



Module 2 Portfolio Assignment - Identifying a Digital and Virtual Health Solution: The *iCare HOME2 Tonometer* for Diagnosis and Remote Monitoring of Glaucoma

Adam M. Lang

University of Denver University College

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Faculty: Matt Vestal, M.H.A.

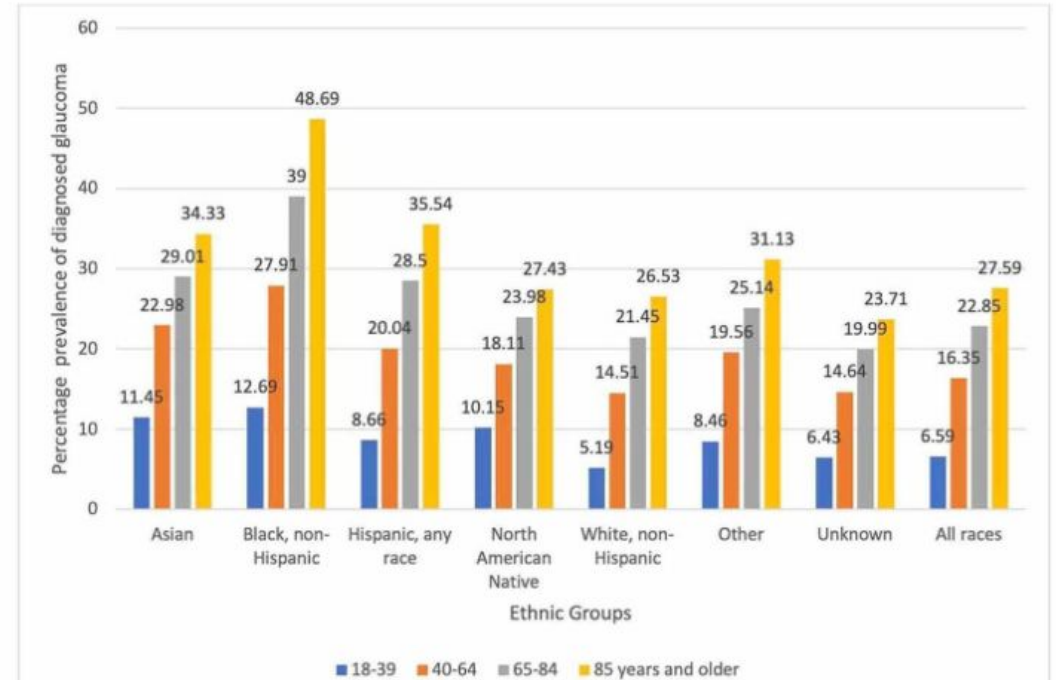
Director: Jeffrey Weide, DBA

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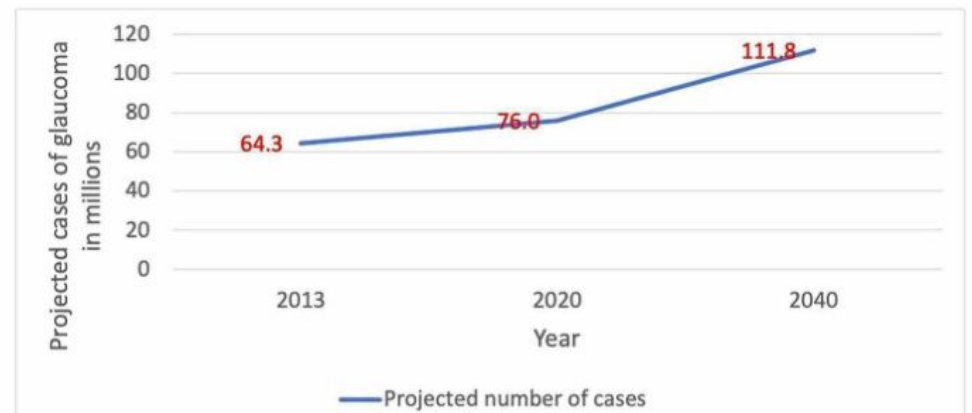
Glaucoma - Population Health + Health Equity

- ▶ #1 cause of irreversible blindness worldwide
- ▶ POAG - 57.5 million worldwide (Allison et al, 2020)
- ▶ Effect 112 million people by 2040!!
- ▶ Health Inequity by Population
 - ▶ African American - 5.6% -> 15%
 - ▶ Hispanic/Latino - 4.7% -> 18%
 - ▶ Non-Hispanic WHITE- 1.7% -> 7%
 - ▶ Asian -> 5% (PACG)
 - ▶ Men 36% higher than Females
 - ▶ Diabetes Mellitus
 - ▶ Age 65+ years
 - ▶ Family History

