

# Evaluating Compliance in Glaucoma Treatment: A Big Data Analysis of Prescription Patterns and Influencing Factors

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## INTRODUCTION

- Glaucoma is a leading cause of irreversible blindness worldwide.
- Noncompliance with anti-glaucoma eye drop therapy remains a significant challenge, often leading to disease progression and vision impairment.
- Understanding the factors influencing compliance is crucial for developing targeted interventions to improve patient outcomes.

## OBJECTIVES

- To evaluate compliance with anti-glaucoma eye drop medications in a large health service cohort.
- Focus on prescription patterns.
- Identify patient-, medication-, and environment-related factors affecting compliance.

## METHODS

- Study Design:** Population-based big data analysis using Maccabi Health Services electronic medical records.
- Inclusion Criteria:** Patients  $\geq 18$  years with a diagnosis of glaucoma.
- Exclusion Criteria:** Glaucoma diagnosed after study period,  $< 1$ -year follow-up, no eye drop purchases.
- Outcome Measures:**
  - Compliance Rate:** % of fulfilled prescriptions out of total prescriptions per patient-year.
  - Compliance Failure:** Unfulfilled prescriptions at 1-, 2-, and 3-month gaps.
  - Impact of Repeated Noncompliance:** Assessing failure in 1, 2, or 3 consecutive prescriptions.
- Statistical Analysis:**
  - Linear regression:** Evaluated compliance rates adjusting for confounders.
  - Cox regression:** Assessed hazard ratios for compliance failure based on clinical and demographic factors.

## RESULTS

### Cohort Analysis:

- Initial: 109,425 glaucoma-diagnosed patients (aged  $\geq 18$  years).
- 40,200 (50.4%) had at least one prescription purchase.
- Most patients fulfilled  $> 80\%$  of prescribed medications within a 3-month prescription gap.

### Factors Increasing Compliance:

- Age  $\geq 70$  years.
- Higher socioeconomic status.
- Additional comorbidities.
- Higher IOP at diagnosis.
- Frequent IOP checks ( $\geq 2$ /year) improved prescription fulfillment by  $+10\%$ .
- Usage of prostaglandin analogs and carbonic anhydrase inhibitors.

### Factors Reducing Compliance:

- Multiple medication alterations
- Fewer clinical visits, OCT scans, and visual field tests.
- High body mass index (BMI).
- Smoking.

### Prescription Patterns:

- Prostaglandin analogs were the most frequently prescribed and purchased medication.

