



## Foresee PHP®

Preferential Hyperacuity Perimeter

*See Wet AMD before your patients do.*



The **Foresee PHP®** Preferential Hyperacuity Perimeter provides an unsurpassed level of sensitivity and specificity in detecting recent onset Choroidal Neovascularization (CNV) and differentiating it from the intermediate (dry) state of AMD. The visual field analyzer monitors macular function by measuring relative photoreceptor field location and utilizing the phenomenon of hyperacuity, the ability to detect the misalignment of an object's location relative to the other objects in space.

By combining the patient interactive software with the innovative algorithm, PHP technology can identify CNV lesions when they are small and when visual symptoms are still unnoticed. Early detection remains the vital precursor to preserving vision and maximizing treatment outcomes. The earlier the detection, the earlier the treatment, and better the visual outcome.

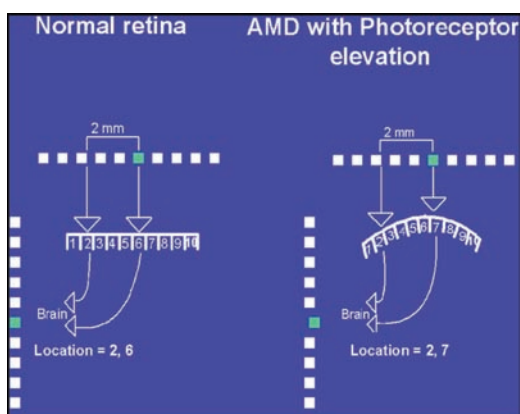


## Foresee PHP® Technology

The Foresee PHP Technology is based on the well-studied phenomenon of hyperacuity. Hyperacuity, also known as Vernier acuity, is the ability to detect misalignment of an object's location relative to other objects in space. This ability to detect misalignments is in the magnitude of 3-6 seconds of arc, which is 10 times better than the resolution ability in the fovea (around 30-60 seconds of arc). Hyperacuity is unaffected by a patient's age and is highly resistant to retinal image degradation, and is thus suitable for assessing retinal function in patients with cataracts as well.

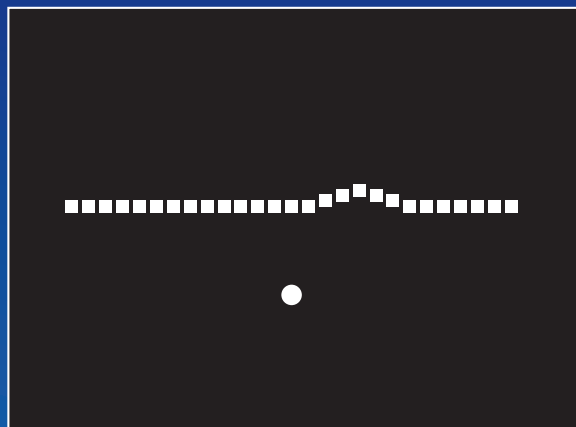
## How the Foresee PHP Test Works

When a dot-deviation signal is projected on a healthy retina, it stimulates a collinear set of retinal receptive fields. Special neuronal circuits in the visual cortex process this information, leading to the perception of a straight dot-deviation signal. When retinal pigment epithelium (RPE) elevation occurs, both in the case of when drusen are present as in intermediate AMD, and often to a more significant degree when CNV develops, a geometric shift in photoreceptor location might occur. The photoreceptor fields stimulated during RPE elevation may be different than those stimulated on a normal retina. Therefore, linear signals may be perceived as distorted or misaligned.



During the examination, the patient is presented with a series of dot deviation signals [Exam Figure 2]. These dot deviation signals are composed of a collinear set of points (dots), and include one or more dots positioned at different locations (artificial distortions).

The patient is instructed [Exam Figure 1] to mark on the touch-screen any deviations they may see on the dotted line. Different magnitudes of artificial distortions are presented during the test, to compete with the patient's actual pathological distortion(s) caused by AMD and a rise in the RPE. If there is a pathological distortion present, and if it is more pronounced than the presented artificial distortion, the patient will preferentially pick their own pathological distortion [Exam Figure 3]. This phenomenon is known as preferential looking.