Attachment H: Age-specific prevalence of diagnosed glaucoma by ethnic groups in 2018



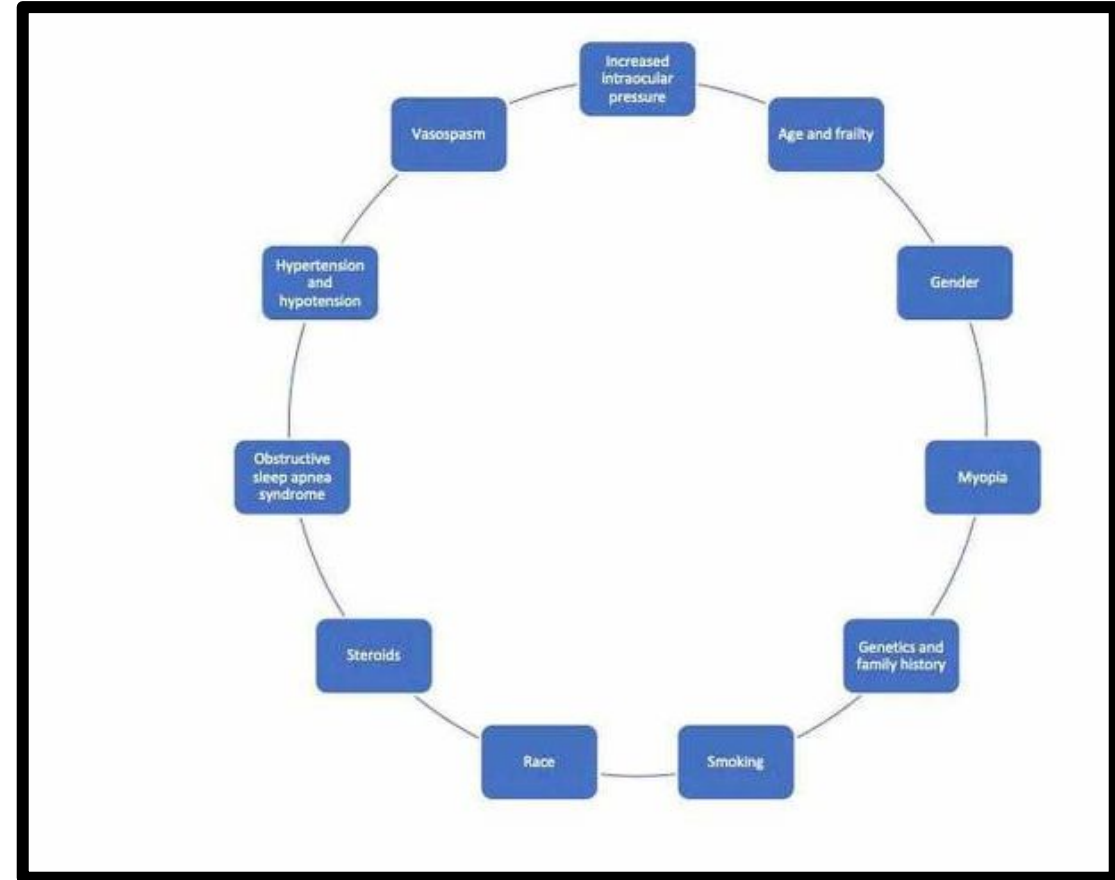
Attachment D: Projected Prevalence of Glaucoma



Glaucoma - Economic Burden + Risk Factors

Economic Burden of Glaucoma - USA

- ▶ American economy: \$2.9 billion
- ▶ Treating/preventing glaucoma per year: \$5.8 billion
- ▶ Annual medical cost of glaucoma projection:
 - ▶ \$12 billion by 2032
 - ▶ \$17.3 billion by 2050

