



Survey of long-term home monitoring of visual field in patients with glaucoma

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Purpose

Early detection of progression in glaucoma is key to providing targeted medical intervention to preserve vision. We survey participant perceptions on the use of a tablet device for weekly home-monitoring of visual field (VF) over 12 months by participants having glaucoma.

Methods: Home-monitoring

Participants were recruited at a routine clinical review to a home-monitoring (HM) trial whereby they could undertake testing *at-home* using a loaned iPad tablet (Melbourne Rapid Fields iPad application, MRF). Patients were taught how to perform the test by clinical assistants *in-clinic* (Figure 3) and were tasked with weekly self-monitoring *at-home* with the guidance of tablet generated instructions (audio and written). Text message reminders were sent every week on the day a test was due. Participants were retested with both the MRF and the Humphrey Field Analyzer (HFA), *in-clinic* at 6-month intervals. Home-monitoring was performed over a 12-month period (Figure 3).

Visual field testing

- MRF-glaucoma iPad application
- 66 test locations over central 30° (Figure 1)
- Patients respond to the presence of a spot by tapping the screen in a designated “touch zone” (red square: Figure 2)
- Tablet audio instructions ask patients to either fixate centrally, or to follow the fixation target to a corner of the tablet to test the peripheral visual field.
- Summary Index: mean deviation (MD)

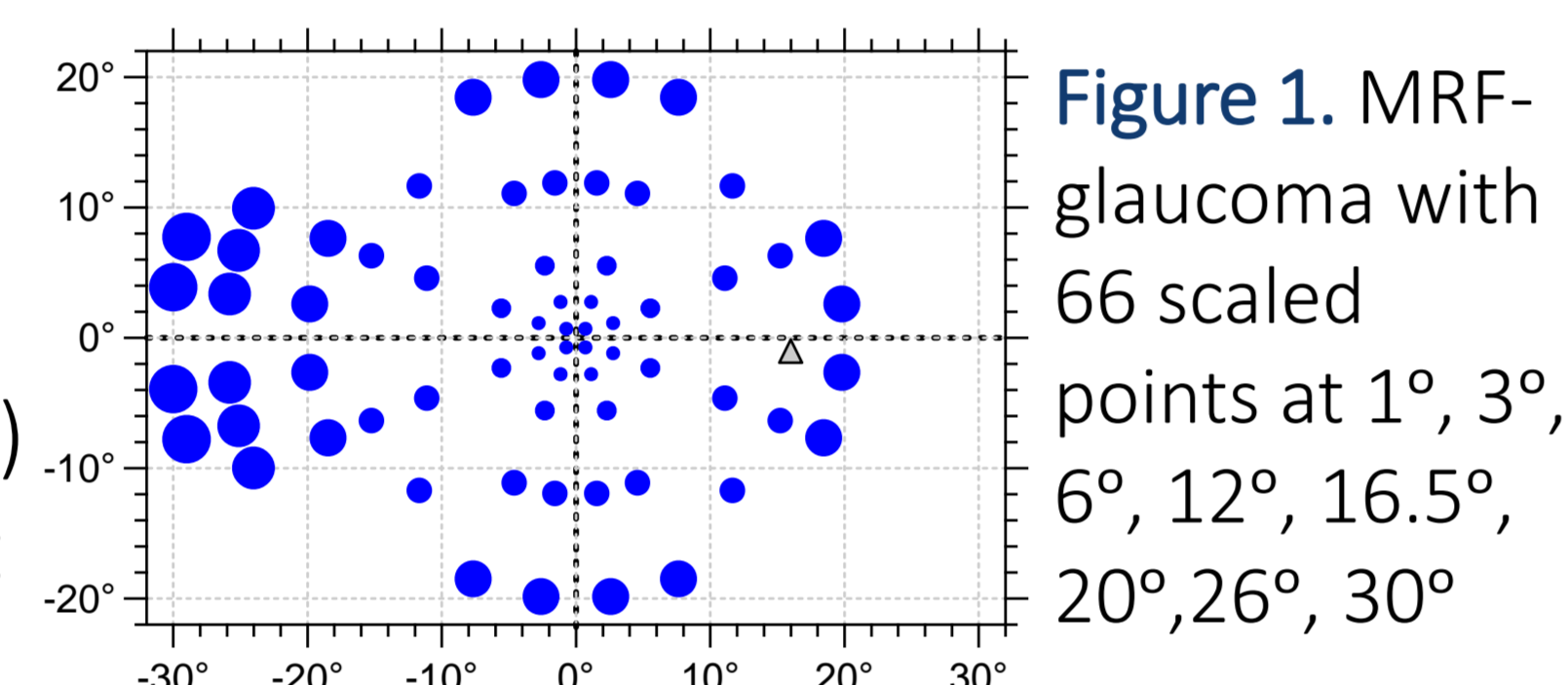


Figure 1. MRF-glaucoma with 66 scaled points at 1°, 3°, 6°, 12°, 16.5°, 20°, 26°, 30°

