Role of the Brien Holden Vision Institute in Diabetic Eye Disease Management

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The Challenge: Closing the Gap

Diabetes - Rate of Blindness

14x higher from diabetes

Non Aboriginal

Aboriginal

(Reference)
### New Research and Utilisation

#### What We Have Learnt:

- Gap in Aboriginal health care
  - Limited access
  - ‘Leaky pipe’
- Early detection and prompt referral paramount
- Diabetics need annual eye exams
- Retinal cameras are a critical part of the solution

#### What Is Needed:

- Accessible
- User friendly (non-mydriatic & automatic)
- Automated detection of key retinal features
- Portable/Durable/Available
- Cost effective
- Accurate/objective
- End-user driven
The Ideal System

**Will:**
- be widely available and accessible
- have instrumentation that is:
  - automatic
  - portable
  - ruggedized
  - cost-effective

**And Will:**
- produce high quality images
- provide accurate recording, analysis & assessment
- guidance on-site and to the expert (remotely if needed)
Our Hypothesis:

That the **EyeQ System** will help provide accessible, early and effective detection, ‘diagnosis’ and management of blinding eye disease.
Objective

- To develop the EyeQ system; an affordable and innovative high-resolution retinal camera that acquires multispectral images (MSI) of the retina, coupled with a custom image analysis (ImA) algorithm and artificial intelligence (AI).

- This will provide automated, same-visit detection and interpretation of retinal images that can be used by health care workers in regional/remote and Aboriginal communities and professionals at all levels of the health system.
**The Solution: The EyeQ System**

- Automatic: can be used by non-expert operators
- Accurate (sensitivity/specificity)
- Fit for environment, fit for purpose
- Same-visit recommendation

- Provide detailed HQ MS and stereoscopic images and analysis for the Expert to review and manage the patient either on-site or remotely
- By 2015, System for detection, interpretation and ‘diagnosis’ of diabetic retinopathy and glaucoma
- By 2015, risk assessment software
- Beyond 2015 – many other conditions detected
We have Image Analysis for Feature Extraction

- Current image analysis software applied to a conventional RGB retinal camera image
  - vascular branches
  - optic disc
  - macular
  - exudates
  - haemorrhages

- What we need is Automated algorithm feature analysis with High Res images
Unique HQ Multi-Spectral Imaging Camera

Confounding of colour information limits image analysis options.

Conventional Camera

Composite Colour Image

Multi Spectral Images & HiRes Camera reveal detailed features unobtainable with colour cameras.
RESEARCH

- Determine the knowledge, attitude and awareness of health care workers in detecting diabetic retinopathy

- To develop a team approach for detecting, referring and managing diabetic retinopathy

- To develop and evaluate a diabetic retinopathy program for a health district.
Human Resource Development
Service Delivery in KZN

33 optometrists
11 Districts
123 clinics
1,200,000 patients
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