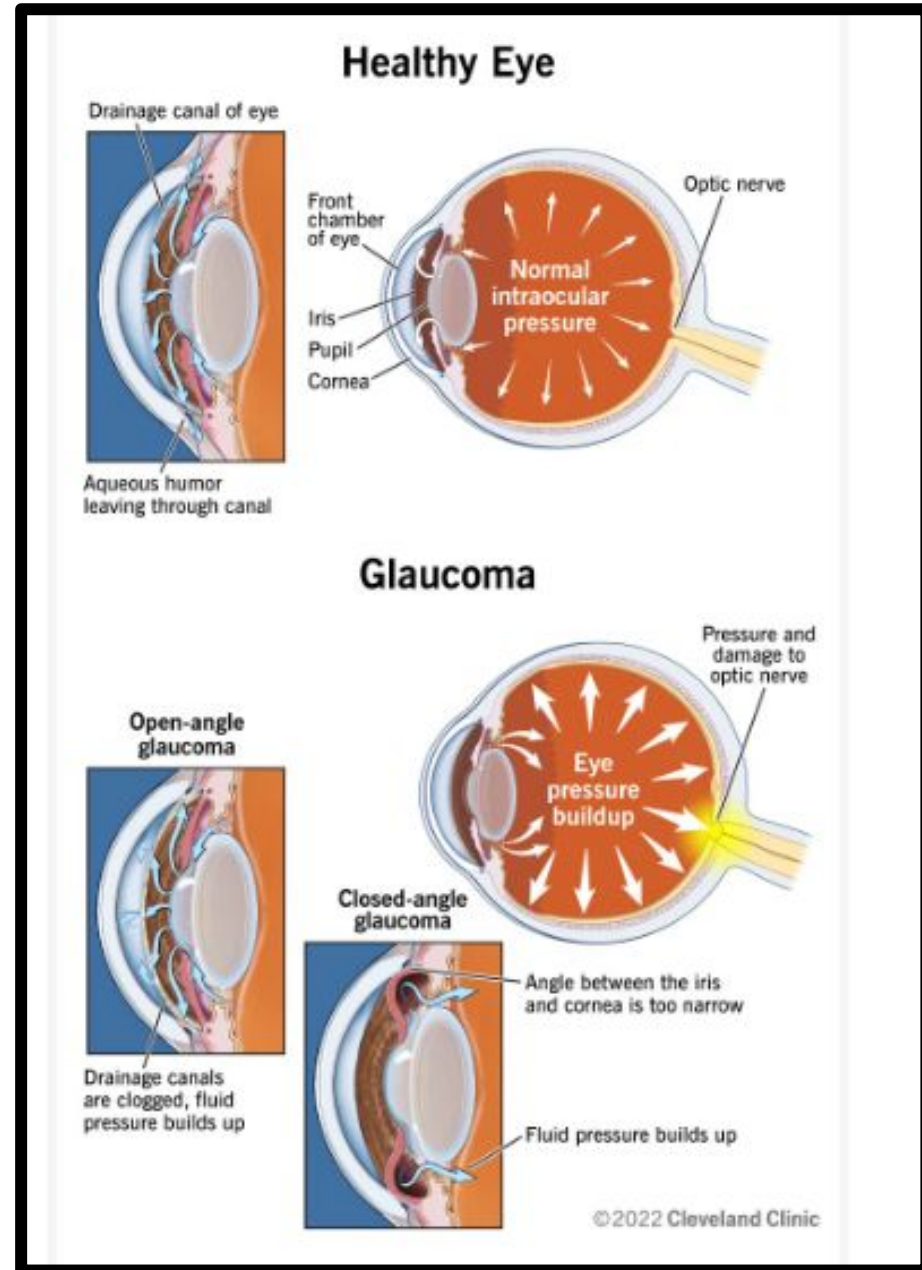


Glaucoma Risk Factors (Allison et al, 2020)

- How many of these are SDOH?
- How many of these already contribute to US healthcare economic burden?
- How many of these are preventable risk factors via digital health intervention?

Glaucoma - Pathophysiology

- ▶ Anterior eye filled with a clear fluid (aqueous humor).
- ▶ Fluid is made behind the Iris and leaves through channels where the iris and cornea meet
 - ▶ “Anterior chamber angle” or “The Angle”
- ▶ Slowing or blocking aqueous humor flow => intraocular pressure