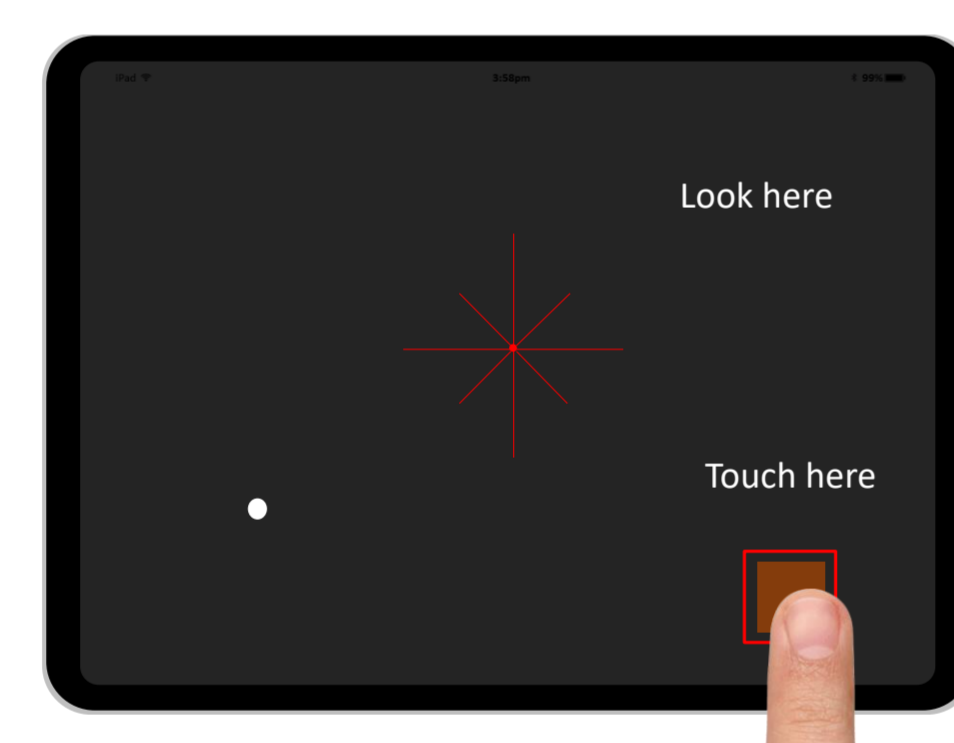


Figure 2. Visual field task.



Figure 3. Experiment timeline. Glaucoma participants undertook in-clinic supervised testing (6-monthly) with the iPad as well as self-directed HM (weekly) of visual fields.

Methods: Survey

- Patients were tasked with performing home monitoring of vision over 12 months on a weekly basis. They had routine clinical reviews at 6 and 12 months (Fig. 3).
- After the 12 month review, they completed a 19 question survey on their experiences with the MRF application and the HM concept.

Survey structure:

- Questions 1-4: Familiarity with technology
- Questions 5-8: General study feedback.
- Questions 9-15: Ease of use of the MRF iPad application (5-point Likert scale)

Statistics:

Survey outcomes shown as histograms or divergent stacked bar charts. Analysis with Chi-Square or T-test.

Results

Parameter	All
Participants	41
Age (mean ± Std. Dev., years)	62.3 (± 15.3)
Age (min, years)	25
Age (max, years)	81
Avg test frequency (days)	10.4

Table 1. Patient demographics, number and frequency of *at-home* test returns in participants who completed 12 months of review.

