INFORMATION BRIEF (RAPID REVIEW)

ADVANCED VISION ANALYZER

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
016/2025

IPT Mark
INAHTA
Rapid Review

Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia
Level 4, Block E1, Precinct 1
Government Office Complex
62590, Putrajaya
Tel: 603 8883 1229

Available online via the official Ministry of Health Malaysia website: http://www.moh.gov.my

SUGGESTED CITATION: Gan, Y. N., Roza, S. and Syaqirah, A. Advanced Vision Analyzer. Malaysian Health Technology Assessment Section (MaHTAS); 2025. 8 p. Report No.: 016/2025

DISCLOSURE: The author of this report has no competing interest in this subject and the preparation of this report is entirely funded by the Ministry of Health Malaysia.

TITLE: ADVANCED VISION ANALYZER

PURPOSE

This review was conducted upon request by the Deputy Director-General of Health (Research and Technical Support), Ministry of Health Malaysia (MOH), to provide information on the potential use and clinical value of the Advanced Vision Analyzer (AVA), an ophthalmology medical device by [redacted]. The request followed a preliminary discussion held on 25 August 2025 regarding the suitability of this device for use in healthcare facilities providing eye care services by Optometry Officers, and the need to review evidence on its clinical effectiveness, safety, and cost-effectiveness.

BACKGROUND

The AVA is a portable and lightweight virtual reality-based perimeter developed by [redacted] (Figure 1). It is designed to perform visual field testing under conditions comparable to standard automated perimetry, with integrated eye-tracking and a secure cloud-based storage system for data backup. The device also incorporates the proprietary Elisar Standard Algorithm (ESA) to enhance test accuracy and efficiency. With its compact design and innovative features, the AVA offers the potential to expand access to visual field assessment beyond conventional perimetry systems.[1]

Figure 1. Advanced Vision Analyzer (AVA) by [redacted].[1]
[redacted]

The AVA comprises a head-mounted virtual reality headset, a hand-held patient response button, a tablet test controller that connects wirelessly to both the headset and a cloud server hosting software with cloud-based updates, and a protective case for safe transport and storage (Figure 2).[1,2]

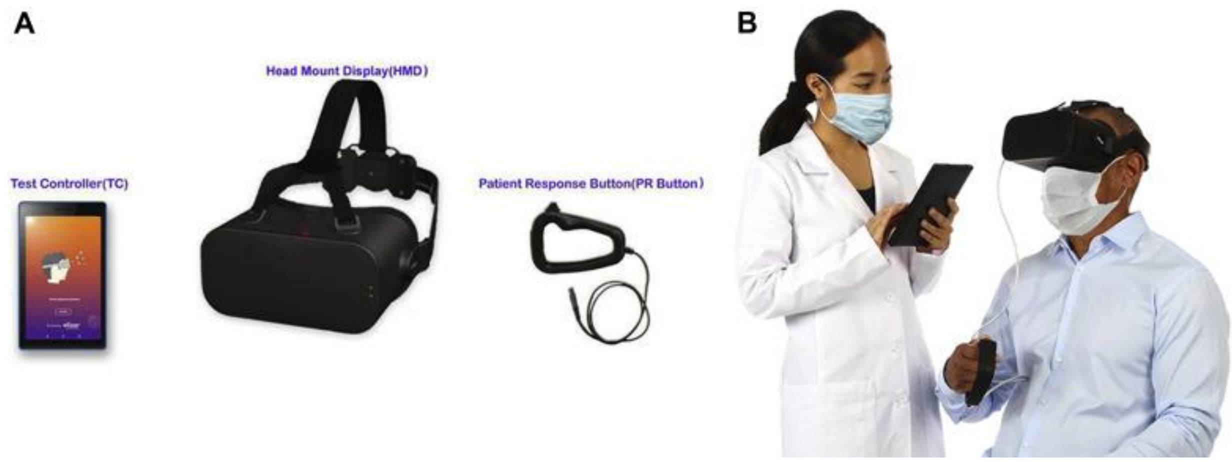

Figure 2. Images showing the Advanced Vision Analyzer (AVA). A, Components of the AVA: a head-mounted device (HMD), patient response (PR) button, and test controller. B, Patient and the instructor performing the visual field test with the AVA.[2]
Source: https://www.sciencedirect.com/science/article/pii/S2666914521000336

