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Citation: Campbell, P. & Callaghan, T. (2022). Acceptability of home-based visual field testing for glaucoma monitoring: Accuracy and reliability data. Paper presented at the 24th international meeting of the Imaging and Perimetry Society, 10-13 Aug 2022, Berkeley, California..

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Adherence, accuracy, and reliability of home-based visual field testing for glaucoma monitoring

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Financial disclosures



This work is supported by:

- Glaucoma UK/INTERNATIONAL GLAUCOMA ASSOCIATION Research Award
- An earlier project grant from Fight for Sight charity
- UK Research and Innovation Grant



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Visual Field testing

Detecting
Progression

Capacity

COVID-19

HOME
MONITORING

Icare® HOME
tonometer



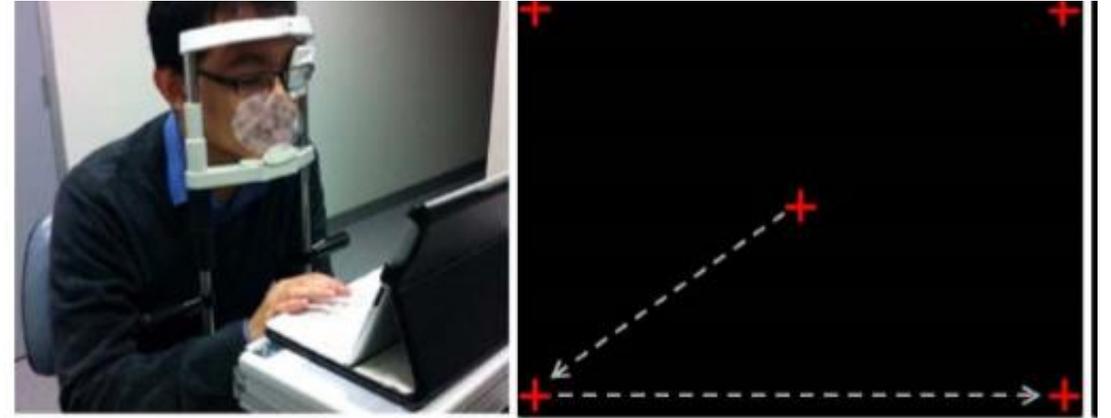
Practical recommendations for measuring rates of
visual field change in glaucoma

B C Chauhan,¹ D F Garway-Heath,² F J Goñi,³ L Rossetti,⁴ B Bengtsson,⁵
A C Viswanathan,² A Heijl⁵

Home visual field testing

- Tablet-based devices and head mounted displays have been developed
- They have been shown to approximate conventional SAP perimetry (HVF)

Melbourne Rapid Field Test



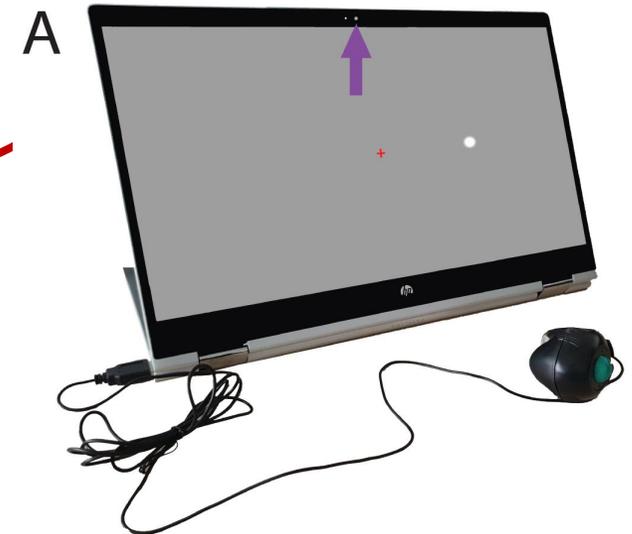
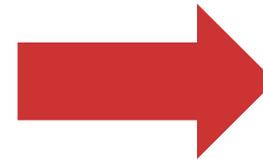
Vingrys, A.J., et al, 2016. Validation of a tablet as a tangent perimeter. *TVST*, 5(4)

