

# Eye Morphology HAS\_EYE\_002

## Purpose

To detect abnormalities in eye morphology.

## Experimental Design

- **Minimum number of animals** : 7M + 7F
- **Age at test**: Ideal age = 15 weeks  $\pm$ 3 days. Minimal age = 14 weeks
- **Sex**: We would not expect the results of this test to show sexual dimorphism

## Procedure

1. Examine the anterior of both eyes (e.g. with slit lamp) and record any abnormalities
2. Test the iris/pupil light response
3. Image abnormal eyes as a minimum or all eyes if capacity permits
4. Dilate both eyes
5. Examine the anterior and posterior of both dilated eyes (e.g. with slit lamp and ophthalmoscope) and record any abnormalities
6. Image abnormal eyes as a minimum or all eyes if capacity permits

OCT:

1. Turn on the OCT and start the database
2. Anaesthetize mouse
3. Prepare mouse eyes with drops and place contact lens (focal length 10 mm) on the right eye
4. Enter mouse data in the "Create new patient file" area and switch to the "Acquisition" window
5. Move the OCT camera to the right position and activate measurement modus
6. Place mouse collaterally to the OCT camera on the right side of a platform that is fixed in front of the OCT lens
7. Search the contact lens in the live picture of the fundus image field and place the pupil of the mouse eye in the centre of the window
8. Move the OCT camera such that OCT lens and contact lens touch each other
9. Focus the fundus picture by slightly moving up/down or forward/backward
10. Save fundus images
11. Set the „Ref.Arm“ ruler such that the section of the retina is placed in the centre of the blue rectangle
12. Set the mode of measurement on „vertical, horizontal line“
13. Move the blue horizontal line in the fundus image field to the optic nerve level
14. Save images of retinal sections
15. Move the OCT camera to the left position
16. Repeat measurement procedure for the left eye

## Scheimpflug Imaging:

1. Turn on the Pentacam and start the patient data management
2. Apply one drop 0.5% Atropine to each mouse eye for pupil dilation
3. Enter mouse data in the "Patient" group box and switch to the Scan menu
4. Activate the "1 Picture" modus in the "Image Options" area
5. Move Pentacam to the right position
6. Hold the mouse on a platform such that the vertical LED 475 nm light slit is orientated in the center of the right eye ball
7. Guarantee optimal focus by using the fine adjustment software tool in the adjustment window
8. Start imaging manually by pressing the "Start Scan" button
9. Scheimpflug images are saved automatically
10. Move Pentacam to the left position
11. Repeat measurement procedure for the left eye

## Notes

- As a minimum, all abnormalities should be imaged.
  - Where capacity permits, all mice can be imaged
- Majority of parameters can be analysed using the standard approach for assessing categorical data. To increase power for analysis purposes, where an abnormality is detected in the left, right or both eyes, the data may be combined to generate one "abnormal" category.
- Data for both eyes is recorded under one parameter to distinguish phenotypes of incomplete penetrance in individuals and if an observation for one or both eyes cannot be made, this is recorded as 'no data'. The IMPC analysis pipeline does not take into account whether an abnormality is fully penetrant or not and the same weight is given for an abnormal observations in one or both eyes. In cases where it is not possible to confirm if an abnormality is present or not, the data is not included in the statistical analysis. The following logic is applied in determining whether to include the data in analysis:
  - If at least one of the eyes shows an abnormality in a particular parameter, the data for that specimen will be included in the statistical analysis even if the other eye is marked as "no data".
  - If the eyes are marked as "no data", or one eye is normal and the other eye is "no data" for a particular parameter the data for that specimen will not be included in the statistical analysis.

## Data QC

Image QC is typically performed during data collection to ensure high quality images are captured whilst eyes are dilated etc.