Glaucoma - Pathophysiology

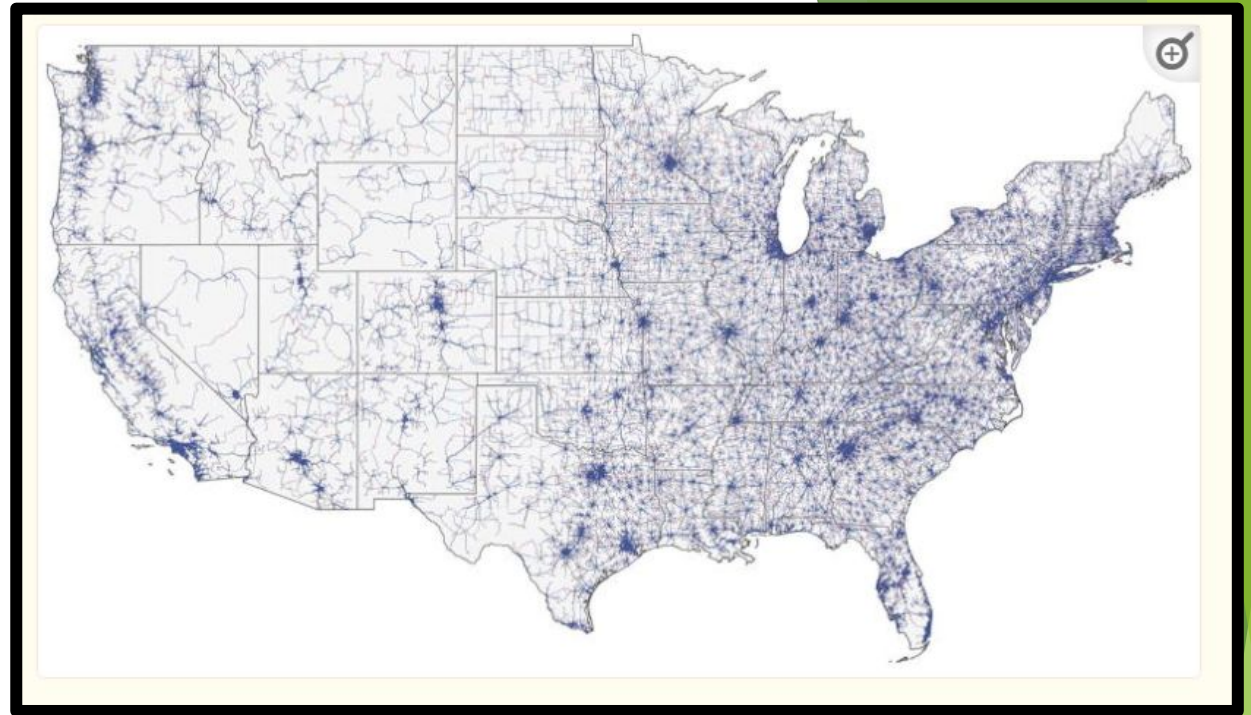
<u>Open-Angle glaucoma</u>	<u>Angle-Closure glaucoma</u>
Caused by inter ocular pressure	Caused by inter ocular pressure
Develops slowly	Develops quickly
Don't have noticeable symptoms	Noticeable Symptoms.

Shehryar et al. 2014

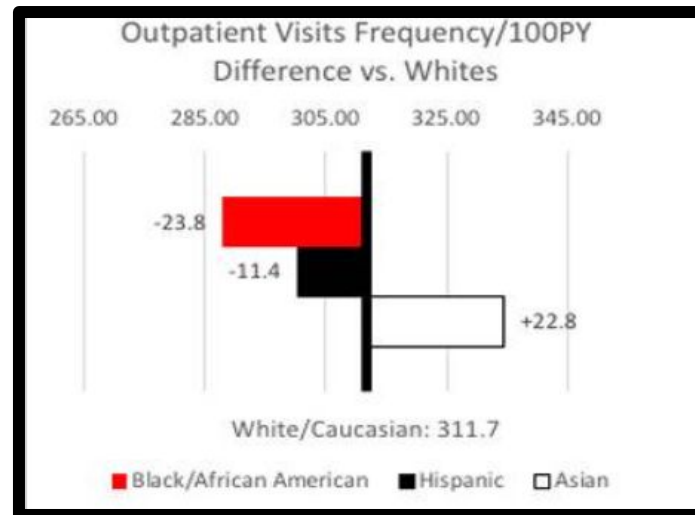
- ▶ Glaucoma Classification:
 - ▶ Primary (idiopathic)
 - ▶ **Open-Angle (9 in 10 in USA!!!)**
 - ▶ **Angle Closure**
 - ▶ Normal-Tension
 - ▶ Congenital
 - ▶ Secondary (known cause)
 - ▶ Neovascular
 - ▶ Pigmentary
 - ▶ Exfoliation
 - ▶ Uveitic

Why did I choose this?