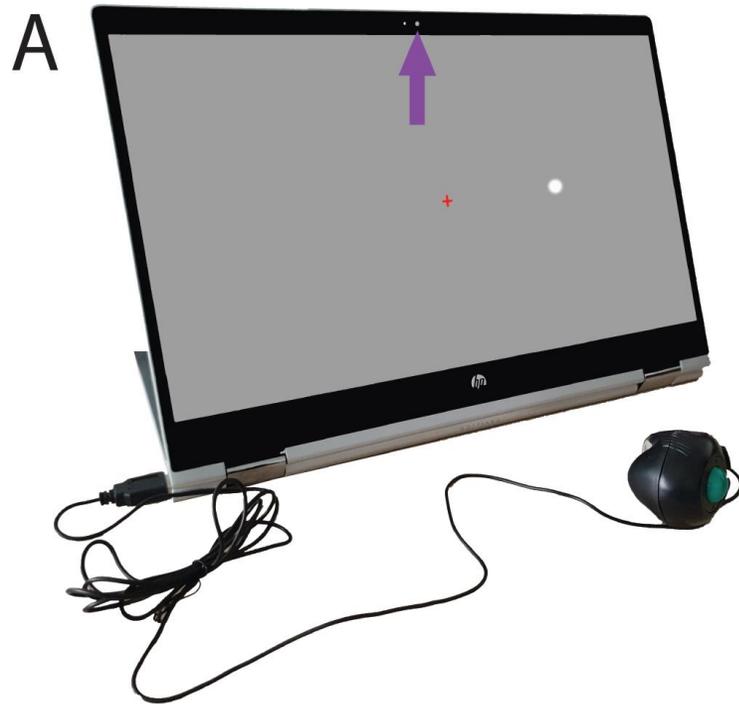


A. Head-mounted (i-H) type

Kimura, T et al ., 2019.
Comparison of head-mounted perimetry (imo[®]) and Humphrey Field Analyzer. *Clinical Ophthalmology*

- Since 2013 we have developed **Eyecatcher®**
- Designed to perform hospital grade visual field assessments at home





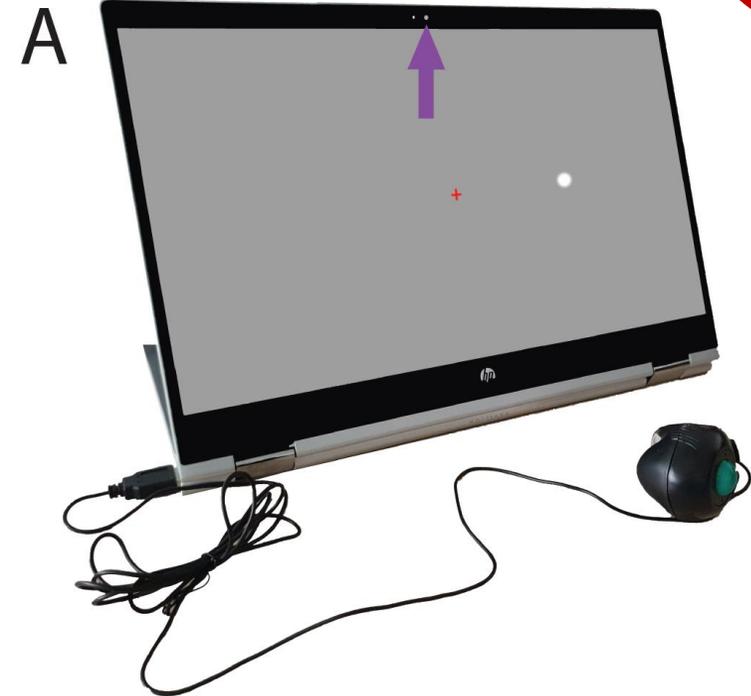
- “ZEST-like” thresholding algorithm, a central fixation cross, and a button press response.
- 4 x 6 grid corresponding to the central 24 locations of a standard 24-2 perimetric grid ($\pm 15^\circ$ horizontal; $\pm 9^\circ$ vertical).