According to the [redacted] website, the AVA is designed for use in a wide range of settings without the need for a traditional exam lane or high-cost capital equipment. As a small, battery-operated perimeter, it can perform visual field threshold measurements without requiring a dedicated dark room, making it adaptable for both clinical facilities and outreach programmes. Its portability and flexibility in deployment may help reduce barriers to access where conventional perimetry systems are impractical.[1]

The device is also described as patient- and user-friendly. Its lightweight, head-mounted design allows testing in multiple positions, including reclining, which may benefit elderly or differently abled patients. Additionally, the AVA generates simplified reports to support patient communication, while maintaining a familiar reporting format that adheres to international standards for clinicians. The system is automated and intuitive, requiring minimal training, and incorporates key functionalities such as foveal threshold testing; standard test patterns (24-2, 30-2, 10-2); multiple strategies including screening, full threshold, Elisar Standard, and Elisar Fast; as well as fixation monitoring and integrated eye-tracking.[1] The AVA uses a Goldmann size III stimulus with background luminance of 9.6 cd/m^2.[2]

According to the Malaysian Clinical Practice Guidelines (CPG) for the Management of Glaucoma, automated visual field analysis remains a key component in the investigation of glaucoma.[3] Standard Automated Perimetry (SAP) is regarded as the clinical standard to diagnose and monitor glaucomatous visual field loss and can be performed on several devices, including the Humphrey Field Analyzer (HFA; [redacted]) and the Octopus Perimeter ([redacted]).[3,4] Commonly used threshold algorithms include the Swedish Interactive Threshold Algorithm (SITA) Standard and SITA Fast on the Humphrey perimeter, although alternative strategies such as “Dynamic Strategy” in the Octopus perimeter may also be considered. In very advanced disease, it may be necessary to employ larger stimuli, such as Goldmann size V rather than size III, or adopt strategies that focus more closely on the remaining visual field, such as the Octopus M1 or M2, or the Humphrey 10-2 programme. Evidence for non-conventional perimetry, such as Short Wave Automated Perimetry and Frequency Doubling Perimetry, is currently insufficient to demonstrate any clear advantage over SAP. Importantly, visual field tests must be reliable and reproducible to guide clinical management.[3]

The CPG highlights several visual field defects that are suggestive of primary open-angle glaucoma. Classical defects include paracentral scotomas, nasal steps, and arcuate scotomas, while temporal wedges are considered uncommon. Early glaucomatous changes on SAP may be indicated when the Glaucoma Hemifield Test is graded as outside normal limits, or when there are at least three clustered non-edge points with significantly depressed sensitivity, of which one should demonstrate a significance level of $p<1\%$ on the pattern deviation plot. In addition, a pattern standard deviation (PSD) with a p-value of <5% is also regarded as suggestive of glaucomatous damage. [3]

A preliminary discussion was held on 25th August 2025 with MOH ophthalmologists on the AVA by [redacted]. The discussion highlighted several advantages of the device. It is portable, suitable for outreach activities and early screening, and does not require the patient to cover one eye during testing. It also allows flexible patient positioning, as it can be used while patients are sitting, reclining, or lying down, and is applicable to both adults and children above the age of ten. Furthermore, it can be used in wards and with patients who have mobility challenges.

Several limitations were also identified. The device is less suitable for elderly patients due to its weight and is not appropriate for patients with claustrophobia. The brightness of the visual stimulus is relatively low, which may affect accuracy in cases of severe visual field defects, and the frame design may limit detection of peripheral vision loss. The device is relatively expensive, [redacted], and requires frequent recharging. It can test 8–10 patients per charge using the Elisar Standard mode or 15–20 patients with the Elisar Fast mode, with a full recharge taking two hours. The company recommended purchasing two units to minimise downtime. Concerns were also raised about its durability for daily use in busy tertiary care centres, given its relatively recent introduction to the market (about five to six years ago) and the lack of comparative reliability data, although it has reportedly sold 1,000 units in India and Africa.

