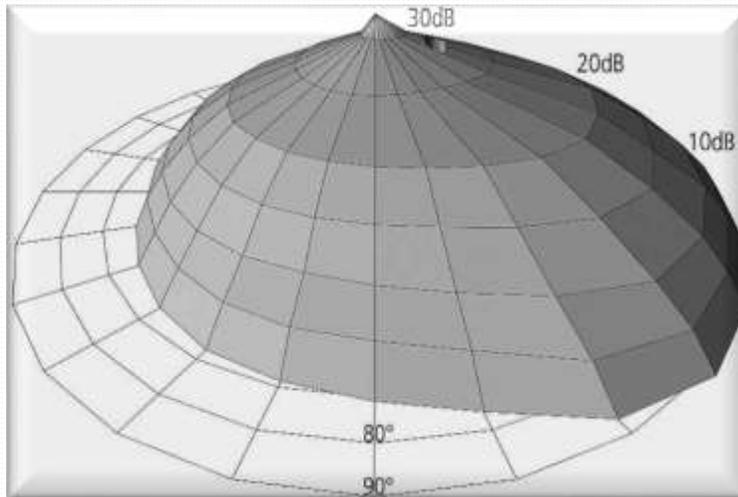


## Perimetry

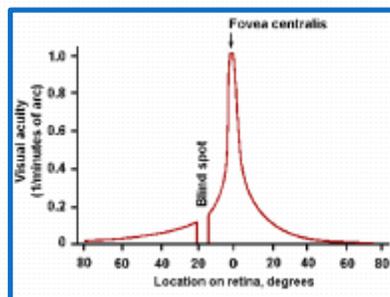
- The normal visual field extends further away from fixation temporally and inferiorly than superiorly and nasally.
- From the center of the retina this sensitivity decreases towards the periphery, evoking the classically defined 'hill of vision:' a three-dimensional representation of retinal light sensitivity.

## Differential light sensitivity



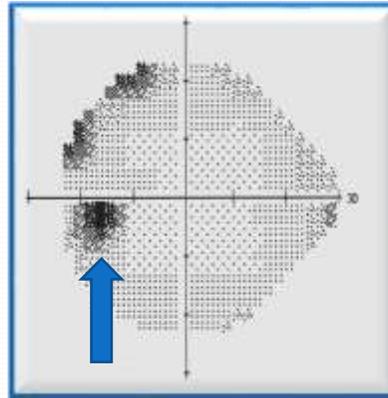
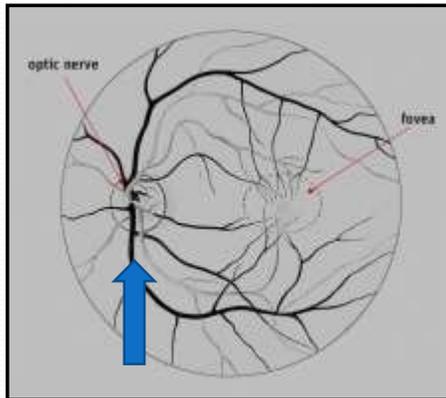
## Perimetry

- The **physiological blind spot** corresponds to the location where the optic nerve enters the eye and its center is located about 15° temporal from fixation.