## Parameters and Metadata

## Eye HAS\_EYE\_001\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** eye

**Options:** present, absent left eye, absent right eye, absent both eyes,

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## Bulging eye HAS\_EYE\_002\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** bulging\_eye

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## Eye Hemorrhage or Blood Presence HAS\_EYE\_003\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** eye\_hemorrhage\_or\_blood\_presence

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Eyelid morphology** HAS\_EYE\_004\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** eyelid\_morphology

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Eyelid closure** HAS\_EYE\_005\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** eyelid\_closure

**Options:** normal, no data left eye, no data right eye, left eye closed, right eye closed, both eyes closed, no data for both eyes,

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## **Narrow eye opening** HAS\_EYE\_006\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** narrow\_eye\_opening

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Cornea** HAS\_EYE\_007\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** cornea

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Corneal opacity** HAS\_EYE\_008\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** corneal\_opacity

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Corneal vascularization** HAS\_EYE\_009\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** corneal\_vascularization

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Iris/Pupil** HAS\_EYE\_010\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** iris\_pupil

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Pupil Position** HAS\_EYE\_011\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** pupil\_position

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Pupil Shape HAS\_EYE\_012\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: pupil\_shape

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Pupil Dilation HAS\_EYE\_013\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: pupil\_dilation

Options: normal, no data left eye, no data right eye, left eye dilated, right eye dilated, both eyes dilated, no data for both eyes,

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## Pupil Light Response HAS\_EYE\_014\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: pupil\_light\_response

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Iris Pigmentation** HAS\_EYE\_015\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** iris\_pigmentation

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Lens** HAS\_EYE\_016\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** lens

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Lens Opacity** HAS\_EYE\_017\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** lens\_opacity



**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Fusion between cornea and lens** HAS\_EYE\_018\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** fusion\_between\_cornea\_and\_lens

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Synechia** HAS\_EYE\_019\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** synechia

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## **Retina** HAS\_EYE\_020\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** retina

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Retinal Pigmentation** HAS\_EYE\_021\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** retinal\_pigmentation

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## **Retinal Structure** HAS\_EYE\_022\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** retinal\_structure

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Optic Disc HAS\_EYE\_023\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: optic\_disc

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Retinal Blood Vessels HAS\_EYE\_024\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: retinal\_blood\_vessels

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Retinal Blood Vessels Structure HAS\_EYE\_025\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: retinal\_blood\_vessels\_structure

Options: normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Retinal Blood Vessels Pattern HAS\_EYE\_026\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** retinal\_blood\_vessels\_pattern

**Options:** normal, no data left eye, no data right eye, left eye abnormal, right eye abnormal, both eyes abnormal, no data for both eyes,

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## Persistence of hyaloid vascular system HAS\_EYE\_027\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** persistence\_of\_hyaloid\_vascular\_system

**Options:** absent, no data left eye, no data right eye, present left eye, present right eye, present both eyes, no data for both eyes,

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## Slit Lamp observation HAS\_EYE\_028\_001 | v1.2

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

**Description:** slit\_lamp\_observation

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## **Ophthalmoscope Observation** HAS\_EYE\_029\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

**Description:** ophthalmoscope\_observation

---

## **Slit Lamp Equipment ID** HAS\_EYE\_030\_001 | v1.0

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

**Description:** slit\_lamp\_equipment\_id

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## **Slit Lamp Equipment Manufacturer** HAS\_EYE\_031\_001 | v1.0

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

**Description:** slit\_lamp\_equipment\_manufacturer

---

## Slit Lamp Equipment Model HAS\_EYE\_032\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: slit\_lamp\_equipment\_model

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## Ophthalmoscope Equipment ID HAS\_EYE\_033\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: ophthalmoscope\_equipment\_id

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## Ophthalmoscope Equipment Manufacturer HAS\_EYE\_034\_001 |

v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: ophthalmoscope\_equipment\_manufacturer

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## Ophthalmoscope Equipment Model HAS\_EYE\_035\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: ophthalmoscope\_equipment\_model

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**PIL number** HAS\_EYE\_036\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: experimenter\_id

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**Optical Coherence Tomography Equipment ID** HAS\_EYE\_037\_

001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: optical\_coherence\_tomography\_equipment\_id

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**Optical Coherence Tomography Equipment Manufacturer**

HAS\_EYE\_038\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: optical\_coherence\_tomography\_equipment\_manufacturer