The discussion concluded that the AVA by [redacted] offers several positive features, including compact size, portability, suitability for patients with mobility difficulties, and potential for use in early screening. However, there are significant limitations, particularly regarding cost-effectiveness, suitability for elderly patients, and durability under high workload conditions. Additional considerations suggested that the device may be more suitable for optometry-led screening in primary care settings rather than routine use in tertiary hospitals.

EVIDENCE SUMMARY

A systematic search was conducted in scientific databases, including Ovid and PubMed, up to September 2025 using these search terms: advanced vision analyzer or analyser, [redacted], virtual reality perimetry. A total of four relevant articles were identified, all of which focused on adults with glaucoma. These comprised three cross-sectional observational studies and one systematic review.[2,4-6] Notably, all three cross-sectional observational studies were authored by the same first author.[2,5,6]

EFFICACY/ EFFECTIVENESS

The systematic review by Hekmatjah et al. (2025) compared the utility and diagnostic performance of virtual reality perimetry with SAP. A systematic literature search was conducted in three databases (PubMed Central, Embase, and Cochrane Central Register of Controlled Trials) from inception to September 2024 for randomized controlled trials or prospective or retrospective cohort studies that compared different modalities of VRP to SAP in adults >18 years of age with glaucoma. A total of 14 studies comparing 10 different VRP devices (including AVA) with HFA or Octopus 900 were included: 12 prospective, single-centre studies and two prospective multi-centre studies. Two studies compared AVA with HFA which are described in detail below.[2,5] In summary, when compared with the HFA 24-2 SITA Standard test, the AVA showed moderate to strong correlations for pointwise threshold sensitivity, sectoral mean sensitivity (MS), mean deviation (MD), PSD, and test–retest variability (TRV). When compared with the HFA 10–2 SITA Standard test, the AVA demonstrated good agreement for MS, MD, and PSD using Bland–Altman analysis. These findings suggest that the AVA was able to distinguish glaucomatous from non-glaucomatous eyes and showed good correlation with SAP. The authors concluded that VRP had strong potential to evaluate visual fields in adults with glaucoma, though further data was needed to validate emerging technologies and testing protocols.[4]

The prospective, cross-sectional, observational case series study by Narang et al. (2021) evaluated the AVA ([redacted]) by comparing pointwise threshold sensitivity and functional correlation of ESA with SITA of the Humphrey Field Analyzer (HFA; [redacted]). The study recruited 160 eyes in total (85 from control participants and 75 from glaucoma patients) for functional testing, 15 eyes for assessing TRV, and 107 eyes for blind spot analysis (45 normal and 62 glaucoma eyes), with separate groups used for each assessment. All participants underwent testing with both ESA and SITA Standard 24-2, and one eye was randomly selected for analysis. Statistical comparisons included intraclass correlation coefficients (ICC), Bland-Altman plots, linear regression, mean bias (MB), and proportional bias analysis. The investigators compared threshold measurements, TRV, and blind spot location accuracy between the two devices.[2]

The mean age of normal participants enrolled in the study was 38.21 ± 15.59 years, while that of the glaucoma group was 56.72 ± 13.15 years. Results showed that the mean time required to perform a field test with the AVA was 7.08 ± 1.55 minutes, slightly longer than with the HFA (6.26 ± 0.54 minutes), though the difference was not statistically significant (p = 0.228). The MS difference between AVA and HFA was -2.2 ± 2.3 dB in normal participants (p < 0.001) and -2.6 ± 3.5 dB in participants with glaucoma (p < 0.001). Pointwise threshold values showed moderate to strong correlations between AVA and HFA (correlation coefficients, r = 0.68—0.89). For MS, the overall ICC value was 0.893 (p < 0.001) with MB of 2.48 dB and a limit of agreement of 10.90 (range, 7.93 to -2.97). These results indicated that AVA consistently measured lower sensitivity values compared to HFA, but showed strong correlation and agreement overall, though with variability at the individual measurement level. For TRV, response variability decreased with an increase in sensitivity and increased with eccentricity. Blind spot location was accurate, and global indices of testing methods correlated well.[2]