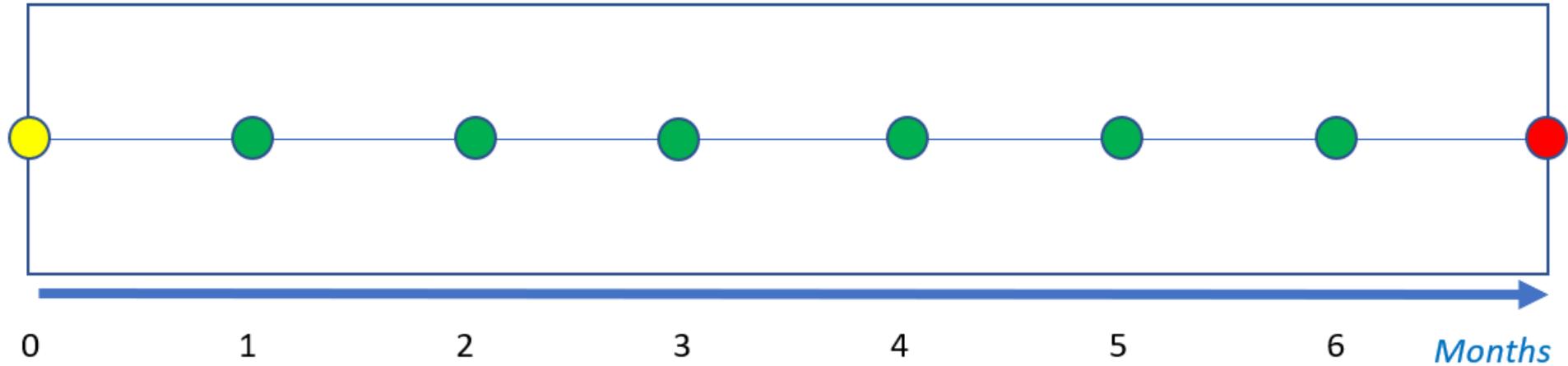


STUDY AIMS

- Are glaucoma patients willing to comply with a home-testing regime (**adherence**)?
- Do home perimeter continue to produce high quality VF data when operated at home, unsupervised (**accuracy**)?



Procedure



- 2 x HFA (24-2 SITA Fast) per eye

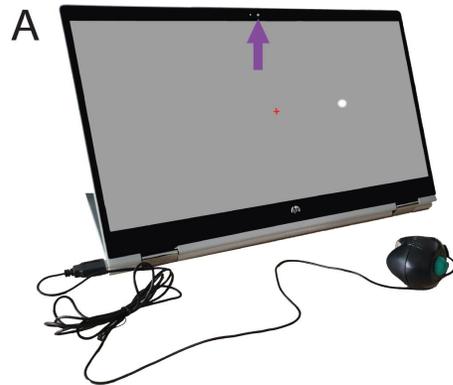


- Eyecatcher VF test both eyes at home



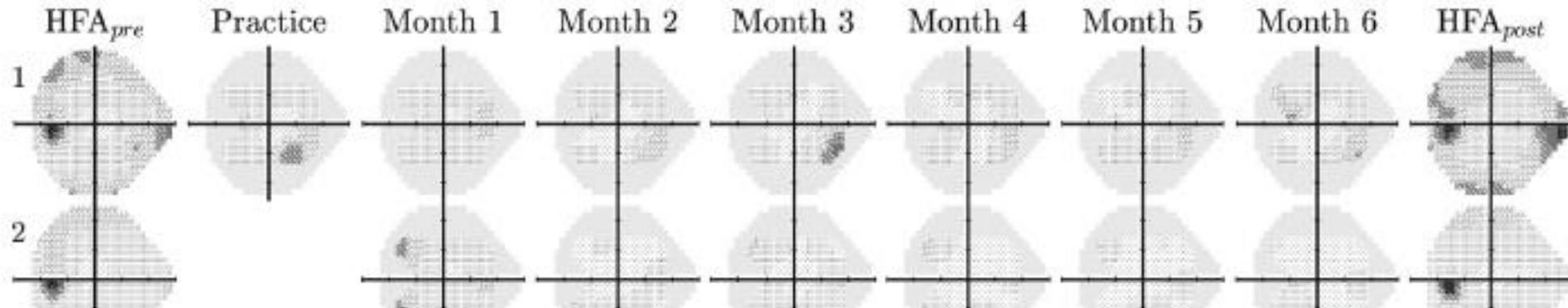
- 2 x HFA (24-2 SITA Fast) per eye and semi-structured interview

