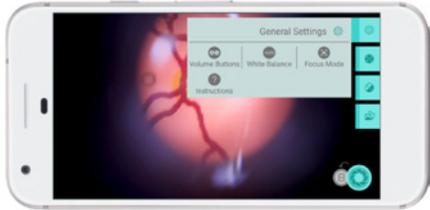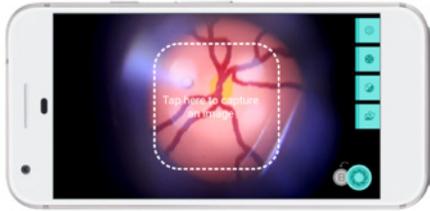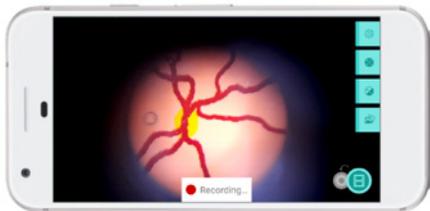*Custom camera settings*

General settings

Manual focus

Capturing a photo

Recording a video

ABOUT PEEK RETINA CAMERA

This app is a tool to help you capture better images using your Peek Retina device by optimising your camera settings for fundus imaging.

When using Peek Retina to examine a dilated eye you need to examine the optic disc and the macular area. The phone's standard settings make it easier to capture disc images but difficult to capture areas of the macular.

Our Peek Retina Camera app automatically optimises your phone's camera settings for use with Peek Retina to make it easier for you to capture good quality fundus images.

Unfortunately, the app does not work on all phones. We have optimised development on those phones most often in use in diabetic retinopathy screening programs. Once the functionality is proven we will strive to develop for more phones. We have also published the manual adjustments people can make if they wish.

USING PEEK RETINA CAMERA

Custom Camera Settings

There are a number of features within the app designed to improve the ease and quality of your retinal imaging. These can be accessed either using the controls along the shorter edge of the display or within the general settings menu.

White Balance - Allows adjustment of the overall colour of the image. On many handsets the auto white balance will find a great colour balance. On certain handsets, though, retinal images may have a saturated red channel leading to a poor image. Selecting the 'incandescent' or other "bluer" white balance settings may be useful in this case.

Focus Mode - Allows various different manual or automatic focus settings, depending on those allowed by your handset's manufacturer.

Continuous Photo/Video - The app will attempt to automatically adjust the focus as it deems necessary. Where imaging an eye with strong corneal reflections, lens or corneal opacity this may distract the autofocus resulting in the retina appearing out-of-focus. In this situation, using either 'Infinity' or 'Manual' focus settings may result in a better image.

Auto (Two-stage Autofocus) - The app will attempt to automatically adjust the focus only when you hold your finger on the capture area. Once you are happy that the image is in focus, release the capture area to capture an image. As with the continuous photo/video modes, imaging an eye with strong corneal reflections, lens or corneal opacity this may distract the autofocus resulting in the retina appearing out-of-focus. In this situation, using either 'Infinity' or 'Manual' focus settings may result in a better image.

Infinity Focus - The camera is set to focus at infinity meaning that only distant objects will appear in focus. For many handsets this will mean that the retina will appear in focus, even in eyes with strong corneal reflexes, lens or corneal opacities. However with some handsets the retina may appear slightly out of focus and a manual focus setting which is slightly nearer than infinity is required. Such a setting can be set using the Manual Focus setting where supported by the handset's manufacturer.

Manual Focus - Allows you to find the right focus manually using the manual focus slider. This is most easily found by setting the focus at the 'furthest' setting and then slowly bring it nearer until the retina becomes clear.

Exposure Adjustment - Allows the right image 'brightness' to be set. How bright a retina appears varies from eye to eye, particularly between eyes of different ethnicities. Also within eyes adjusting the exposure can help achieve a better image. When looking at the optic nerve reducing the exposure can avoid image saturation and add more detail to the image. Other parts of the retina, particularly the macula, are considerably darker however and here increasing the exposure can increase image quality, revealing more detail.