The authors concluded that AVA effectively captured threshold values for each point in the visual field, with adequate functional correlation suggesting substantial equivalence between the AVA (ESA) and HFA (SITA Standard), indicating that AVA may allow accurate assessment of visual field. However, there were several limitations. The authors acknowledged that the AVA lacked an active eye-tracking system, which might reduce reliability in individuals with abnormal or eccentric pupils. To achieve thresholds between 0 and 8 dB (low sensitivity ranges), the device required an increased stimulus size, based on the assumption that Ricco's law applies, although this was not tested. The authors highlighted that the diagnostic precision of the AVA had not yet been established, and larger studies with detailed clinical evaluation were needed before drawing definitive conclusions about its diagnostic accuracy.[2]

Another prospective, cross-sectional, observational case series study by Narang et al. (2023) evaluated the diagnostic precision and tested the equivalence of AVA ([redacted]) and HFA ([redacted]) for the detection of glaucoma. Threshold estimates of one eye each of 66 patients with glaucoma, 36 control participants, and 10 glaucoma suspects were analysed using the 10-2 test with AVA and HFA. The MS values of 68 points and central 16 test points were compared. Analysis included ICC, Bland-Altman plots, linear regression of MS, MD, and PSD as well as receiver operating characteristic curves with area under the curve (AUC) to assess diagnostic precision. Based on the results, Bland-Altman plots showed significant correlation for MS, MD, and PSD values for both devices. For MS, the overall ICC value was 0.96 (p < 0.001) with a mean bias of 0.0 dB and limits of agreement range of 7.59. The difference in MS values between both devices was -0.4760 ± 1.95 (p > 0.05). The AUC for MS values for AVA was 0.89 and for HFA was 0.92 (p = 0.188); whereas it was similar at 0.88 for MD values (p = 0.799). AVA and HFA identically discriminated between normal and patients with glaucoma (p < 0.001), although HFA denoted marginally greater ability (p > 0.05). The authors concluded that the results supported adequate equivalence between AVA and HFA, as threshold estimates obtained with AVA strongly correlated with those of HFA using the 10-2 program.[5]

A recent cross-sectional observational study by Narang et al. (2025) compared two fast threshold strategies of visual field assessment in patients with glaucoma: Elisar-Fast (AVA) and SITA-Fast (HFA). A total of 192 subjects were recruited, and 138 subjects (150 eyes; 91 eyes from 80 glaucoma patients and 59 eyes from 58 healthy controls) were analysed. Each subject underwent both 24-2 Elisar-Fast and SITA-Fast in randomised order with a minimum time interval of one hour between tests. Main outcome measures were mean test-time, pointwise and sectoral sensitivity, significance of MS values and global indices (MD and PSD) and their correlation. Results showed that the mean test-time for Elisar-Fast was 3.38 ± 0.28 minutes, which was slightly longer than SITA-Fast (2.59 ± 0.25 minutes) and the difference was statistically significant (p = 0.001). However, the clinical relevance of this one-minute difference is likely minimal. Nonetheless, in high-volume settings, it may increase overall service time. Correlation coefficient for pointwise threshold values was strong for both devices (range, 0.70 – 0.92). The ICC value of ⩾0.8 was observed across all sectors, indicating good reliability. Bland-Altman plot denoted 95% of the data for MS values within limit of agreement. The ICC values for overall MS, MD, and PSD were 0.916, 0.913, and 0.872, respectively, indicating good reliability. High degree of correlation was observed for MD (r= 0.912, p = 0.00) and PSD values (r= 0.732, p = 0.00). Comparison of values indicated a difference of 1.09 dB for MD and 0.06 dB for PSD between both strategies. The authors concluded that Elisar-Fast demonstrated a high degree of correlation with SITA-Fast for global indices and pointwise threshold values, supporting its ability to assess visual fields in patients with glaucoma.[6]