## Physiological blind spot

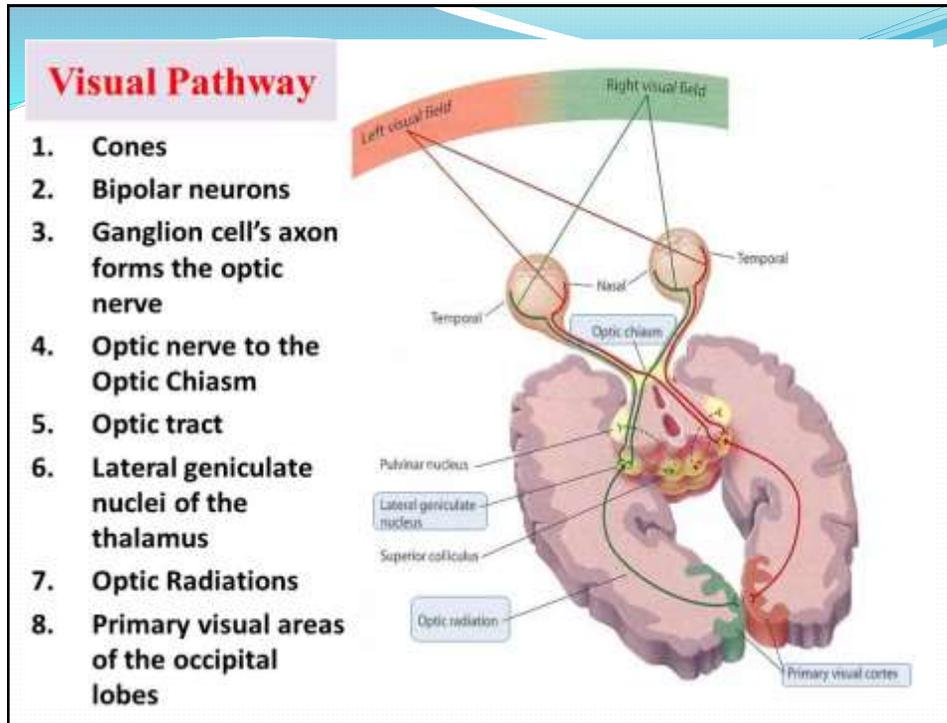
- Corresponding to the optic n head,
- $15^{\circ}$  temporal to the point of fixation,
- $2/3$  below the horizontal meridian,
- Size  $5^{\circ}$  horizontal,  $7^{\circ}$  vertical



## Importance of visual field testing

It reflects topographic sensitivity of various foci on the retina

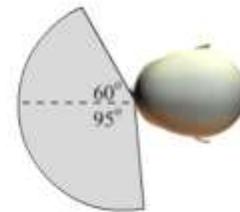
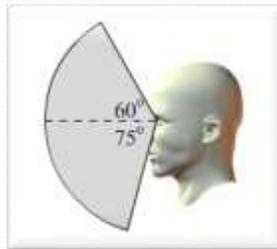
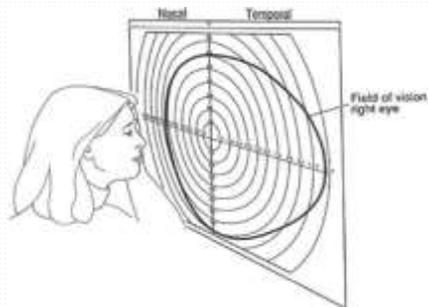
- Resolution – acuity
- Differential light sensitivity.
- Contrast.
- Colour,
- Motion,
- flickers



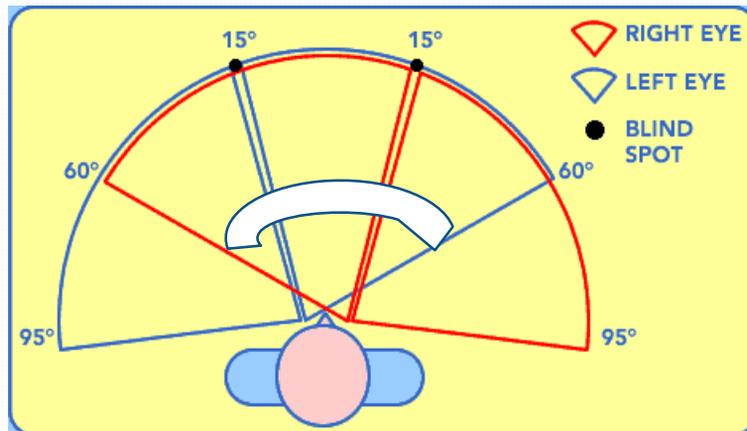
## Factors affecting the visual field

- Apparent size of the spot (actual size, distance),
- Duration of the stimulus,
- Background illumination,
- Intensity of the stimulus,
- Contrast,
- Colour of the stimulus,
- Patient factors:
  - Light dark adaptation,
  - Refraction,
  - Education, attentiveness.