CAPTURING PHOTO AND VIDEO

Capture still images - Once you have a clear image on the screen, you can capture the image by simply tapping in the centre of the display.

Switch capture mode - Press this button to switch between capturing still images and video. Still images often have higher image quality compared to videos and take up less storage. However a short video guarantees the capture of even a fleeting glimpse of an important retinal feature without having to worrying about pressing-to-capture at the right moment. This is particularly useful when imaging uncooperative patients.

Start / stop recording video - When in video mode, you can start recording by tapping the capture area in the centre of the display. To stop recording tap the same area again. Note that during recording the camera settings cannot be adjusted.

Image and Video Gallery

The gallery allows you to view back all of the images and video that you have captured using the app. Media from each session is sorted into a separate sub-directory. By default, the gallery opens in the sub-directory for your current session. If you wish to view media from a previous session press the back button in the top left of the screen and select the relevant sub-directory. Once you have found the image or video that you wish to view press its thumbnail and it will be opened in you phone's default image viewer or video player respectively. To return to the gallery press the back button.
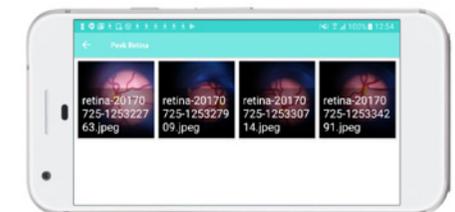

Image and video gallery

CAMERA FEATURE COMPATIBILITY

Operating System		Auto White Balance AWB	Continous Autofocus CF	Two-Stage Autofocus AF	Infinity Focus ∞	Manual Focus	Exposure Adjustment	Manual ISO	Manual Shutter Speed	Manual White Balance	HDR/Burst Mode HDR
Android 5.0-7.1.2	OS Support*	✔	✔	✔	✔	Varies*	✔	Varies*	Varies*	Varies*	Varies*
	App Support	✔	✔	✔	✔	If supported by phone manufacturer	✔	Not yet	Not yet	Not yet	Not yet
Android <5.0	OS Support*	✔	✔	✔	✔	✘	✔	✘	✘	✘	Varies*
	App Support	Peek Retina Camera is supported for Android 5.0+ only									
iPhone	OS Support*	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
	App Support	Peek Retina Camera is supported for Android 5.0+ only (see suggested iPhone settings for other manual camera apps below)									
Other (e.g. Windows Phone)	OS Support	Varies									
	App Support	Peek Retina Camera is supported for Android 5.0+ only									

MORE ABOUT PEEK

Peek creates tools and health intelligence that radically increase access to eye care worldwide. We harness the power of smartphones to help make this happen.

We create apps, devices and services, to increase access and help make impact for people with vision problems.

Peek, Peek Retina and Peek Retina Camera are trading names of Peek Vision Ltd, a company wholly owned by The Peek Vision Foundation (registered charity number 1165960).

For more on Peek and full T&Cs please visit **www.peekvision.org**

* Operating System support does not guarantee that the handset's standard camera app will provide this functionality. For Android 5.0 (Lollipop) and above the availability of manual camera settings varies by handset. We recommend using the Manual Camera Compatibility Test (https://play.google.com/store/apps/details?id=pl.vipek.camera2_compatibility_test) to understand which manual camera functions your phone supports. For iPhone there are a variety of manual camera apps available for a wide range of prices.

Settings for iPhone Manual Camera Apps

We don't have an app for the iPhone yet but there are a number of manual camera apps available on the Apple App Store. These range from free apps to apps used in recording cinematic releases. We haven't exhaustively tested all of these apps but have found that Shutter (https://itunes.apple.com/us/app/shutter-manual-camera) contains many of the features necessary for improving Retina's performance. The settings in the table below represent a good starting point from which you can adjust the focus and exposure so to fine tune the image clarity and brightness for different parts of the eye.

Peek Retina brightness setting	Focus mode	Exposure Adjustment
Medium	Infinity or Manual	75%