- ▶ “Teleglaucoma” has become common for diagnosis + monitoring IOP (Ertel et al, 2021)
- ▶ Why? Socioeconomics/SDOH/DDOH
 - ▶ **Transportation/Geography**
 - ▶ **Number of Eye Specialists**
 - ▶ Insurance
 - ▶ Education + Adherence
- ▶ Why? Racial Inequity
 - ▶ Black and Hispanics
 - ▶ Less outpatient eye exams
 - ▶ Less preventative screenings



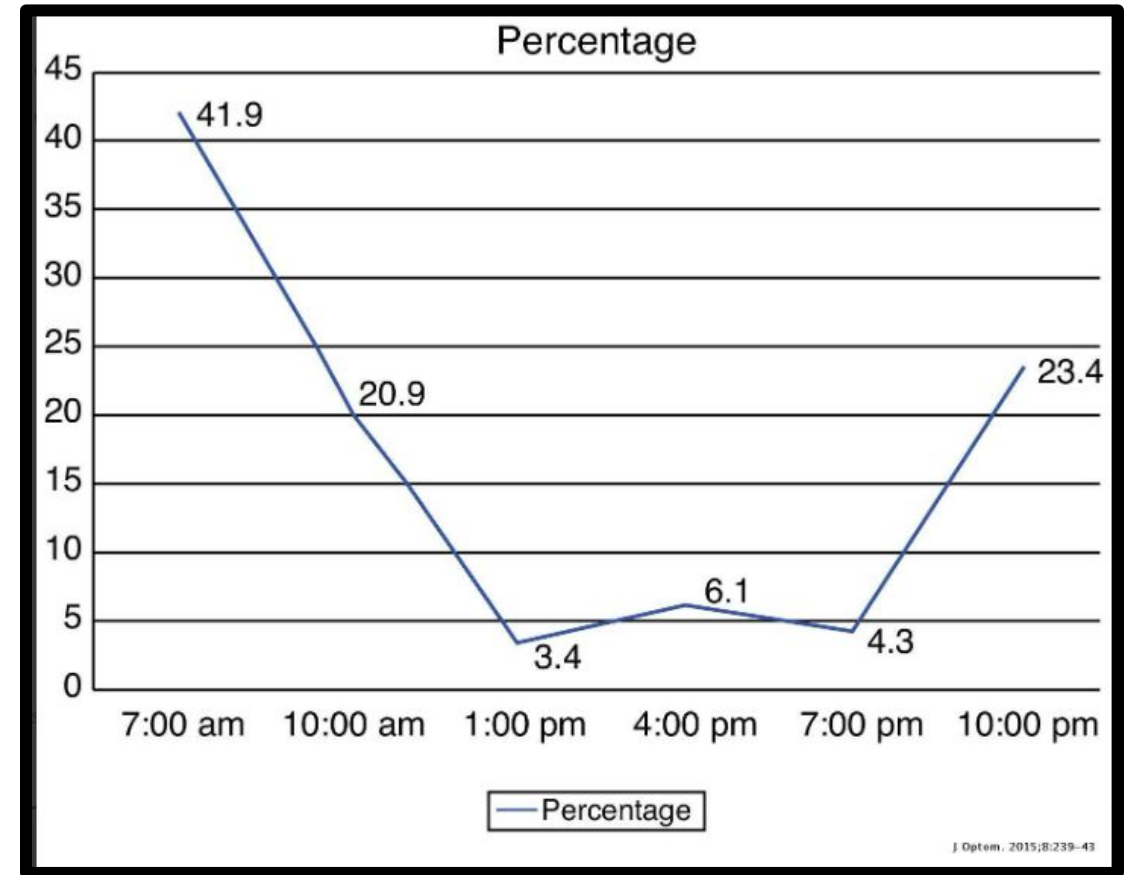
Source: Lee et al, 2016



Source: Halawa et al, 2022

Tonometry for Diurnal Variations

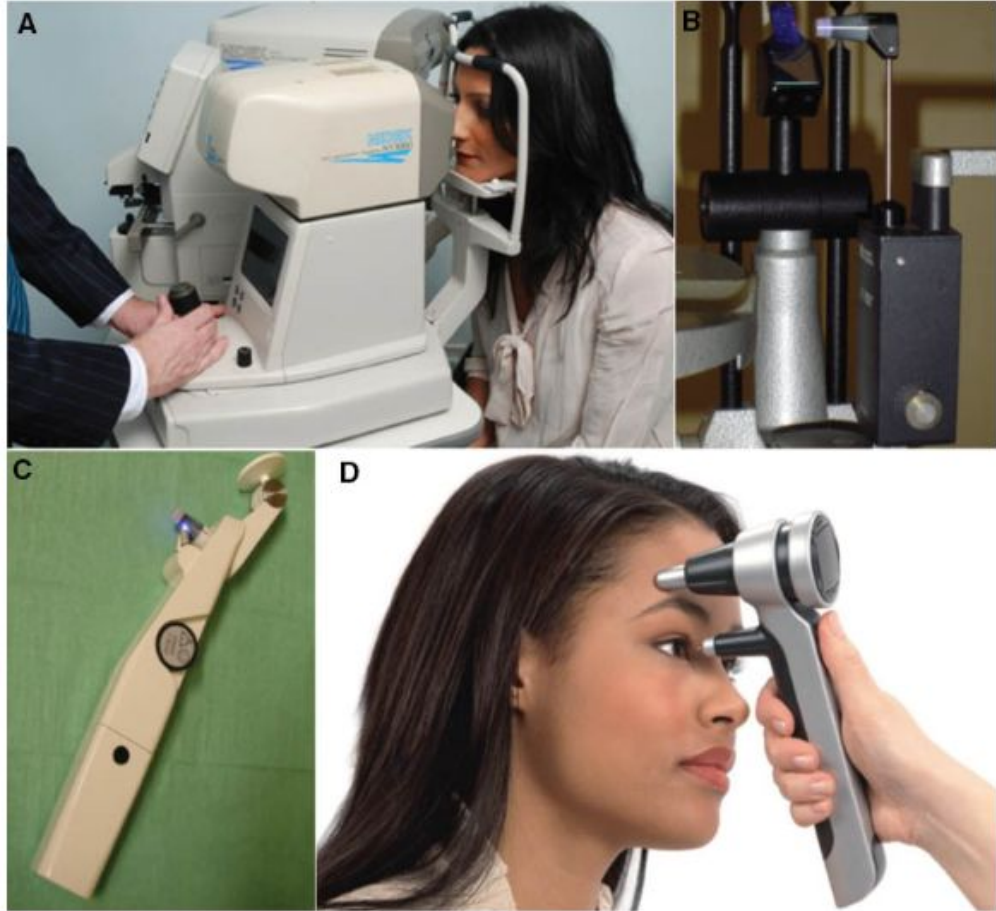
- ▶ IOP measures variation:
 - ▶ Circadian rhythms
 - ▶ Diurnal Variations
- ▶ Majority IOP spikes are outside of normal 8am-5pm clinic visits
- ▶ Patients evaluated every 3-4 months!!!
 - ▶ 50% of glaucoma is undiagnosed!



Source: Arora et al, 2015

Tonometry - Issues

- ▶ Non-Contact Tonometer
- ▶ Goldmann applanation
- ▶ Perkins applanation
- ▶ iCare (early version)
 - ▶ “Rebound tonometer”



iCare HOME2 - Overview

New Device, New Features!

iCare Home 2

- 1) Recline or Upright Testing
- 2) Screen Prompts
- 3) Easy Menu System
