Innovative optical concept offers simple, affordable, fast glaucoma screening test

September 13 2016, by Debbie Mayhew

Credit: Cambridge Consultants

Innovative technology from product design and development firm Cambridge Consultants could help combat glaucoma – a major global cause of blindness, second only to cataracts. It offers a low-cost, user-friendly way of diagnosing and monitoring the disease – so that early intervention and treatment can help slow its progress.

Glaucoma affects more than 60 million people worldwide. It leads to optic nerve damage as a result of abnormally high fluid pressure inside the eye. The most common form is open-angle glaucoma, which affects around 95% of patients. It causes a gradual loss of peripheral vision – but can be virtually unnoticeable to the patient until they have lost half of their visual field. The damage is irreversible so, without treatment, an individual can become totally blind.

Open-angle glaucoma is hereditary – a family history of the disease increases the risk of an individual developing glaucoma by a factor of between four and nine. So regular checks are crucial for those at risk – and frequent monitoring is needed if problems start to develop.

The new Viewi optical concept developed by Cambridge Consultants shows how it could be possible for patients to monitor any effect on their vision in the comfort of their own homes. At the moment, patients typically have an annual optometrist or hospital check-up using a visual field analyser. Flashing lights at varying points of the visual field test sensitivity – with the patient pressing a button each time they see a light. The novel Viewi technology performs the same test but at a fraction of the cost – around £20 rather than £20,000 for the clinical device.

At the heart of the Viewi concept is the extensive optical expertise of

Cambridge Consultants, which has been combined with a smartphone app to reproduce the hospital-based 'static perimetry' test. The smartphone is slotted into the light and portable headset, and runs a fast, conventional suprathreshold test in less than five minutes per eye. The patient simply presses a button – connected to the headset wirelessly via Bluetooth Smart – each time they see one of the flashing dots.

Human factors considerations were a key element in the design of the Viewi system as it had to be user friendly for patients with sight problems, many of whom are also elderly. The results of the static perimetry test are displayed in a non-technical, intuitive format on the smartphone – tracking the progression of the disease – and can be shared instantly with the patient's optician.

"Loss of vision as a result of open-angle glaucoma cannot be recovered – but early diagnosis and treatment can slow the progression of the disease," said Simon Karger, head of surgical and interventional products at Cambridge Consultants. "But although the current clinical tests work exceptionally well, the system for glaucoma management is overloaded.

"We've used our optical expertise – coupled with our algorithm skills – to show how a simple, affordable, fast glaucoma screening test that patients can do at home is entirely feasible. The Viewi system doesn't aim to replace the current screening and management system – it's been designed to augment the clinical tests."

The innovative Viewi concept has been hailed as an important advance by optics expert Chris Dainty, a professor at University College London Institute of Ophthalmology and Moorfields Eye Hospital.

"The Viewi technology could provide a valuable early warning system for people at risk of developing glaucoma, as well as patients who need to monitor the effects of the disease on their vision," he said. "It could

also make the static perimetry test accessible to more patients in developing countries, where expensive clinical equipment and trained professionals are often in short supply."

Provided by Cambridge Consultants