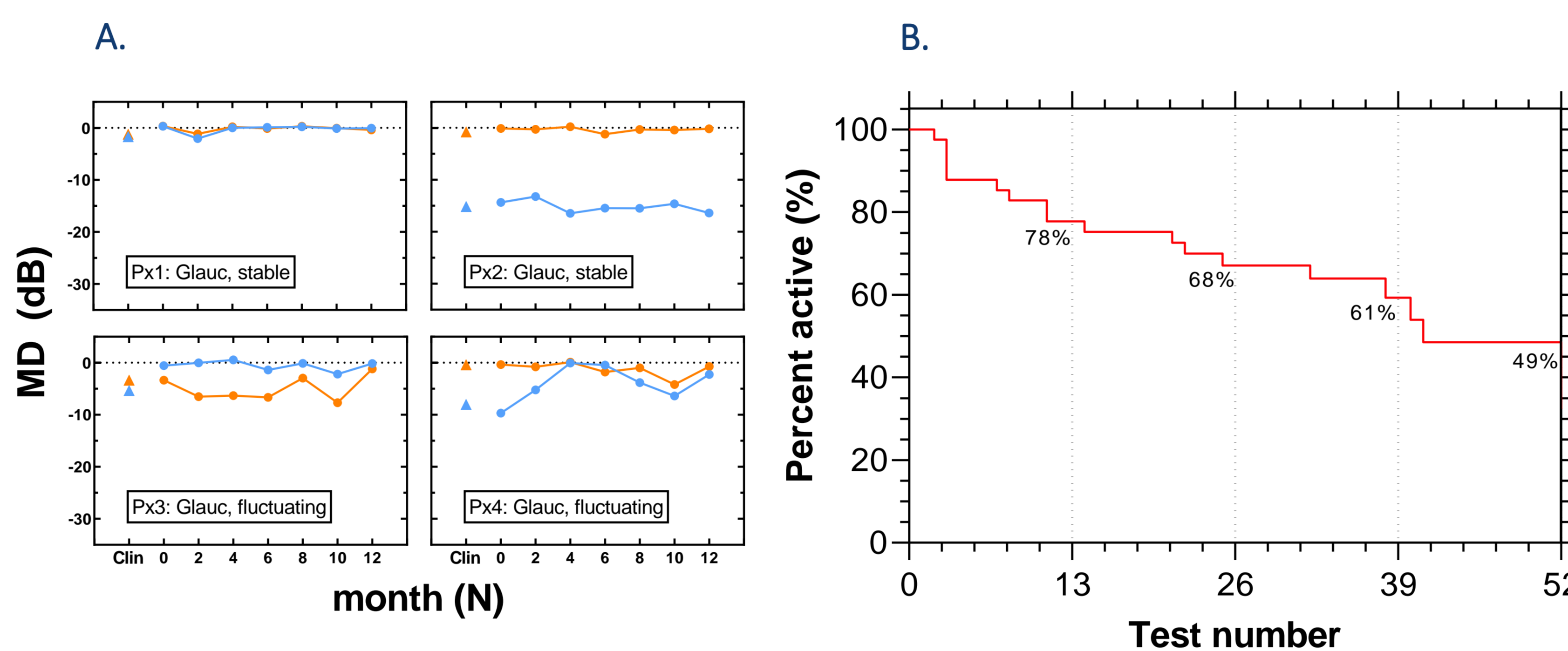
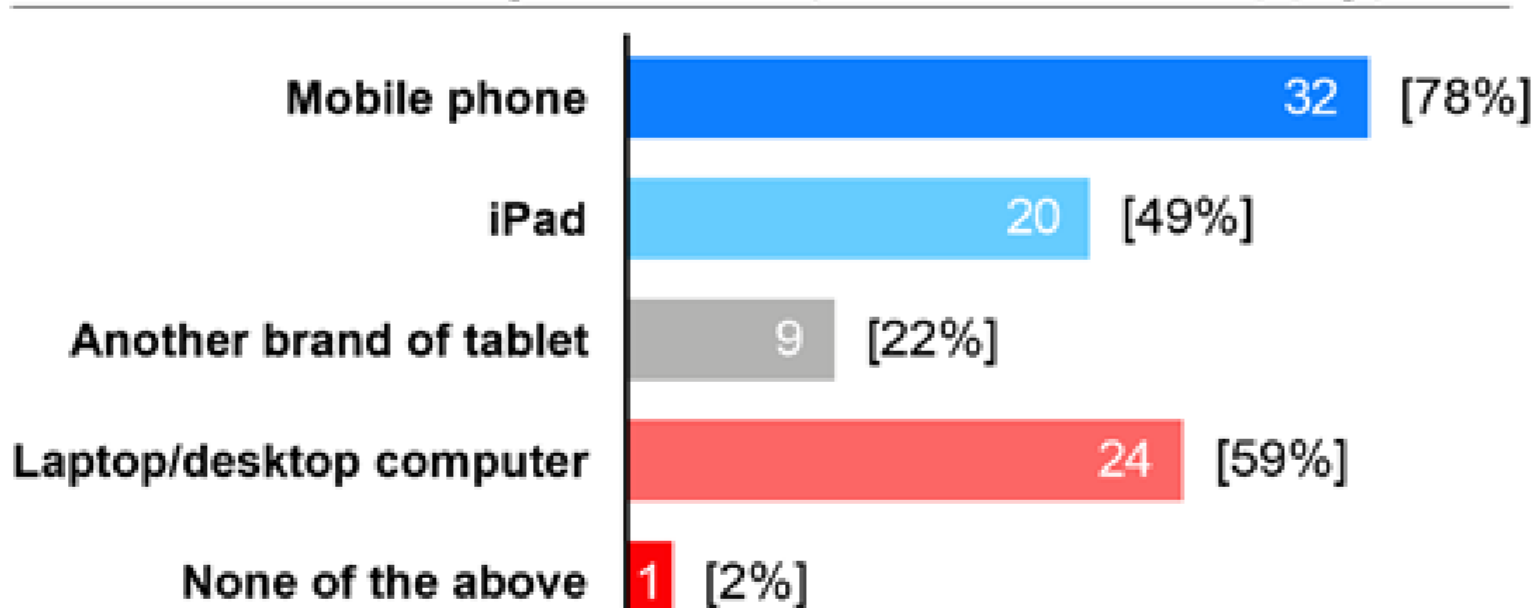


Figure 4. A. Representative mean deviation (MD) returned from 4 participants each month over the 12 months of home monitoring (x-axis) with the MRF application. Filled circles show data from HM with blue being right eye, and orange, left eye. In-clinic results for the MRF (triangles) were obtained supervised by an assistant and are shown as the average of baseline, 6-month and 12-month tests (blue triangle, for right eye, orange triangle, left eye). Stable participants showed <4.2dB inter-test variability over the 12 months of observation. B. Retention of n=41 glaucoma participants over 12 months of weekly home monitoring. The annotated retention rates are shown at 3-monthly intervals.