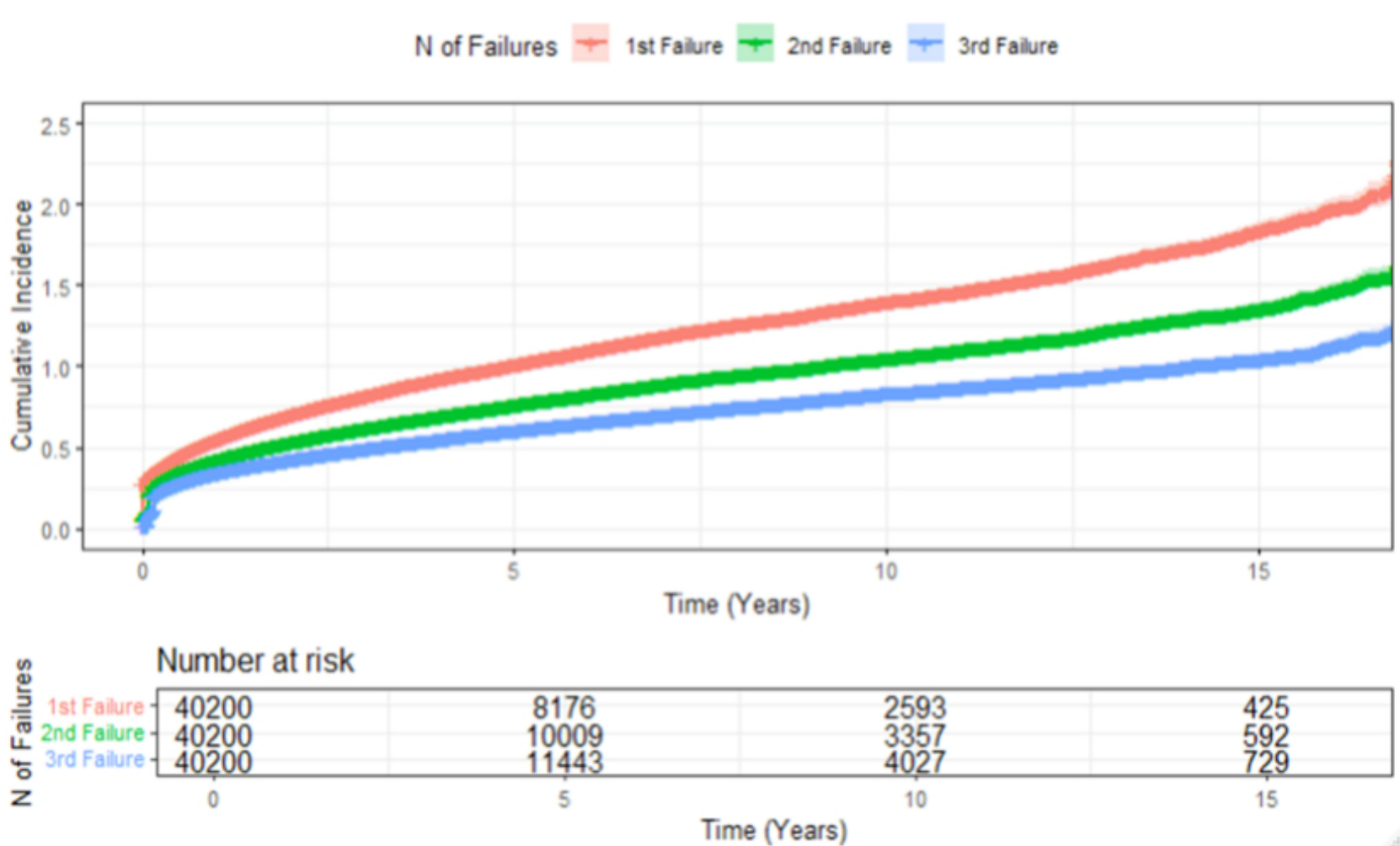
### Noncompliance Trends:

- Progressive decline in adherence over time.

Linear regression analysis for fulfilled prescriptions within 3 months of prescription date

Variable	Estimate	p-value
Age (Years)	$< 30$	1.00
	30-39	-1.38 0.21
	40-49	-0.10 0.92
	50-59	0.50 0.61
	60-69	1.20 0.21
Socio Economic Score (1-10)	$\leq 15$	1.00
	16-24	-0.45 0.13
	$\geq 25$	0.66 0.02
Smoking Status	Non Smoker	1.00
	Current Smoker	-1.30 0.00
First IOP (mmHg)	$< 15$	1.00
	15-19	0.93 0.00
	20-24	2.42 0.00
	$\geq 25$	3.95 0.00
IOP Measurement Frequency (per year)	$< 2$	1.00
	2-4	5.21 0.00
	$\geq 5$	10.20 0.00
OCT Frequency (per year)	0	1.00
	1	3.96 0.00
	2	3.58 0.07
	$\geq 3$	6.38 0.12
Visual Fields Frequency (per year)	0	1.00
	$\geq 2$	5.46 0.00
First Medication	Sympath.	1.00
	Para-Sympath.	-1.54 0.13
	CAI	1.11 0.02
	BB	-0.42 0.38
	PCA	1.75 0.00
Medication Alterations	0	1.00
	1	1.91 0.00
	$\geq 2$	4.46 0.00
	2	2.80 0.02
	$\geq 3$	

Cumulative incidence of compliance failure by 3 months



## CONCLUSIONS

- Glaucoma patients exhibit high compliance with therapy, influenced by age, health conditions, and clinical monitoring.
- Regular IOP monitoring, medication adjustments, and targeted follow-ups improve adherence.
- Targeted interventions should focus on patients with frequent treatment alterations and lower healthcare utilization.
- Special attention should be given to younger patients and those with a history of non-compliance.

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## CONTACT INFORMATION

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