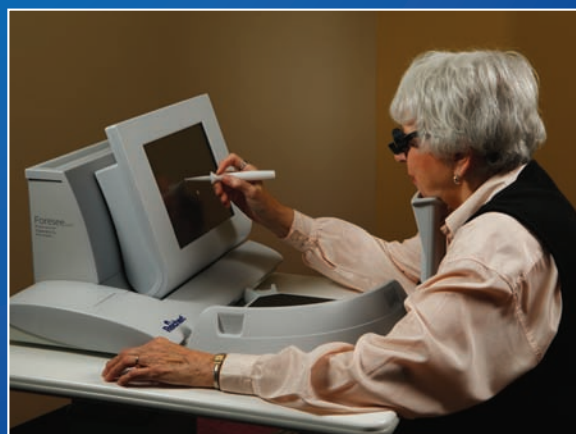
Dot-deviation with artificial distortion



Exam Figure 1



Exam Figure 2



Exam Figure 3

# Immediate Test Results

The Foresee PHP records whether the patient noticed the artificial or pathological distortion, both distortions, or if the patient did not notice either distortion. During the test, the degree of the artificial distortions are varied to identify the magnitude and extent of the visual field defect.

Patient response patterns are recorded and automatically analyzed by a customized algorithm, which compares the responses to a normative database. Immediate test results are presented in a detailed report. The first page test report presents

a Hyperacuity Deviation Map that identifies visual field defects (see below) and provides confidence and reliability parameters (false positive and false negative errors) for the test results. The confidence level indicates the likelihood that the test results are consistent with CNV or with intermediate AMD. A second page history report (not shown) gives enhanced features, such as tracking of hyperacuity deviation maps, p-values, total area, and total integrated intensity.

**Patient Data**  
Displays general patient data and total test time.

**Results**

- Reliability of the data based on false positive and false negative responses to stimuli.
- Represents the average deviation of the visual field compared to a normal reference.

**Hyperacuity Deviation Map**  
Identification of the location and severity of defects in vision due to defects in the retina.

**Comments**  
Recommendations on the next steps in patient management, based on test results.

**Remarks**  
Insert Doctor and Technician comments about the patient and test.

The screenshot displays the Foresee PHP software interface for a patient's test results. At the top, it shows patient information: Patient ID: 080821102317, Date of Birth: 8/21/2008, Gender: (blank), Test No.: 080821102317, Test Date: 8/21/2008, and Test Duration: 03:41 min. The main section is titled "Right Eye" and includes a "Results" box with the following data: "Within Normal Limits", "Reliable: Yes", "Baseline Test: Available", "Reliability Indices: 0.811 (Reliable) 0.5 (Unreliable)", "False Negative Errors: 0.016", and "False Positive Errors: 0.016". Below this is a "Hyperacuity Deviation Map" showing a grid of visual field degrees (7° to 7°) with a color scale from Minimal to Profound. The map shows two distinct red areas of deviation. To the right is an "Examination History" chart showing p-values over time (7/08 to 1/10) with a legend for Baseline, Reliable, and Unreliable. Below the chart are "Hyperacuity Defect Clusters" with three clusters listed, each with parameters like Consistency, Area (sq.deg.), and Integrated Intensity. The bottom section contains "Comments" with a recommendation to schedule the next test, "Additional Test Result" with p-values, test score, and total area, and "Clinic Details" for Eyecare Associates. The system version is noted as 4.0.0.

**Examination History**

- Track and monitor patients over time with chronological test recording.
- Comparison to a normative database of AMD and normal patients.
- P-value scoring

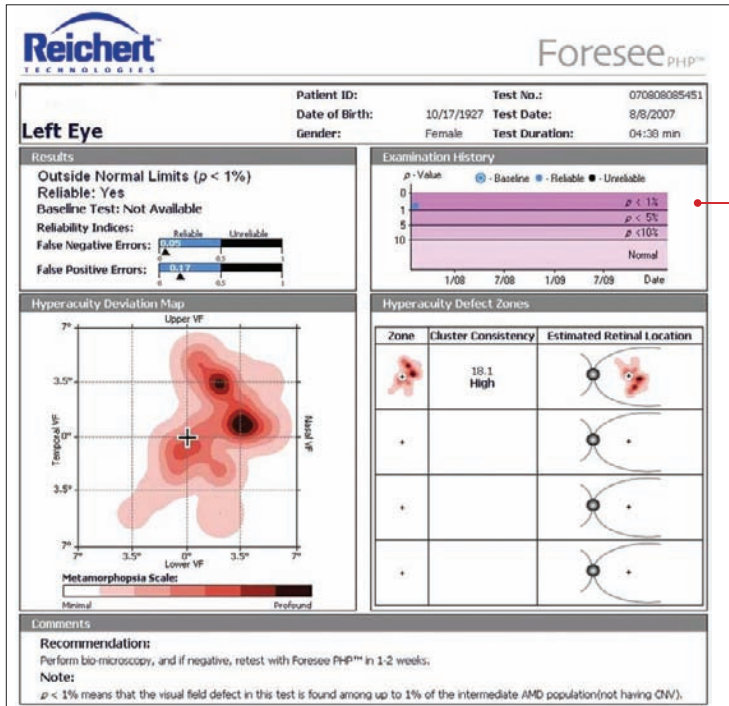
**Hyperacuity Defect Clusters**

- Defines areas that are suspected as being related to AMD progression in Clusters, and from largest to smallest.
- Presents cluster consistency, a value indicating the likelihood that the abnormality found was caused by a genuine visual field defect.
- Presents total area and total volume of clusters.
- Display anatomical location of defect cluster on the retina.

