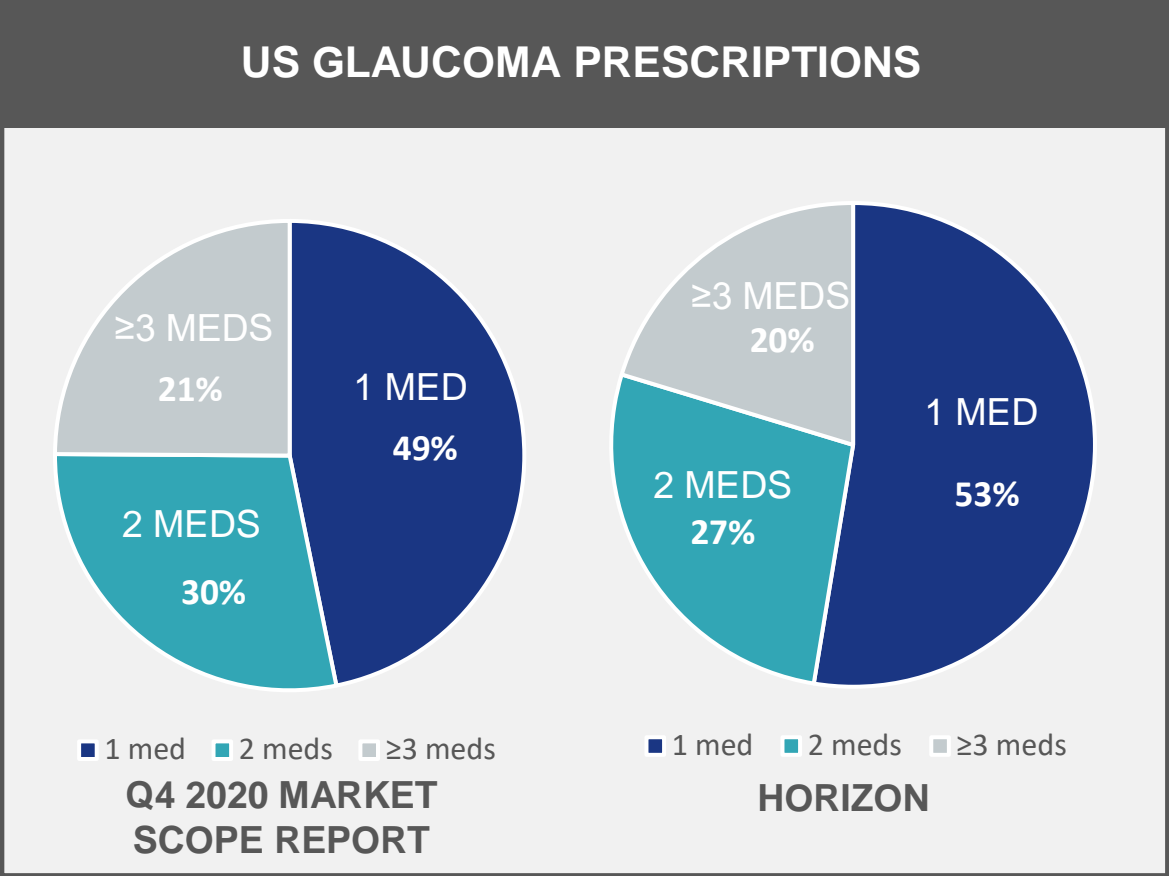
## MEDICATION FREE 0-60 MONTHS

*Durable effect through 5 Years*





# Drop Elimination in the 1 Med Patient

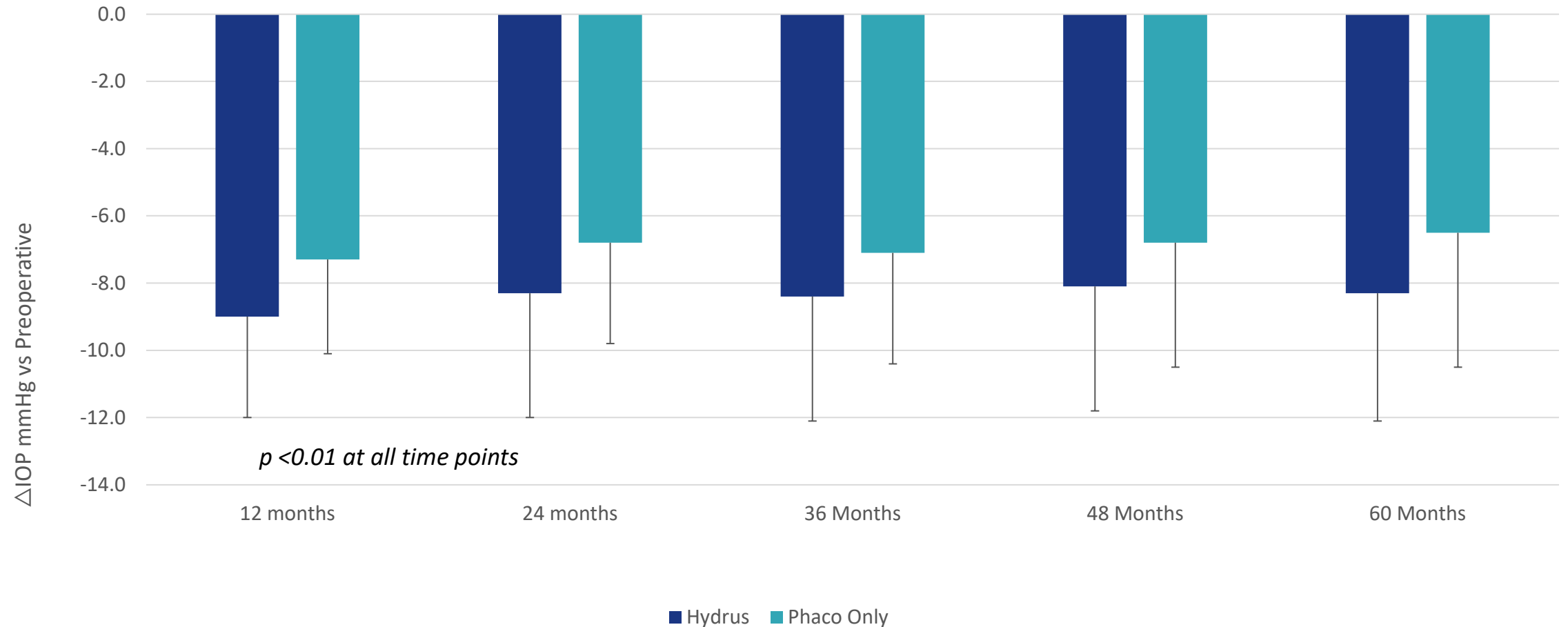


Remain drop-free 5 years after surgery

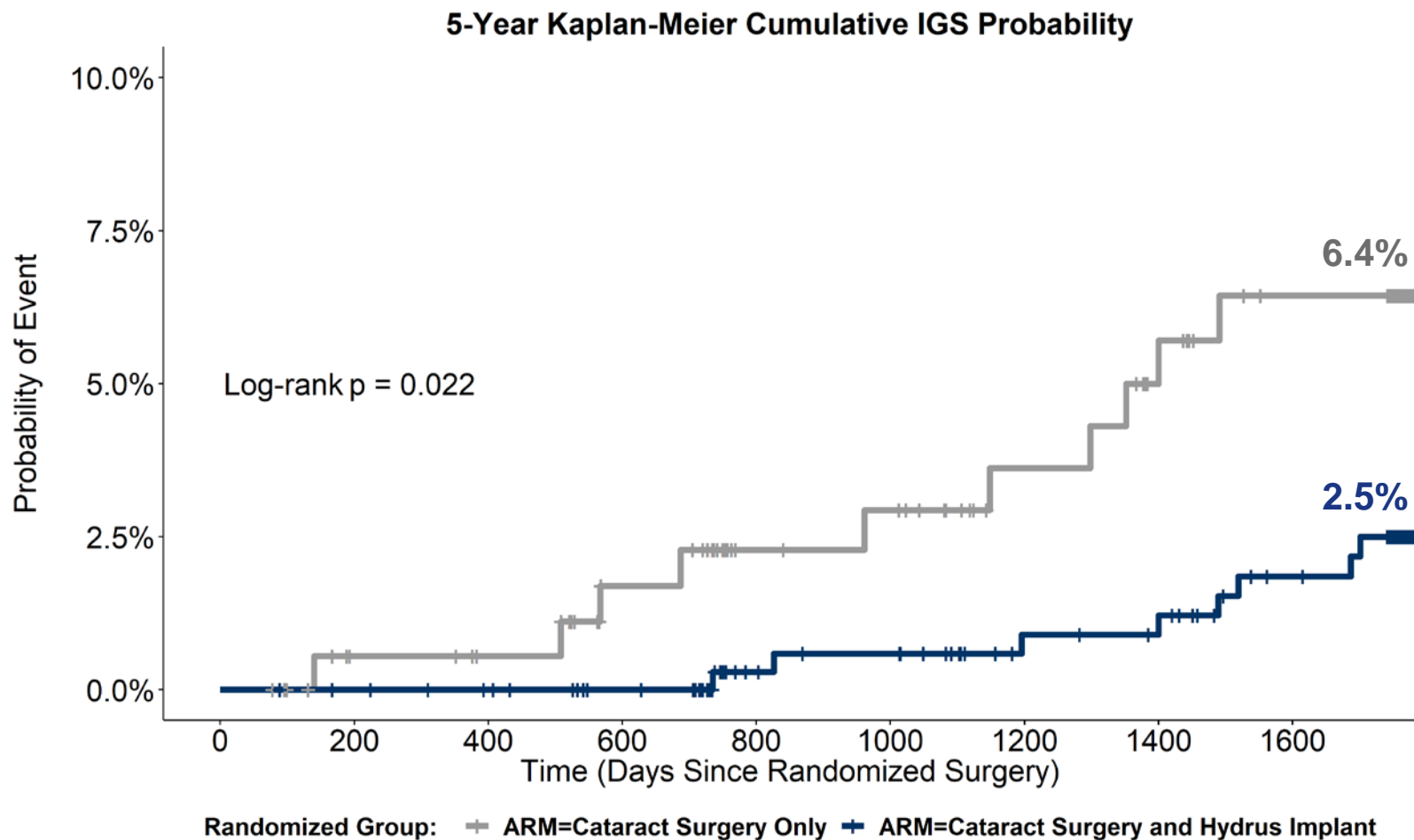
# HORIZON Trial: Durable IOP Reduction

5 Year follow up in randomized cohort N=556\*

Reduction in IOP vs. Baseline – Medication Free Eyes



# Key Finding: Reduced Risk of Reoperation<sup>1</sup>



Incisional Glaucoma Surgery:

- Trabeculectomy,
- Tube shunt,
- Cilioablative procedure

**61% Reduction in Risk of SSIs in eyes treated with Hydrus**

**Two-thirds of the patients who had an IGS were mild at baseline (Visual Field MD better than -6 dB)**

# Safety<sup>1</sup> – Few Changes from Year 2 to 5

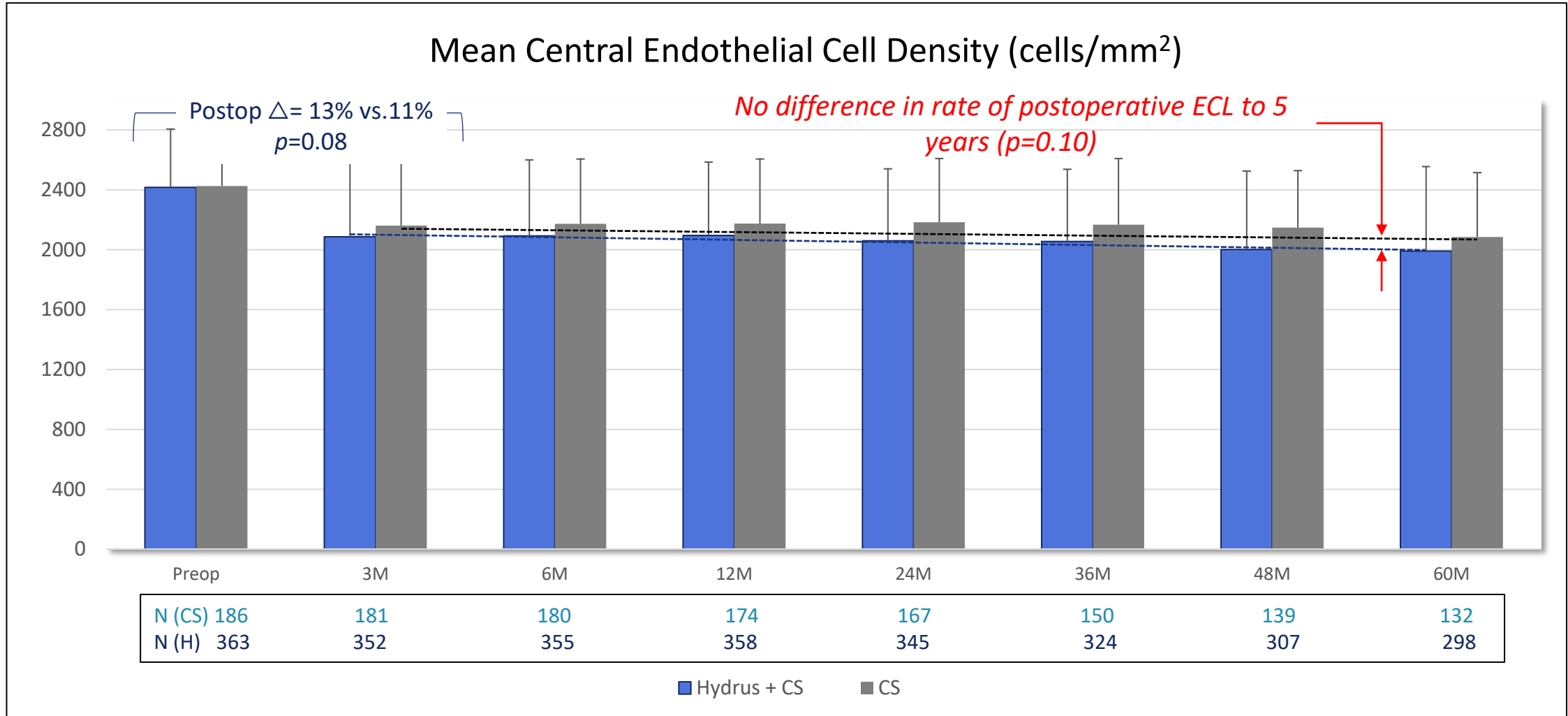
Post Operative Events	Cumulative to 2 Years		Cumulative to 5 Years	
	HYDRUS MS (N=369)	CS Only (N=187)	HYDRUS MS (N=369)	CS Only (N=187)
<b>IOP related events –</b>				
IOP elevation (≥ 10 mmHg, >30D)	0.5%	2.7%	0.8%	2.7%
Hypotony ≤ 6 mmHg ≥ 1 month	0	0	0	0.5%
<b>Loss of BCVA ≥ 2 lines after 3 months</b>	1.4%	1.6%	1.9%	2.1%
<b>Loss of HVF Mean Deviation ≥ 2.5 dB</b>	4.3%	5.3%	8.4%	9.6%
<b>Focal PAS –</b>				
Obstructive	3.5%	0	5.4%	0
Non – obstructive	7.3%	2.1%	8.7%	3.7%
<b>Corneal edema – Severe ≥ 1 day</b>	0.5%	0.5%	0.5%	0.5%
<b>Persistent Inflammation*</b>	0.5%	2.1%	0.5%	2.1%