Results: Survey

Q1. Which do you own? (Select all that apply)



Q3. How many times had you used an iPad before?

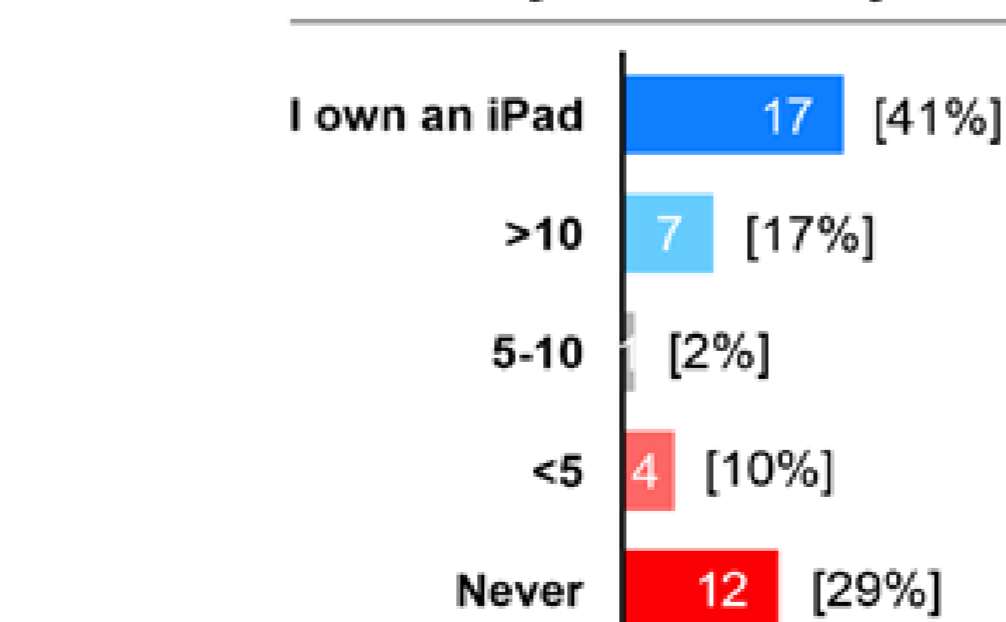
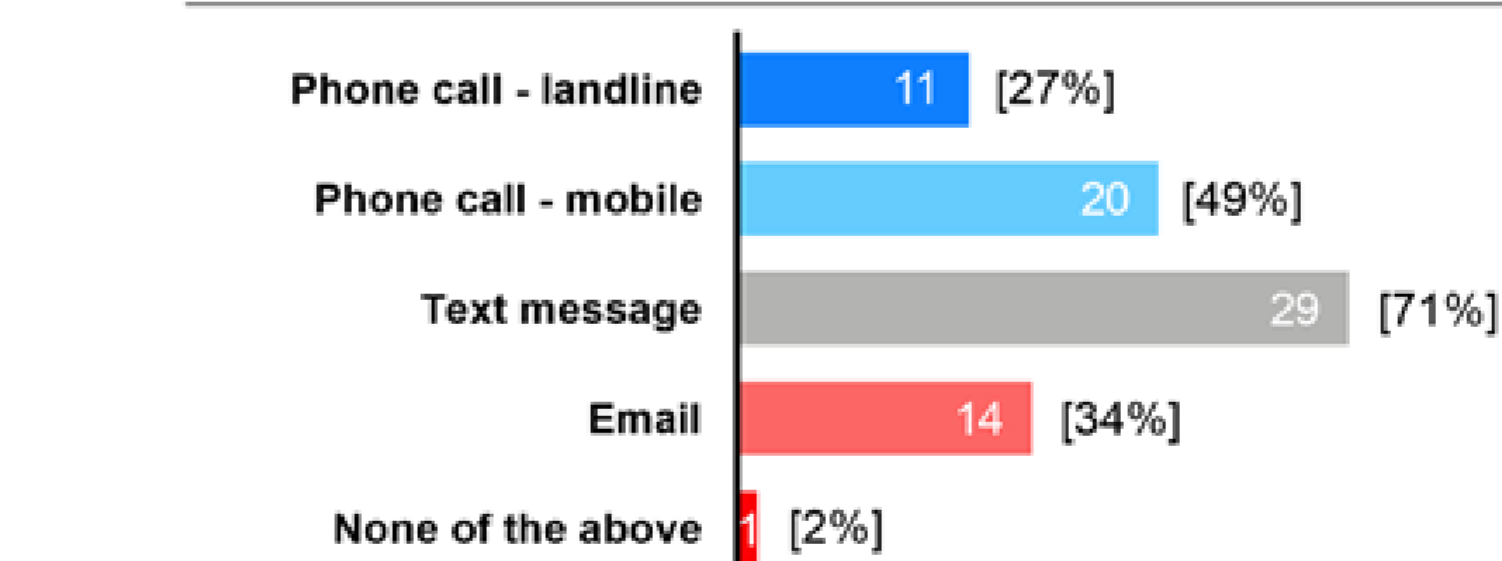
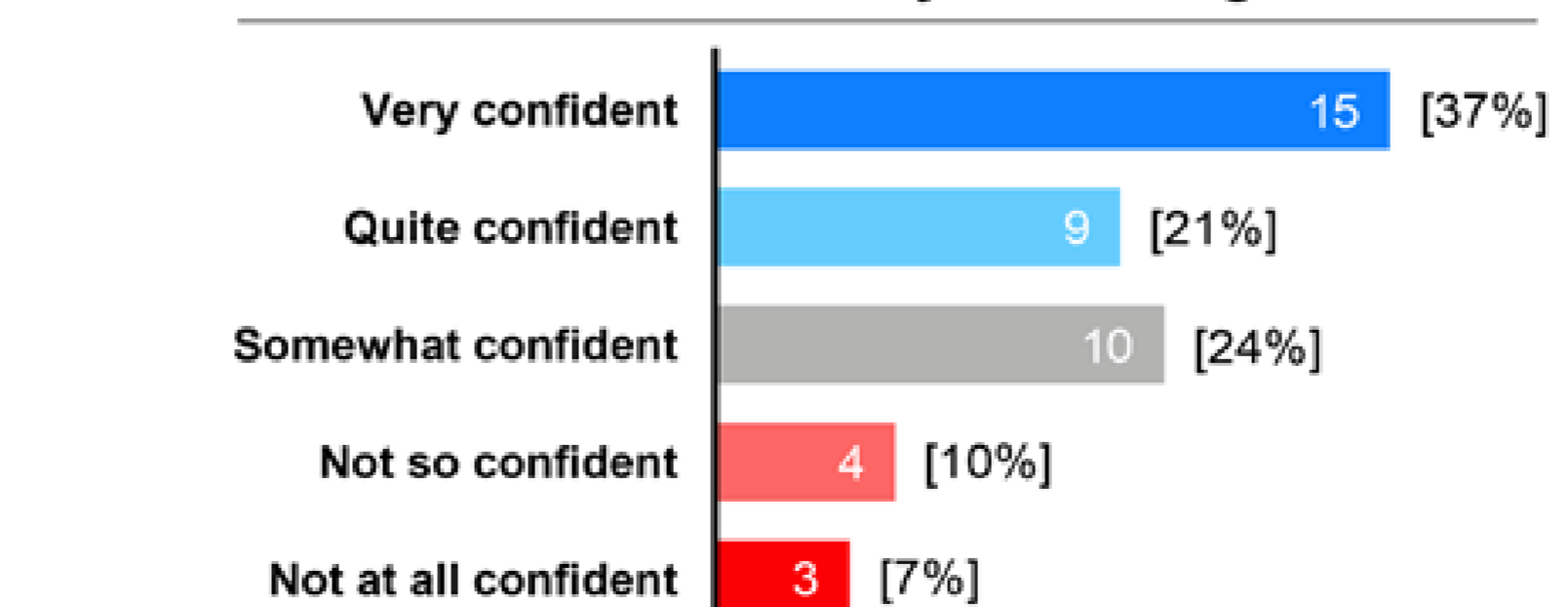