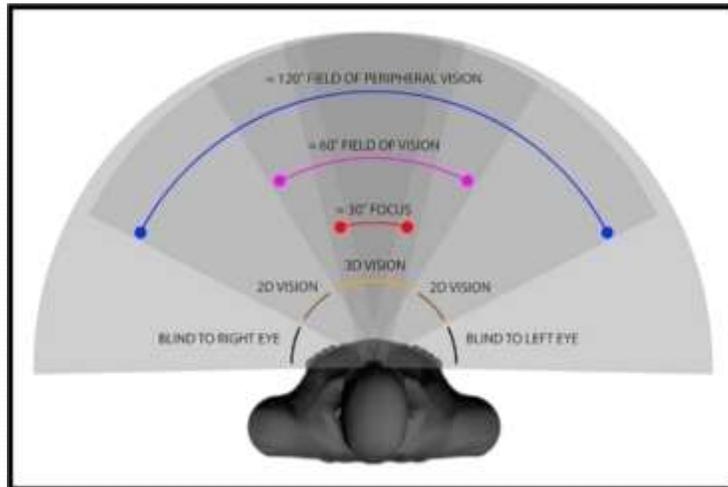
## Monocular visual field



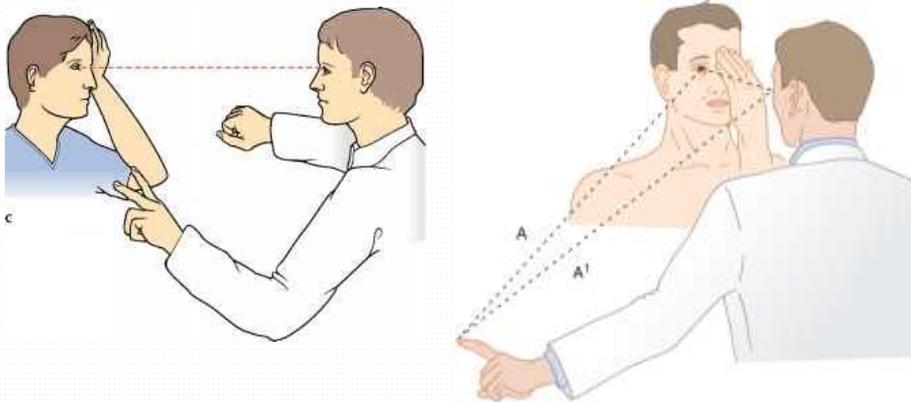
## Binocular visual field



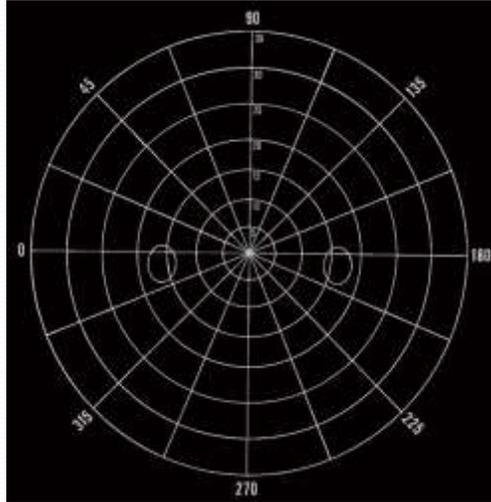
## Stereoscopic visual field



## Confrontation test



## Tangent screen



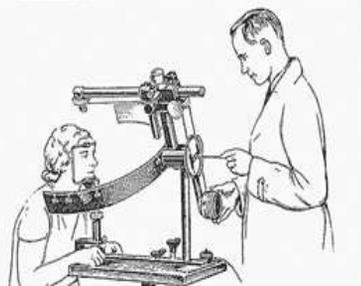
## Tangent screen



## Tangent screen



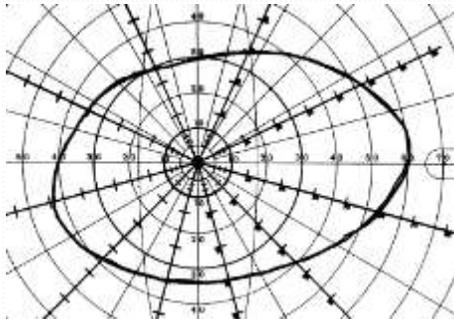
## Arc perimeter



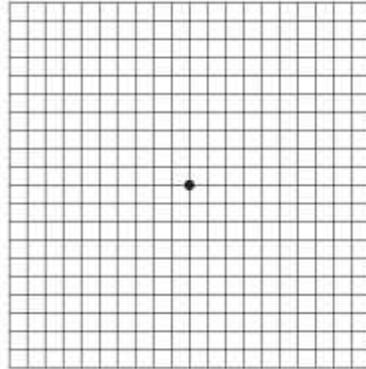
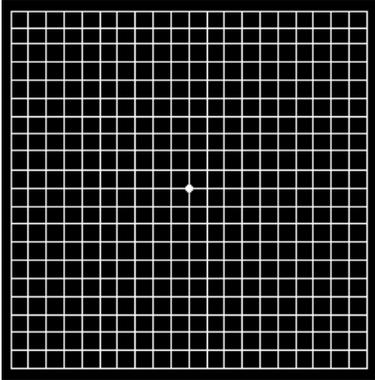
## Goldmann Manual kinetic visual field testing



## Manual visual field testing



## Amsler grid



## Octopus perimetry



## Humphrey Field Analyzer



## Threshold Static Automated Perimetry

- The most commonly used visual field test is **Threshold Static Automated perimetry**.
- A specific point is chosen for examination and the stimulus is increased until its threshold is determined.



## Threshold Static Automated Perimetry

- With Threshold Static Automated perimetry, a computer program is selected.
- The most commonly used one is the **central 30°, 24°** of the visual field using a six degree spaced grid.
- This is accomplished by keeping the **size** and **location** of a target **constant** and **varying the brightness** until the dimmest target the patient can see at each of the **test locations** is found.

## Humphrey Gold Standards

- **Visual Field Index (VFI)** – VFI is a simple and intuitive global index. Its most powerful application is GPA, which trends VFI over time to project remaining vision.
- **GPA Alert** – A message in simple language that indicates whether statistically significant deterioration was identified in consecutive visits.

## Humphery Gold Standards

- **SITA™ Strategies** – (Swedish Interactive Threshold Algorithm)
- SITA is patient responsive: it learns to perform as fast as the patient.
- Aim to reduce test time while preserving the quality of information obtained with standard algorithms. SITA includes two programs, SITA Standard and SITA Fast, which were developed to replace the Full-Threshold and Fastpac strategies, respectively.

## Humphery Gold Standards

- **STATPAC™** – compares results to proprietary age normative and glaucoma databases.
- **Connectivity** – For comprehensive connectivity, HFA3 can be connected to FORUM with Glaucoma Workplace.
- HFA3 also supports common file folder sharing used by most Electronic Medical Record Systems (EMRs).