In summary, the evidence indicates that the AVA shows good correlation with the HFA 24-2 SITA Standard test, though it consistently records slightly lower sensitivity values, and excellent agreement with the HFA 10-2 SITA Standard test, with comparable diagnostic precision. The Elisar-Fast strategy also correlated strongly with SITA-Fast, showing high reliability despite a slightly longer test time. While these findings support AVA as a potential alternative to conventional perimetry, the evidence is limited, and larger studies are needed to confirm its diagnostic accuracy and clinical utility.

SAFETY

No published safety concerns were identified in the retrieved studies, and none reported adverse events directly related to the device. However, as the AVA relies on cloud-based storage, potential risks related to data privacy, confidentiality, and cybersecurity should be considered. According to the Medical Device Authority (MDA) online registry, the AVA by [redacted] is a registered medical device in Malaysia under two establishments: [redacted]. The intended purpose registered with the MDA states that the AVA is designed to measure the visual field of the eye and to aid in the screening, monitoring, diagnosis, and management of ocular diseases such as glaucoma.[7]

COST-EFFECTIVENESS

There was no evidence retrieved on the cost-effectiveness of the AVA. However, it was noted during the preliminary discussion that the device is [redacted].

CONCLUSION

Based on the review, the limited evidence suggests that the AVA demonstrated good correlation and agreement with standard automated perimetry, including both 24-2 and 10-2 HFA programs, and with the SITA-Fast strategy. It shows potential as an alternative tool for visual field testing in glaucoma, offering portability and ease of use. However, the current body of evidence is limited to small, single-centre, cross-sectional observational studies. While one study demonstrated that AVA had comparable diagnostic precision to HFA, large-scale studies are needed to confirm these findings. Concerns also remain regarding cost, durability in high-volume settings, and suitability for certain patient groups. Given its price and uncertainties about long-term durability in busy tertiary centres, the AVA may be more appropriately positioned for optometry-led screening or use in primary care facilities, with further research encouraged to ascertain its long-term diagnostic precision.

REFERENCE

1. [redacted]
2. Narang, P., Agarwal, A., Srinivasan, M., et al. Advanced vision analyzer–virtual reality perimeter: device validation, functional correlation and comparison with humphrey field analyzer. Ophthalmology Science. 2021;1(2):100035.
3. Ministry of Health Malaysia. Clinical practice guidelines: Management of glaucoma. 2nd ed. Putrajaya: Malaysian Health Technology Assessment Section, Medical Development Division; 2017.
4. Hekmatjah, N., Chibututu, C., Han, Y., et al. Virtual reality perimetry compared to standard automated perimetry in adults with glaucoma: A systematic review. PLoS One. 2025;20(1):e0318074.
5. Narang, P., Agarwal, A., Agarwal, A., et al. Comparative analysis of 10-2 test on Advanced vision analyzer and Humphrey perimeter in glaucoma. Ophthalmology Science. 2023;3(2):100242.
6. Narang, P., Rasheed, F. F., Agarwal, A., et al. Comparison of Elisar-Fast and Sita-Fast strategies for visual field assessment in glaucoma. Journal of Glaucoma. 2025;34(3):198-204.
7. Medical Device Authority, Ministry of Health Malaysia. Registered Medical Device Search. Putrajaya: MDA; [cited 2025 Sep 19]. Available from: https://mmdr.mda.gov.my/

Prepared by

Gan Yan Nee
Senior Principal Assistant Director | Pharmacist
Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

Reviewed by

Dr. Roza Sarimin
Senior Principal Assistant Director | Public Health Physician
Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

Dr. Syaqirah Akmal
Deputy Director | Public Health Physician
Malaysian Health Technology Assessment Section (MaHTAS)
Medical Development Division
Ministry of Health Malaysia

1st October 2025