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Summary of research

Key words: Retina, images, vascular, mortality

The focus of this proposal is to quantify the shape and size of retinal vessels from the digital photographs of the retina. Recent studies have also shown that retinal vessel width and tortuosity are associated with cardiovascular risk factors from an early age, suggesting that these measures may be early physio-markers of vascular health. We propose to evaluate the distribution and determinants of these indicators of vascular health and their relationship to the future onset of both fatal and non-fatal disease.

A central purpose of UK Biobank is to identify predictors of future disease, with a view to prevention, early detection, and selective clinical management of high risk groups. Our proposal falls within this remit.

Drs Rudnicka, Owen and Barman (members of UK Biobank Eyes and Vision Consortium) and have worked together on retinal images analysis of a large dataset of child retinal images. Owen and Rudnicka are investigators on an HTA funded project examining performance and cost effectiveness for the NHS of automated diabetic retinal imaging software.

The focus of this proposal is to:

- i. Fully automate identification and quantification of vessels in retinal images, including identification of arterioles and venules
- ii. Examine cross-sectional determinants of retinal vessel size and shape
- iii. Investigate the association between retinal vessel size and shape with

cardiovascular disease precursors, and future onset of both fatal and non-fatal disease.

This research can be used to understand factors that influence the size and shape of retinal vessels and their role in prediction of cardiovascular risk / events. This project requires access to data only (not the biological samples) but we wish to access data on biochemical markers and health outcomes, as and when they become available.