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## Optical Coherence Tomography Equipment Model HAS\_EYE

\_039\_001 | v1.0

[procedureMetadata](#)

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: optical\_coherence\_tomography\_equipment\_model

---

## Scheimpflug Equipment ID HAS\_EYE\_040\_001 | v1.0

[procedureMetadata](#)

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: scheimpflug\_equipment\_id

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## Scheimpflug Equipment Manufacturer HAS\_EYE\_041\_001 | v1.0

[procedureMetadata](#)

Req. Analysis: false

Req. Upload: false

Is Annotated: false



**Description:** scheinpflug\_equipment\_manufacturer

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## **Scheinpflug Equipment Model** HAS\_EYE\_042\_001 | v1.0

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

**Description:** scheinpflug\_equipment\_model

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## **Dilation Method** HAS\_EYE\_043\_001 | v1.0

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

**Description:** dilation\_method

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## **Topical Anesthetic** HAS\_EYE\_044\_001 | v1.0

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

**Description:** topical\_anesthetic

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## General Anesthetic HAS\_EYE\_045\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: general\_anesthetic

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## Date Ophthalmoscope equipment last calibrated HAS\_EYE\_047\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

## Date Scheimpflug equipment last calibrated HAS\_EYE\_048\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

## Date OCT equipment last calibrated HAS\_EYE\_049\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Images Ophthalmoscopy HAS\_EYE\_050\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

## Images Slit Lamp HAS\_EYE\_051\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

## Sheimpflug Lens description HAS\_EYE\_052\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Scheimpflug description HAS\_EYE\_053\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Scheimpflug min left eye lens density HAS\_EYE\_054\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## Scheimpflug max left eye lens density HAS\_EYE\_055\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## Scheimpflug mean left eye lens density HAS\_EYE\_056\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## Scheimpflug min right eye lens density HAS\_EYE\_057\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## Scheimpflug max right eye lens density HAS\_EYE\_058\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## Scheimpflug mean right eye lens density HAS\_EYE\_059\_001 | v1.

0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Unit Measured: %

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## OCT right corneal thickness HAS\_EYE\_060\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT right anterior chamber depth HAS\_EYE\_061\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT right total retinal thickness HAS\_EYE\_062\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT right inner nuclear layer HAS\_EYE\_063\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT right outer nuclear layer HAS\_EYE\_064\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT right posterior chamber depth HAS\_EYE\_065\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT left corneal thickness HAS\_EYE\_066\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT left anterior chamber depth HAS\_EYE\_067\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

---

## OCT left total retinal thickness HAS\_EYE\_068\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

---

## OCT left inner nuclear layer HAS\_EYE\_069\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

---

## OCT left outer nuclear layer HAS\_EYE\_070\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT left posterior chamber depth HAS\_EYE\_071\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## OCT B-scan of right retina HAS\_EYE\_072\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT B-scan of left retina HAS\_EYE\_073\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT VIP of right fundus HAS\_EYE\_074\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT VIP of left fundus HAS\_EYE\_075\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT B-scan of right cornea and lens HAS\_EYE\_076\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT B-scan of left cornea and lens HAS\_EYE\_077\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT VIP of right eye HAS\_EYE\_078\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## OCT VIP of left eye HAS\_EYE\_079\_001 | v1.0

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## Corneal Sclerization HAS\_EYE\_080\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Options:** absent, no data left eye, no data right eye, no data for both eyes, present left eye, present right eye, present both eyes,

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## Corneal deposits HAS\_EYE\_081\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Options:** absent, no data left eye, no data right eye, no data for both eyes, present left eye, present right eye, present both eyes,

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## Iris transillumination HAS\_EYE\_082\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Options:** normal, no data left eye, no data right eye, no data for both eyes, left eye abnormal, right eye abnormal, both eyes abnormal,

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## Vitreous HAS\_EYE\_083\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, no data left eye, no data right eye, no data for both eyes, left eye abnormal, right eye abnormal, both eyes abnormal,

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## Date of procedure HAS\_EYE\_046\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

## General comments HAS\_EYE\_084\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

## Procedural comments HAS\_EYE\_085\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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