Figure 5. Survey responses from participants regarding Familiarity with Technology prior to undertaking 12 months of home monitoring with the MRF iPad application. Chi-square analysis found no significant difference between responses from <70y.o. and ≥70y.o. (p=ns for all questions).

Q2. Preferred mode of communication? (Select all that apply)

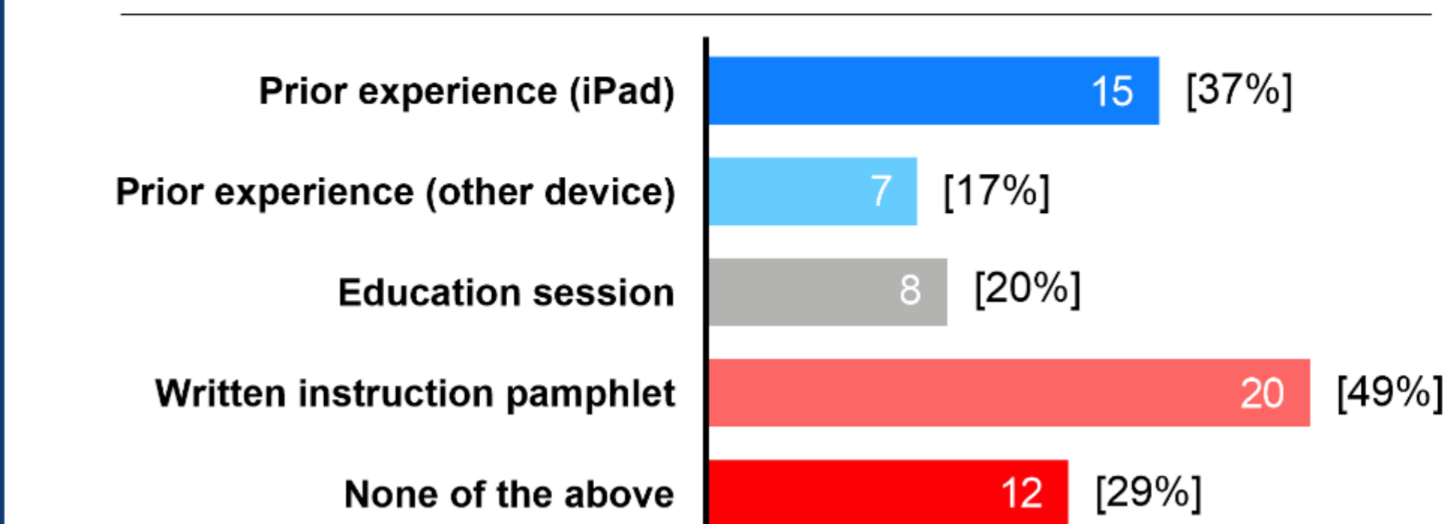


Q4. How confident are you in using an iPad?