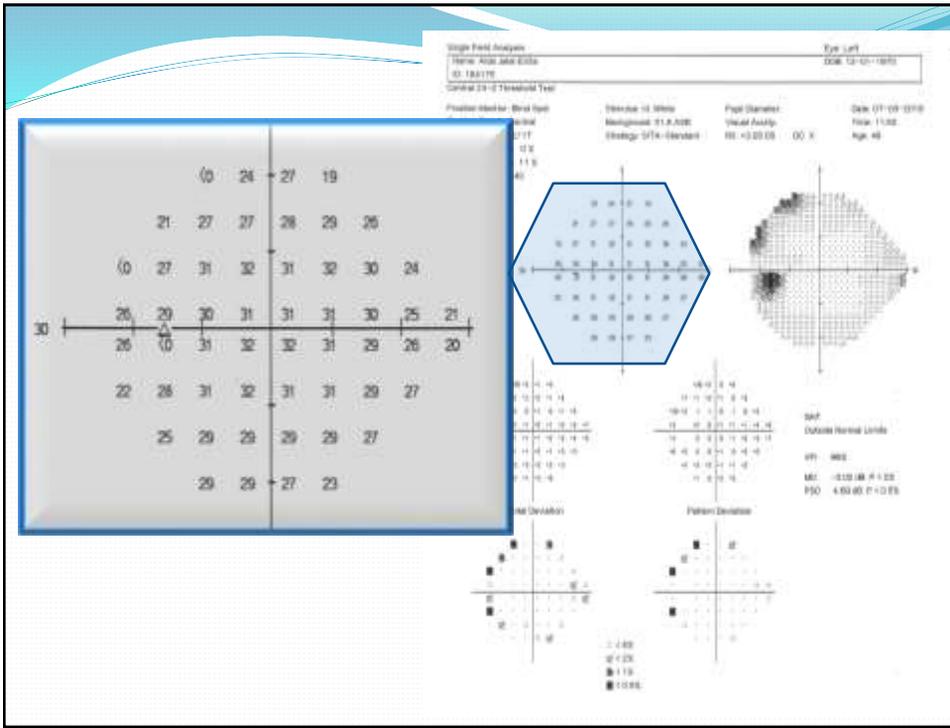
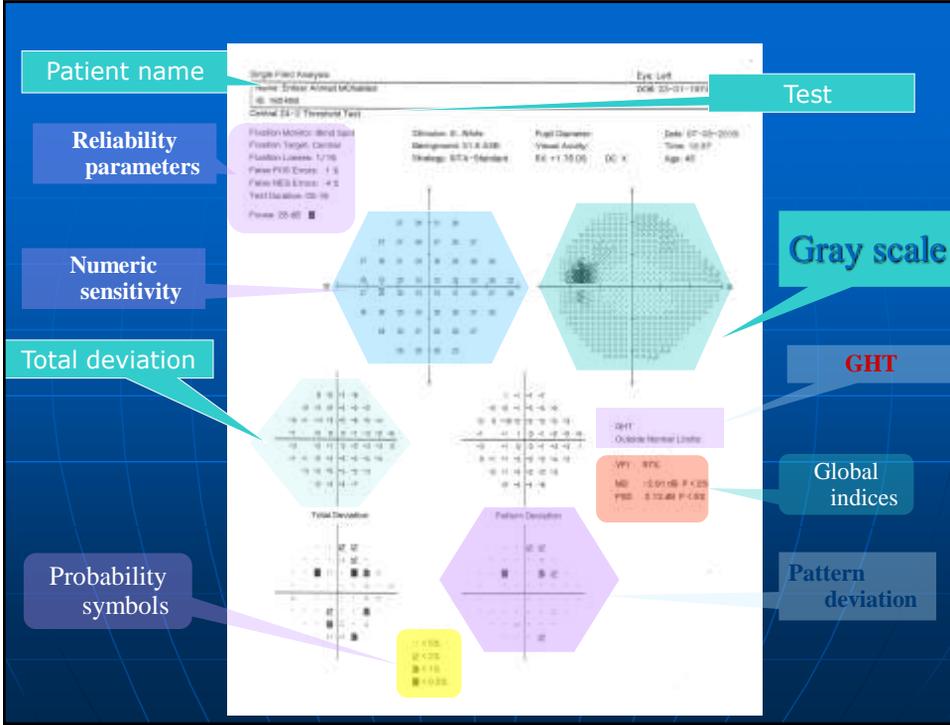
## Humphrey matrix with FDT



## Humphrey matrix with FDT

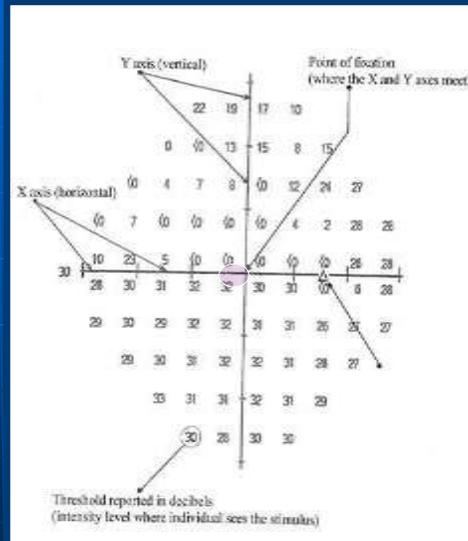
- An in-office glaucoma screener with 35 second,
- **Supra-threshold testing**,
- It provides up to 69 stimuli to characterize visual field defects to facilitate accurate diagnoses.
- It is equipped with **Glaucoma Asymmetry Test** and serial field overview software for comprehensive threshold exams,
- It can perform dependably in **ambient light** so there's no need to darken the room.
- The test results are presented on an LCD color display and can be printed on an external color printer.
- It can store up to a million exams for historical analysis.