Results



- 20 glaucoma participants (median MD = -8.9dB)
- Adherence (percentage of tests completed) = 98.3%.

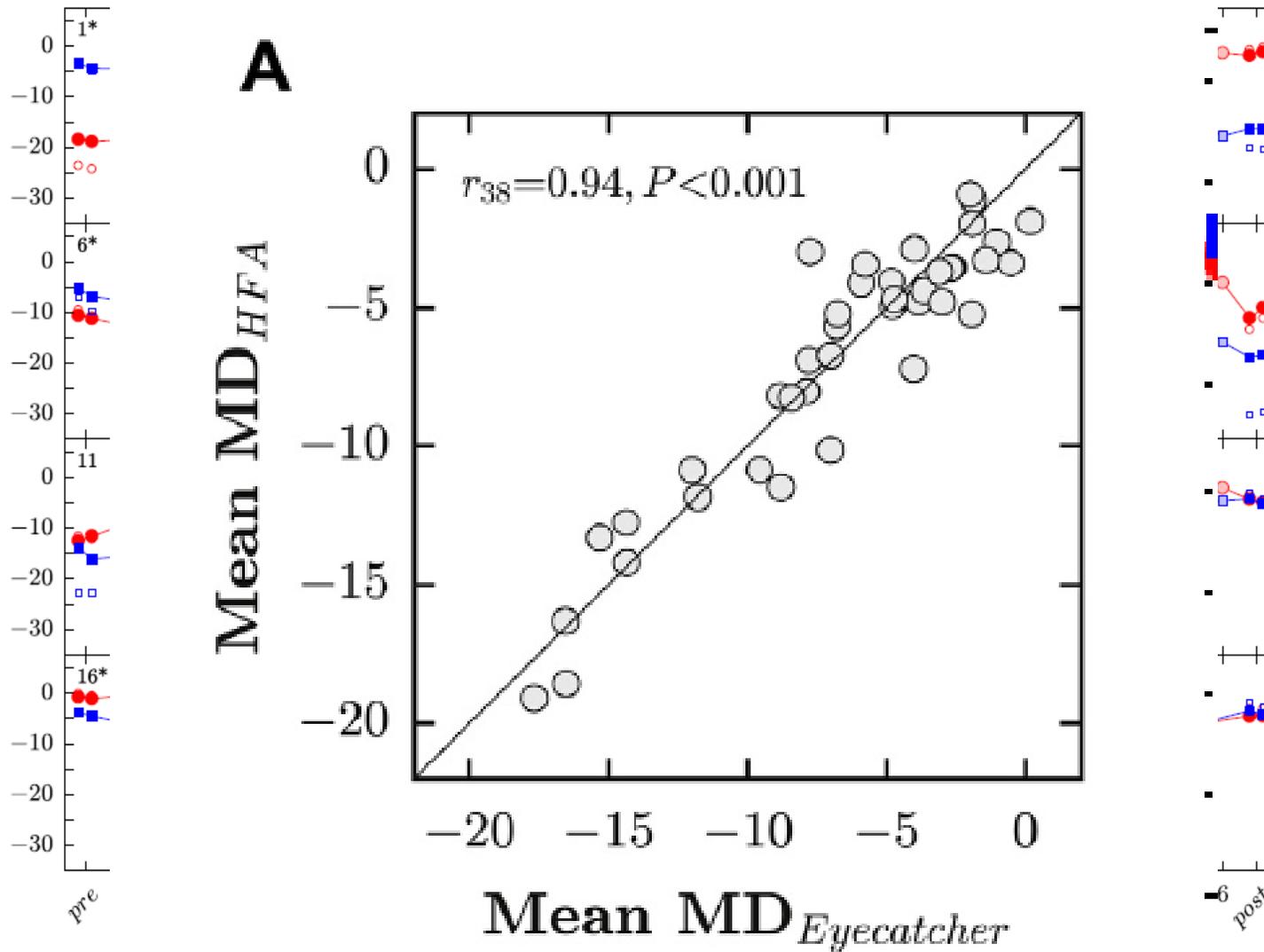
Repeatability of Eyecatcher[®] 2.0



- Good **concordance** between individual VF locations
- Pearson Correlation; $r = 0.86$, $P \ll 0.001$



Eyecatcher[®] 2.0 Accuracy



- Strong association ($p<0.0001$) between Eyecatcher (mean of 6 tests) and HFA (mean of 4 tests)
- Correlation $r = 0.94^*$

*Pearson Correlation; $P < 0.001$]

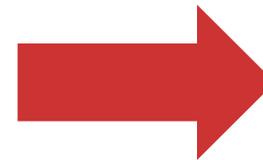
What we found



Jones, P.R., et al., (2021) Glaucoma home monitoring using a tablet-based visual field test (Eyecatcher) *AJO*