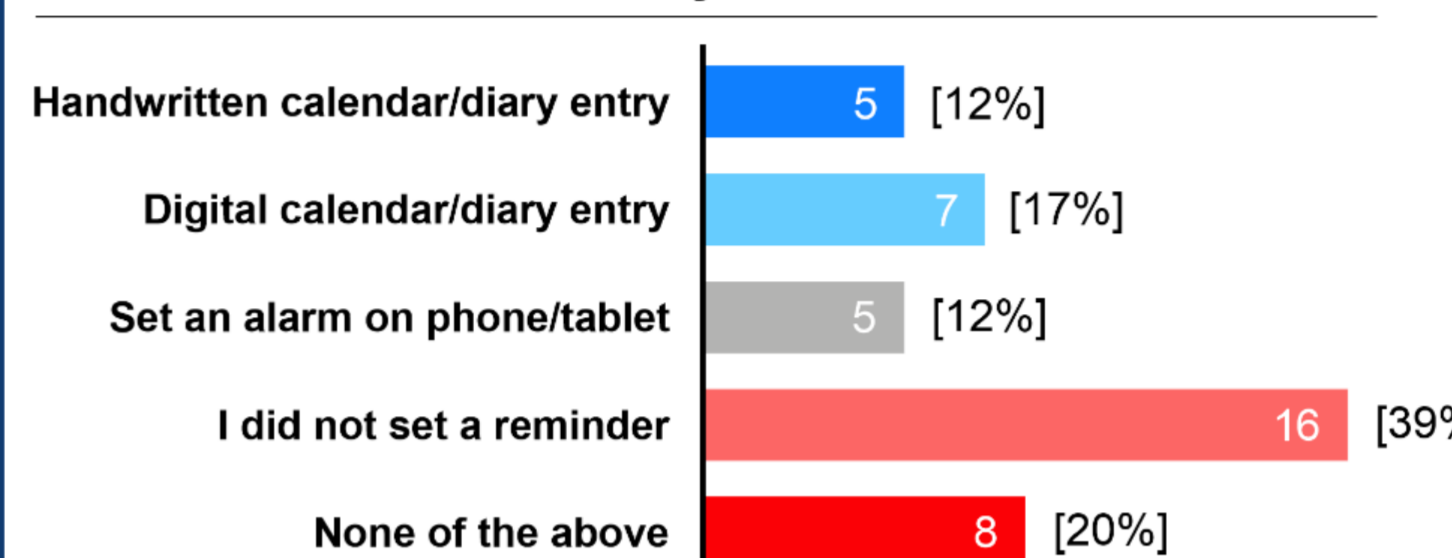


Results: Survey

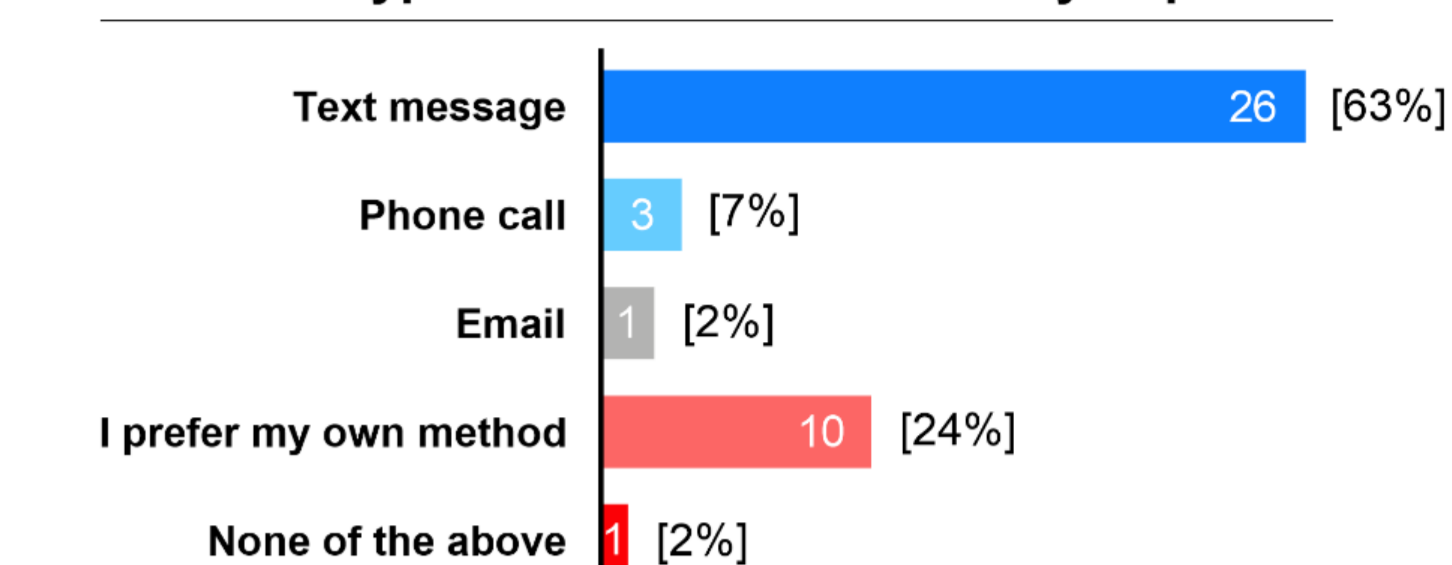
Q5. What helped you to use the study iPad? (Select all that apply)



Q7. What method did you use as a reminder?



Q6. What type of test reminder would you prefer?