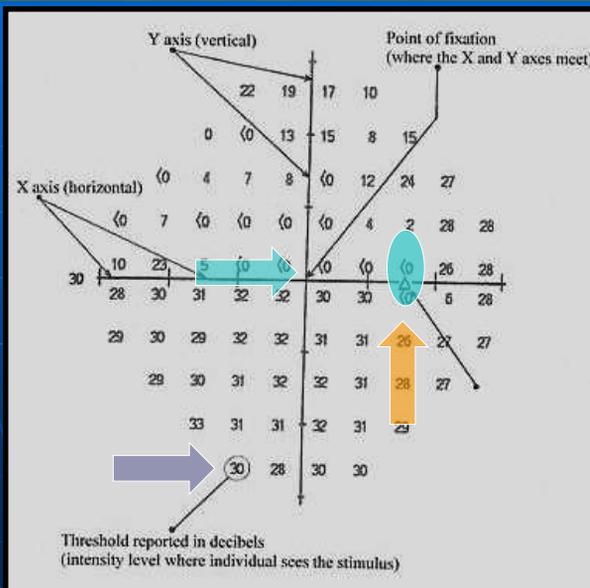


## Numeric threshold values

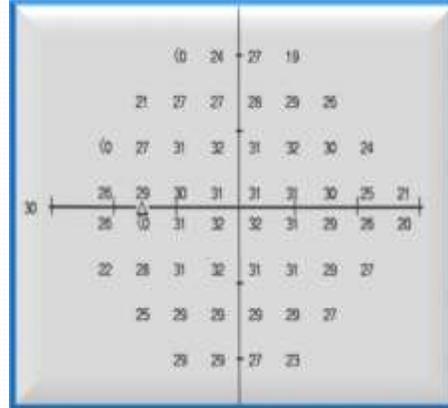
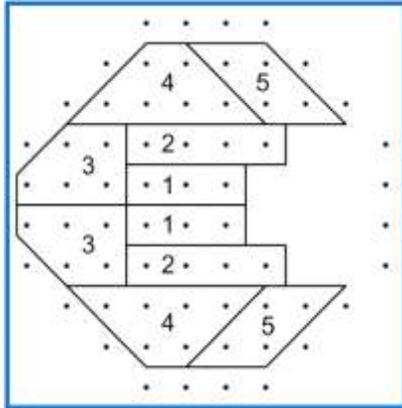
- The tested points are spaced in an equidistant grid pattern, with each point 6 degrees apart horizontally or vertically from any adjacent point.
- dB printouts illustrate the grid patterns.



## 30-2 full threshold grid



## Glaucoma hemifield test

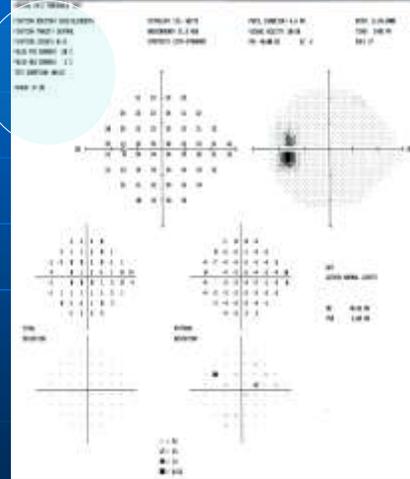


## Glaucoma hemifield test

- The GHT, devised for the Humphrey Field Analyzer, compares 24-2 visual fields into 10 regions, with 5 inferior regions representing mirror images of 5 corresponding superior regions.
- Differences between corresponding superior and inferior zones are compared with the differences present in the population of normal controls. Possible test outcomes are:

## Reliability tests

- Information about these factors is at the top of the chart.



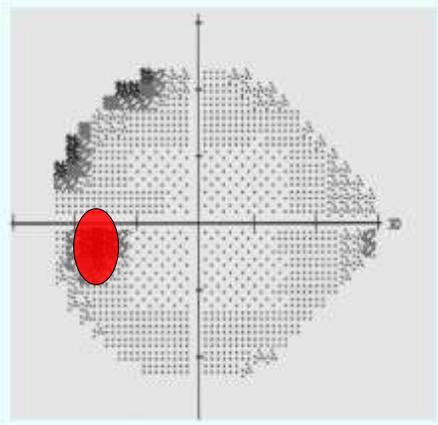
## Assess reliability

- Diagnostic and management decisions should not be made on the basis of **unreliable data**.
- The three measures of reliability are
  - fixation losses,
  - false negatives, and
  - false positives.