Note: PAS observation based on gonioscopic appearance not IOP

Layered hyphema rates >2mm after 1 day was 0.5% in both Hydrus+CS and CS only arms

\*Inflammation lasting >3m postoperatively or recurring <3m after cessation of steroids

# ECD Findings



Error bars are standard deviation

# 2020 AAO Preferred Practice Pattern for POAG

Primary Open-Angle Glaucoma PPP

## GLAUCOMA PREFERRED PRACTICE PATTERN® DEVELOPMENT PROCESS AND PARTICIPANTS

The **Glaucoma Preferred Practice Pattern® Panel** members wrote the Primary Open-Angle Glaucoma Preferred Practice Pattern® guidelines (PPP). The PPP Panel members discussed and reviewed successive drafts of the document, meeting in person twice and conducting other review by e-mail discussion, to develop a consensus over the final version of the document.

### Glaucoma Preferred Practice Pattern Panel 2019-2020

Steven J. Gedde, MD, Chair

Kateki Vinod, MD

Martha M. Wright, MD, American Glaucoma Society Representative

Kelly W. Muir, MD

John T. Lind, MD

Philip P. Chen, MD

Tianjing Li, MD, MHS, PhD, Consultant, Cochrane Eyes and Vision Group

Steven L. Mansberger, MD, MPH, Methodologist

*We thank our partners, the Cochrane Eyes and Vision US Satellite (CEV@US), for identifying reliable systematic reviews that we cite and discuss in support of the PPP recommendations.*

## Hydrus Microstent Receives Highest Designation of ANY MIGS Device As Part of AAO Treatment Guidelines

### HYDRUS Microstent

- Evidence Level: I
- **Evidence Quality: Moderate**
- Benefit / Risk assessment: **Strong**

*2020 is the **first year** any MIGS procedure has carried a recommendation  
Hydrus, Xen and iStent Inject are the only MIGS procedures recommended  
All other MIGS not recommended due to lack of sufficient evidence.*



AMERICAN ACADEMY™  
OF OPHTHALMOLOGY

# Summary

- There were no significant long-term differences in safety between the Hydrus combination procedure and the phaco-only procedure
- We found a sustained difference between groups in IOP reduction and the use of medications over 5 year follow up
- Kaplan Meier survival analysis showed a reduction in risk of further incisional glaucoma surgery in the Hydrus group. This is the first reported *clinical benefit* associated with a MIGS procedure.
- These two findings are very likely related:
  - Medication non-adherence is associated with progression
  - Surgical procedures reduce diurnal fluctuation in IOP compared to topical eyedrops