- 4) iPhone and Android App (Bluetooth)



Position freedom in 200°

With iCare HOME2, measurements can be made in a supine, reclined or sitting position. Taking supine measurements at night and in the morning can provide a full picture of IOP fluctuations.



1. Multiple positions for use
2. Informs patient of correct eye position

Source: iCare, 2023



The smart light guide assists the patient in finding the correct measurement distance and alignment. The device screen and the sound notifications provide further assistance. The patient is guided to make a quality measurement every time.

Source: Digital Glaucoma, 2023

iCare HOME2 - Real-Time Data



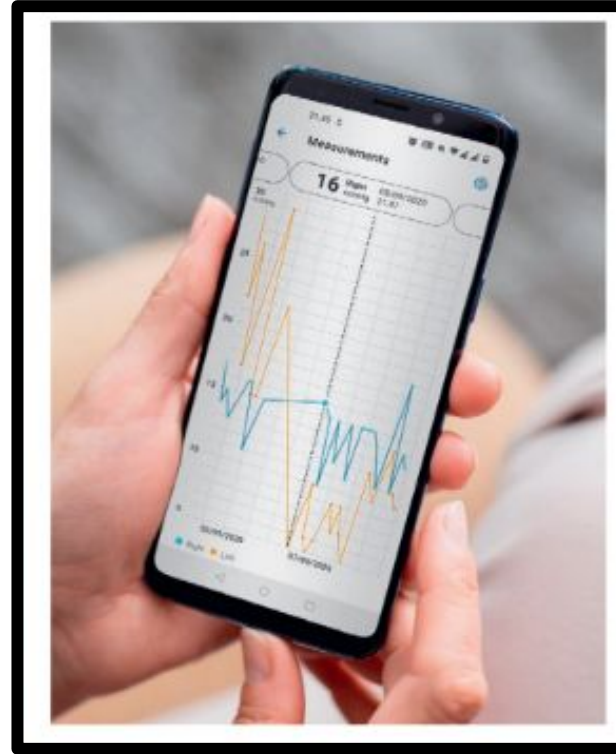
iCare CLINIC is the heart of the iCare HOME2 solution providing ample data review and reporting options. iCare CLINIC is available both as a cloud based and on-premises solution.



iCare PATIENT2 is a smart phone app for transferring IOP data to iCare CLINIC. For patients, iCare PATIENT2 provides easy access to their IOP measurement history with Android or iOS mobile devices.