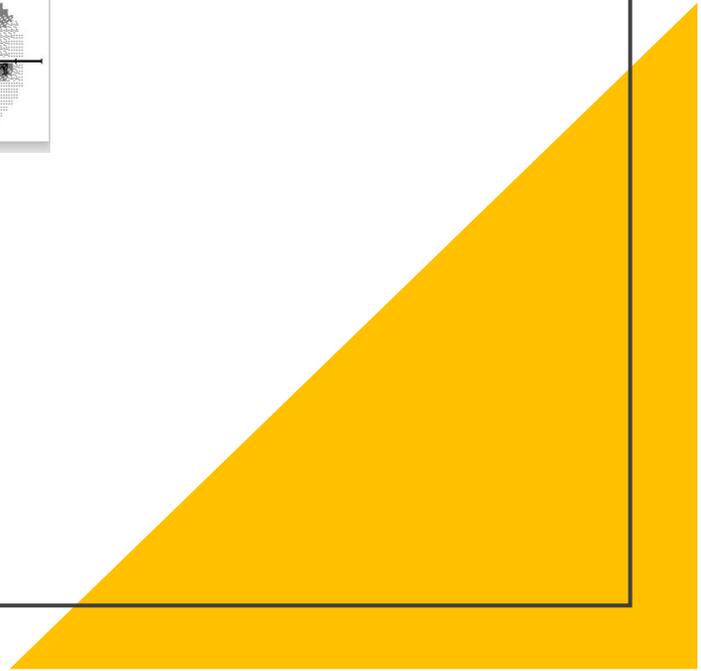
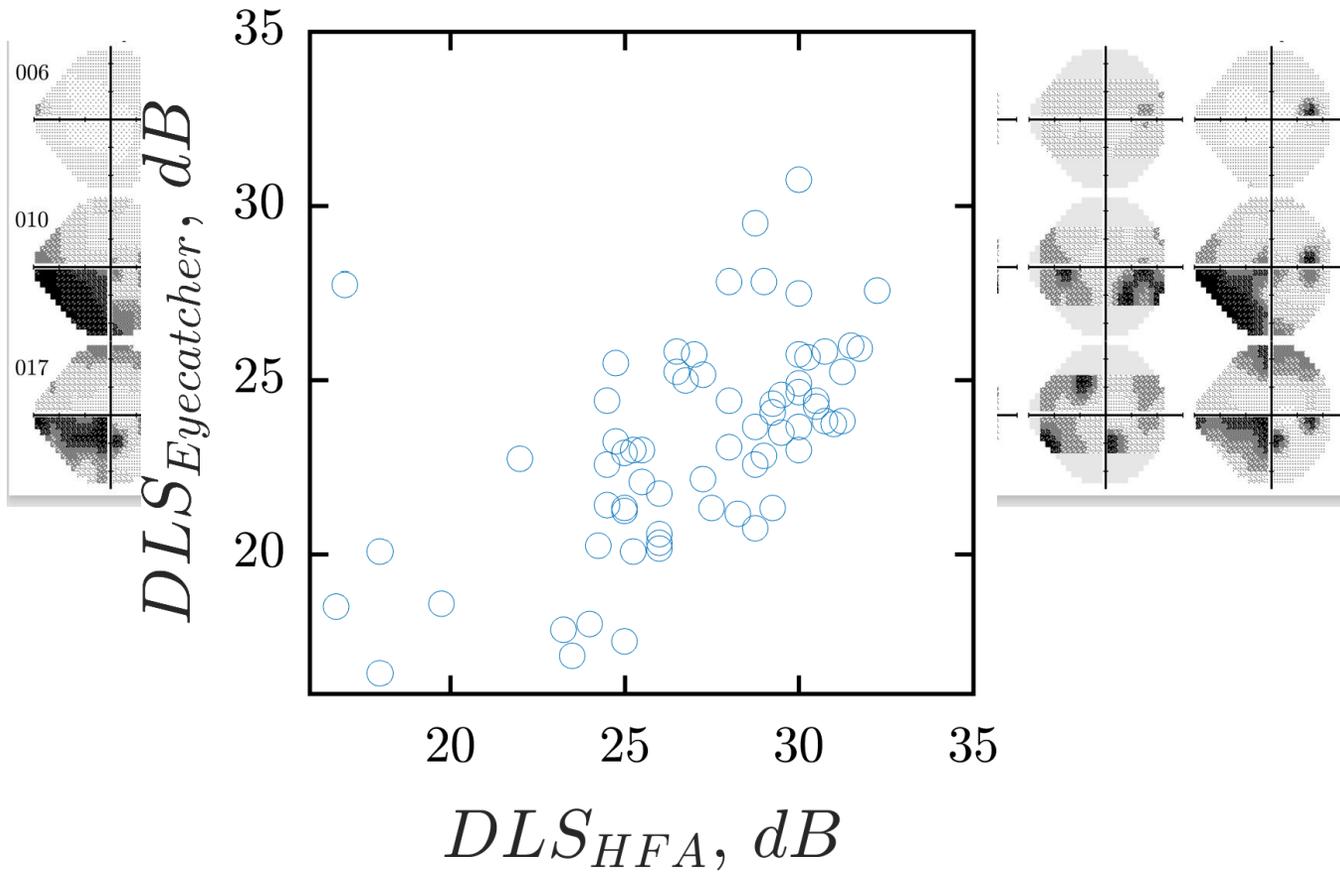
- Participants showed excellent adherence for home monitoring
- Data from 6 home-monitoring tests were in good agreement with 4 SAP tests conducted in clinic (accuracy).
- Home-monitoring of VFs is viable for some patients.

- Inexpensive (~£400) smartglasses, connected to an ordinary android smartphone
- Designed to address our findings and practical limitations highlighted





Repeatability and accuracy of Eyecatcher[®] 3.0



Limitations



- Paracentral vision was assessed
- How representative are participants of wider glaucoma community?

*Who would
benefit from
home
monitoring?*



- Currently being evaluated as a home-monitoring for children with glaucoma and as a glaucoma case-finding tool in sub-Saharan Africa



Thank you

Our participants



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FOR SIGHT**
The Eye Research Charity

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www.eyecatchervision.com



Reference



Jones, P.R., et al., (2021) Glaucoma home monitoring using a tablet-based visual field test (Eyecatcher): an assessment of accuracy and adherence over 6 months. *American journal of ophthalmology*, 223, pp.42-52

www.eyecatchervision.com