Q8. What were your barriers for test compliance? (Select all that apply)

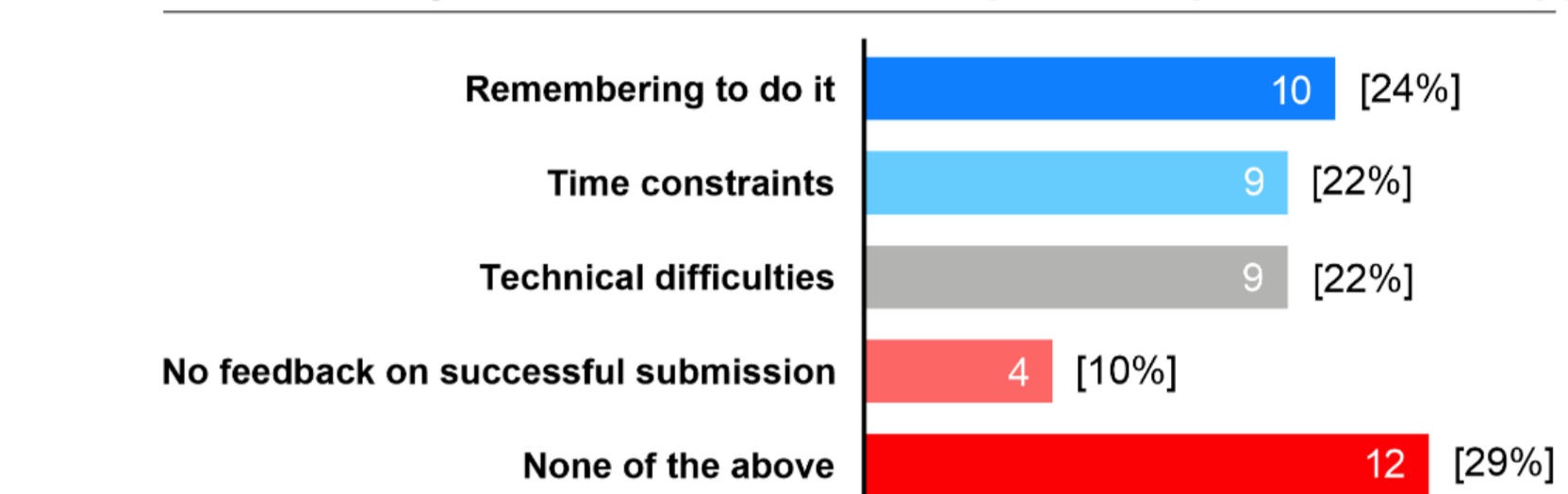


Figure 6. General Study Feedback regarding home monitoring of vision with the MRF iPad application. Chi-square analysis found no significant difference between responses from <70y.o. and ≥70y.o. (p=ns for all questions).