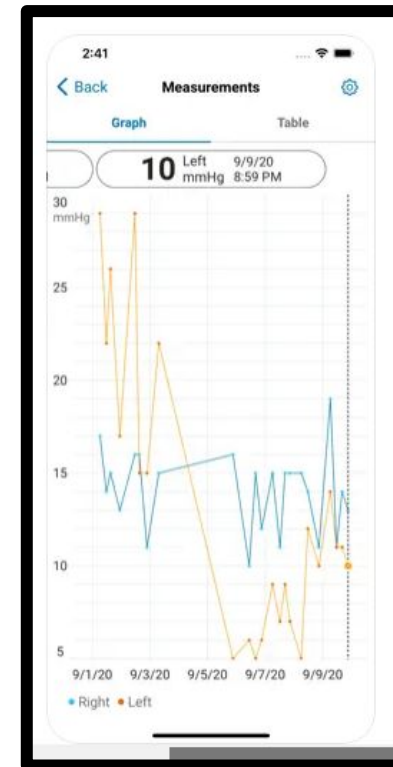
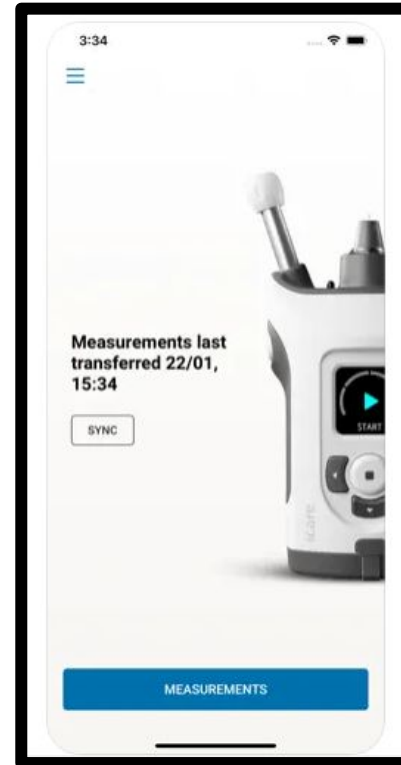
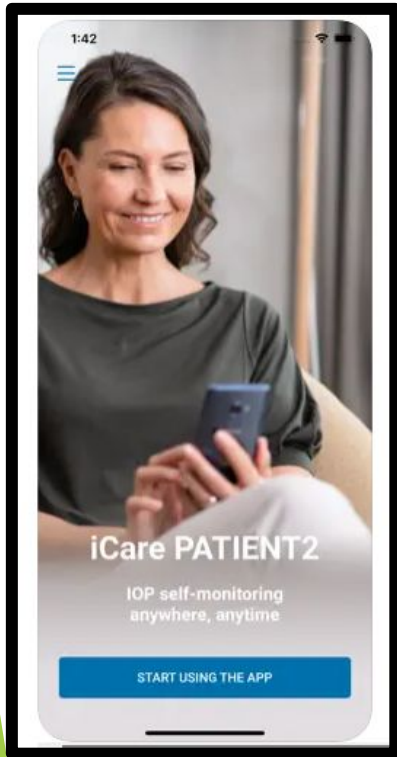
iCare EXPORT allows IOP measurements made with iCare HOME, HOME2 or IC200 to be uploaded to iCare CLINIC using a PC. iCare EXPORT also provides basic IOP data viewing and reporting functions.