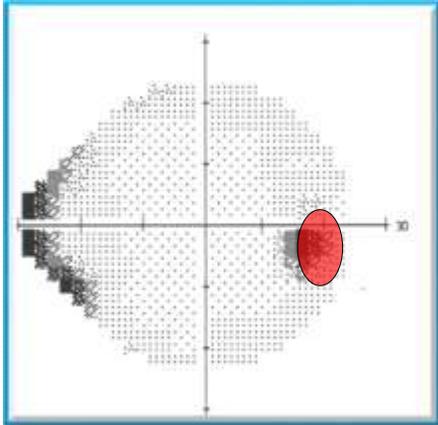
Fixation Monitor: Blind Spot  
 Fixation Target: Central  
 Fixation Losses: 2/17  
 False POS Errors: 0 %  
 False NEG Errors: 11 %  
 Test Duration: 05:40  
 Fovea: 32 dB

# Grey scale

LT Eye



RT Eye



**CENTRAL 24 - 2 THRESHOLD TEST**

**NAME HANAA ABD EL-HAMEID                      RIGHT**

BIRTHDATE 29-07-68    DATE 08-01-07

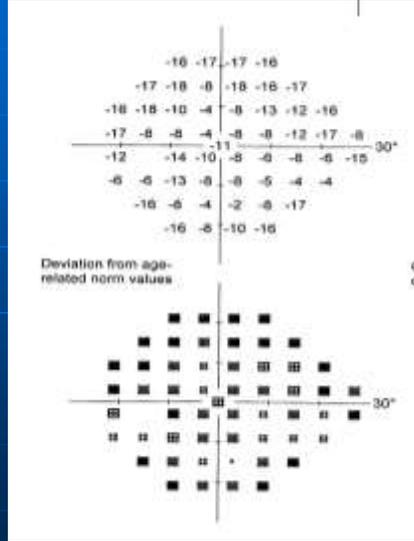
STIMULI III, WHITE, BOXWH 31.5 DEG ALNO SPV CHECK SIZE III      FIXATION TARGET CENTRAL II      TIME 08:54:51

STRATEGY FULL THRESHOLD      RI USED +1.00 DS      OSX      DEG      PUPIL DIAMETER      IN

AGE 39	21	25	18	24		
FIXATION LOSSES 0/22	18	9	27	28	25	25
FALSE POS ERRORS 0/9	24	19	21	31	30	26
FALSE NEG ERRORS 0/12						
QUESTIONS ASKED 480	25	21	27	28	31	30
POWER+ 25 DB	22	26	30	33	30	25
TEST TIME 13:08	26	29	31	31	26	30
WFA 5/18 040-2022	18	27	30	29	31	28
	35	21	19	28		
	19	11	20	20		

# Pattern deviation plot

- This plot is helpful in patients who may have a combined overall depression (from media opacity, for example) as well as localized loss from glaucoma.



# Guided progression analysis (GPA)

**HFA II-i Guided Progression Analysis (GPA) Summary Report**

The new GPA Summary Report for the HFA II-i provides a concise overview of a patient's entire visual field history on a single page, for most patterns. The single page printed is all you need.

**Baseline Excess** - A black triangle indicates a statistically significant change in the current test.

**VFI Index** - A secondary measurement of the patient's visual field status.

**VFI Rate of Progression Analysis** - A line graph showing the patient's visual field index over time.

**VFI Bar** - A bar chart showing the patient's visual field index over time.

**Current Visual Field Summary** - A comprehensive report of the patient's visual field history including VFI, MD, PSD, the Progression Analysis Plot and the GPA Alert.

**VFI Index** - A summary of the patient's visual field index over time.

**GPA Alert** - A message that indicates a statistically significant change in the patient's visual field index.

This GPA Summary Report presents two baseline fields showing individual visual field test results programmed chronologically over time as seen by the regression line as well as the black triangles in the Progression Analysis Plot and the GPA Alert.