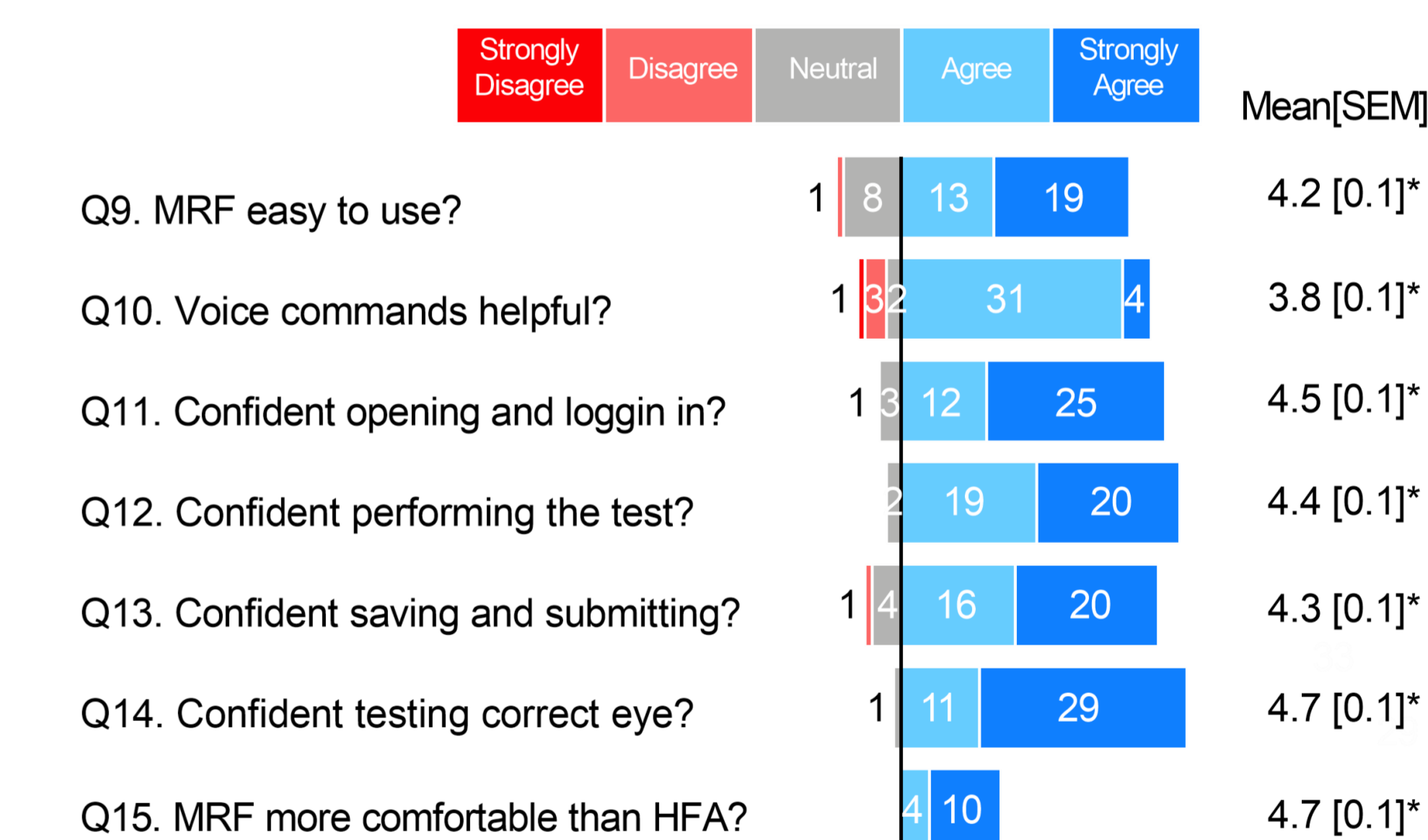


Figure 7. Survey responses on the Ease of Use of the MRF iPad application by participants with glaucoma. *Indicates mean is sig removed from the neutral state of 2.5, p<0.01. HFA = Humphrey Field Analyser.

Conclusions and clinical significance

Self-monitoring of vision at home (HM) using a tablet application is a positive experience for participants with glaucoma, with participants nominating that they are receptive to undertaking weekly or monthly HM over the long term. Despite these facts, persistent loss of retention is found over a 12-month period. Technology education and continued support might be useful in promoting greater retention.

Commercial Disclosures

AJ Vingrys and GYX Kong: Founding directors of Glance Optical Pty. Ltd., makers of MRF vision testing application. SM Prea: none.

Support