- iCare CLINIC (cloud or desktop)
- iCare PATIENT2 (mobile app)
- iCare EXPORT
- ***internet connection needed for all technical components!!!!***

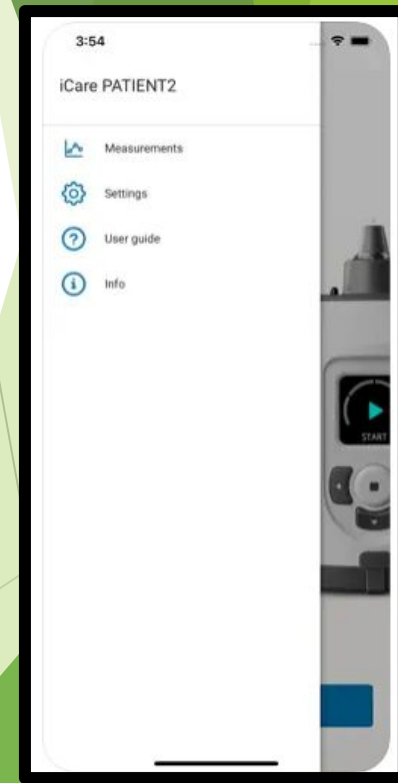
- iCare PATIENT2 mobile app
- Android compatible (v6+)
 - iOS (iPhone) compatible (v12+)

iCare HOME2 - Mobile App User Interface



The app's measurements table. It shows a list of measurements with columns for Time and IOP mmHg. The table is filtered for September 2020. A blue button at the bottom is labeled "MEASUREMENTS".

Time	IOP mmHg
WED 9 8:59 PM	13 Right
8:59 PM	10 Left
3:57 PM	14 Right
3:57 PM	11 Left
11:23 AM	11 Right
11:23 AM	11 Left
6:11 AM	19 Right
6:11 AM	14 Left
TUE 8 8:42 PM	11 Right
8:42 PM	10 Left
11:28 AM	14 Right
11:28 AM	12 Left



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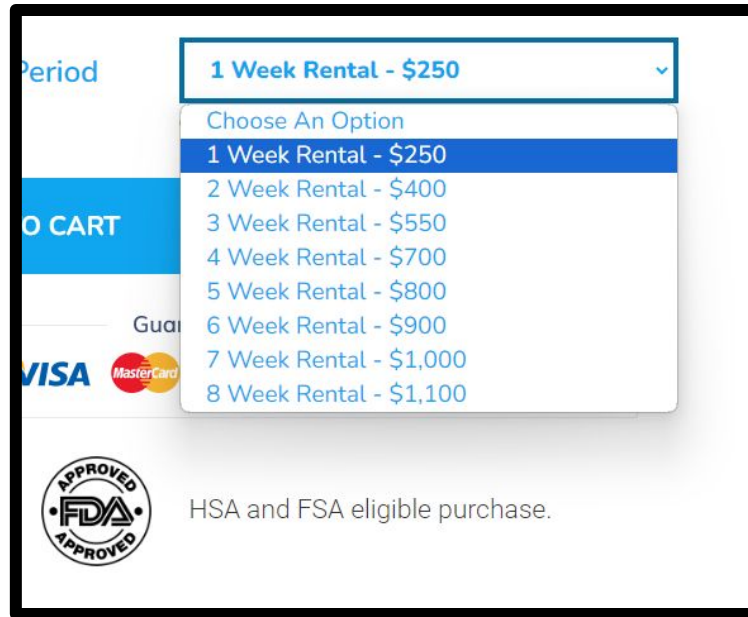
(Future slides)

Positives

- ▶ Easy to use
- ▶ Teach Remotely
- ▶ Real-time results -> mobile phone
- ▶ Health Equity Equalization
- ▶ Diagnosis + Precision Treatments
- ▶ Medication Adherence
- ▶ Population Reach
 - ▶ Rural
 - ▶ Urban
 - ▶ Socioeconomics
 - ▶ Racial Disparity

Negatives

- ▶ **Cost!!!!!!!!!!!!!!!**
- ▶ Socioeconomic bias?!
- ▶ Technical demands
 - ▶ Internet
 - ▶ Bluetooth
 - ▶ Mobile Phone
- ▶ FDA 501(k) clearance
 - ▶ More likely to recall?
 - ▶ Less likely to be approved by insurance?



Source: myeyes.net, 2023


NOW AVAILABLE!
iCare HOME2 Tonometer

The iCare HOME2 tonometer for patient use revolutionizes glaucoma care. The patient can take IOP measurements during normal daily activities throughout the day and the iCare HOME2 can even be used when the patient is lying down. Measurement results are uploaded to a cloud database from where they are easily accessible both to the doctor and the patient. The doctor is provided with accurate real world IOP data to support treatment decisions.

Please note that a prescription from your doctor is required for purchasing this device.

~~\$3,495.00~~ **\$2,995.00**

ADD TO CART

 HSA and FSA eligible purchase.

Source: myeyes.net, 2023