## Case Study

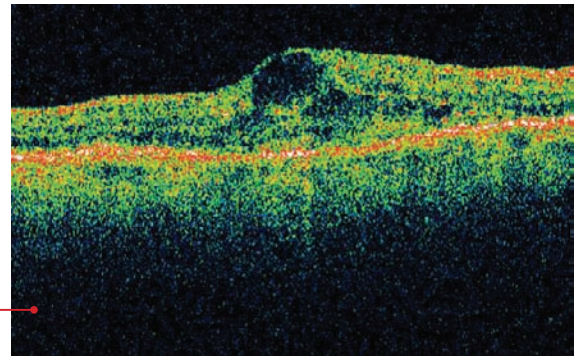
An 80 year old female presented blurred vision for two months in her left eye, with no clinical evidence of CNV present. The Foresee PHP test was performed, and the test result showed outside normal limits with a P-value less than 1%, and significant metamorphopsia. The reliable positive PHP test indicated the possible presence of CNV. An OCT and FA confirm clinical correlation with

the PHP results. The OCT showed evidence of subretinal fluid and a central macular thickness of approx 400 microns. The FA showed areas consistent with CNV. The patient underwent 3 Lucentis injections and vision improved from 20/200 to 20/20 and normalization of the OCT test.



### PHP

Abnormal test indicates a high probability of CNV.

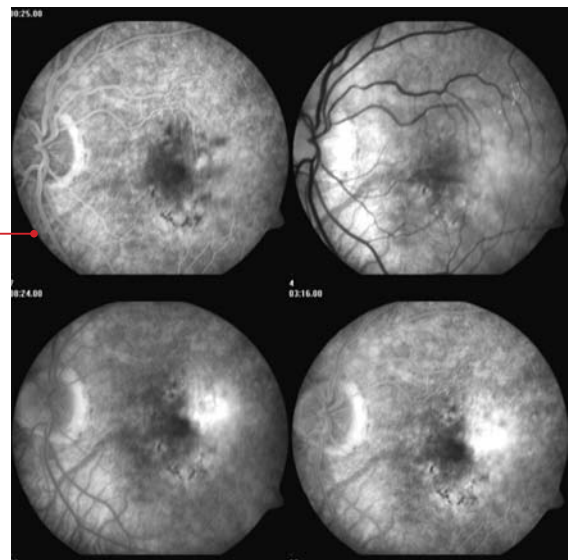


### OCT

Significant macular edema with increased foveal thickness.

### FA

Fluorescein Angiography showed leakage consistent with CNV.



## Features

- Early CNV detection – The only instrument clinically validated and FDA cleared for early detection of CNV.
- Normative Database Analysis for early detection of CNV.
- High sensitivity (82%) & specificity (88%) for early detection of CNV.\*
- Patient friendly – Interactive, quick, and non-invasive examination.
- Practice friendly – Touch-screen menus to expedite operations, automatic patient backup, and macular field testing in as little as 3 minutes per eye.
- Doctor friendly – Quantitative automated threshold visual field test for AMD monitoring.

\* Alster Y, Bressler NM, Bressler SB et al. Preferential Hyperacuity Perimeter (PreView PHP) for detecting choroidal neovascularization study. Ophthalmology 2005;112:1758-65

## Specifications

<b>Catalog Number:</b>	900F007
<b>Stimulus:</b>	Dot Deviation signal flashed over macular loci
<b>Area of Field Tested:</b>	Central visual field – 14°
<b>Data Storage:</b>	Data storage, backup, and transfer results stored on a hard drive. Dedicated USB memory stick for automatic results backup. Removable USB memory stick for results export and software upgrades.
<b>Results Export Format:</b>	HTML, JPEG, BMP
<b>Networking:</b>	Device ready for office networking
<b>Printer:</b>	External inkjet printer supplied
<b>Device Dimensions:</b>	12 inches (30 cm) height 20 inches (50 cm) width 12 inches (30 cm) depth
<b>Chin Rest &amp; Hand Switch Assembly Dimensions:</b>	8 inches (20 cm) height 16 inches (40 cm) width 16 inches (40 cm) depth
<b>Overall System Weight:</b>	40 lbs (18 kg)
<b>Electrical:</b>	100-240 V, 50/60 Hz, 1A max IEC-320 standard power inlet connector for worldwide use



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