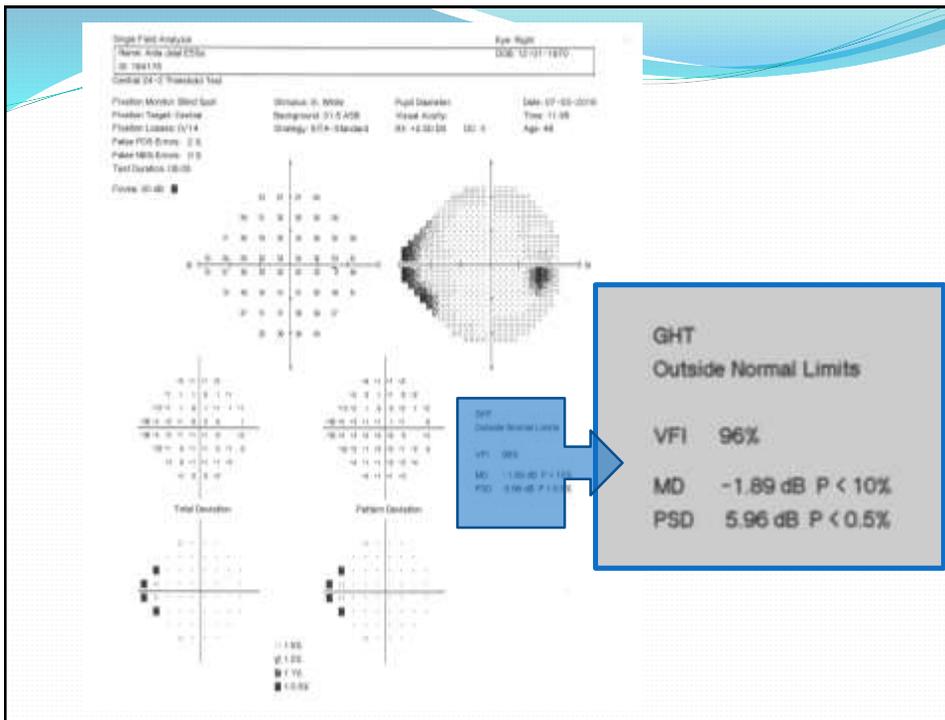
**GPA software identifies statistically significant changes in visual field threshold sensitivity automatically.**

# Visual field index (VFI),

visual field index (VFI), is a global index to determine the percentage of field loss on every visual field.

**This is designed to allow us to monitor our glaucoma patients for disease progression across the glaucoma spectrum,”**

**The visual field index is a number that gives you the age-adjusted visual field function that is designed to be less sensitive to cataract formation, which can often confound glaucoma diagnosis in perimetry.**



## Visual field interpretation

- Look for signs of **unreliable fields**: Are there many **false positives** (> 15% using SITA), or **losses of fixation** (> 33%)?
  - ✓ Is there a lens rim artifact or uncorrected ptosis? If the fields appear reliable, continue to step 2.
- Look at the **sensitivity map** to determine whether the field is within normal limits.
  - ✓ If the fields are **within normal limits**, there is no further analysis.
  - ✓ If one or both of the eyes exhibit **abnormal** fields, continue to step 3.

## Visual field interpretation

- Is the visual field damage present in **one or both eyes**?
- If only **one eye** is affected, the damage is located in front of the optic chiasm (i.e. the cornea, vitreous, retina, or optic nerve of only one eye).
- Damage in the visual fields **of both eyes** could be due to damage at the level **of the optic chiasm and beyond**, or due to **separate damage in the visual pathways** of each eye anterior to the chiasm.

## Visual field interpretation

- Locate the **region** of the visual field deficit.
- ✓ Refer to the patterns of visual field defects chart to determine the likely region of damage to the visual pathway.
- Identify the **shape of the visual** field defect.
- ✓ Refer to the chart to determine the likely region of damage to the visual pathway.

## Visual field interpretation

- **Compare** these visual fields with each of the patient's **previous** visual field tests to identify **progression** of visual field loss.
- Do not take a shortcut by comparing these fields to only the most recent visual field, as this may be misleading.
- Generally three or more visual field tests are necessary to evaluate disease progression.
- Consider the findings in the context of the physical exam findings and the results of other tests and imaging.

# Not every VF defect is glaucoma

