



Centre for Eye Health

2017 YEAR IN REVIEW

Summary Document



An initiative of Guide Dogs NSW/ACT and UNSW



UNSW
SYDNEY

I EXECUTIVE SUMMARY

In 2017 Centre for Eye Health entered a new phase of growth with the opening of our first satellite clinic in Sutherland Hospital. This significant achievement is the result of an innovative and unique collaboration between optometry and ophthalmology working together under the RANZCO Collaborative Care Guidelines. It represents the first milestone in our pursuit of integrated care and vision rehabilitation (in association with Guide Dogs NSW/ACT - GDN). 2017 also saw significant growth of the Glaucoma management clinic (GMC) with patient appointments increasing 73% from 2016. Patient appointment numbers since the inception of the clinic through to the end of 2017 total almost 1400. The GMC is a collaboration between the Prince of Wales Hospital Ophthalmology Department and the Centre for Eye Health

Our reputation for clinical excellence remains strong within the industry, feedback from our patients remains overwhelmingly positive and referrals continue to increase. We continue to use an evidence-based approach to seek ongoing excellence in clinical care, research and education.

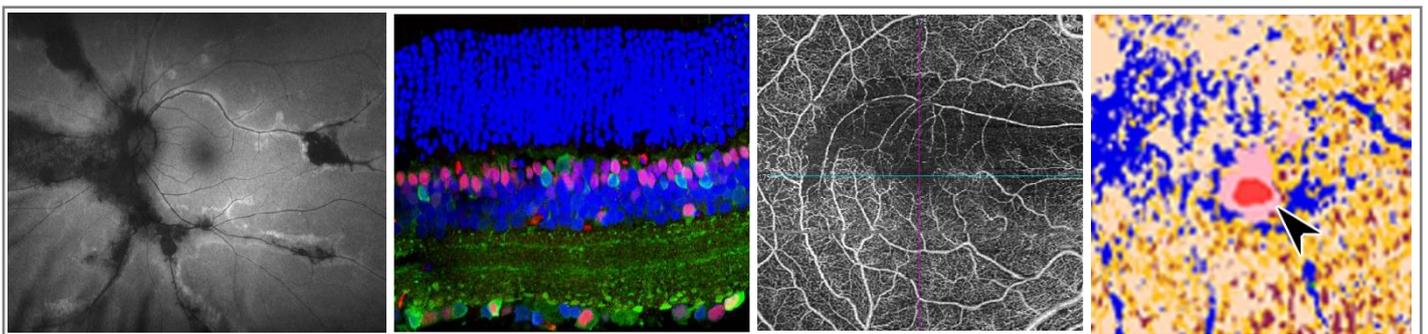
Other highlights for 2017 include the implementation of a pilot program to facilitate referrals to CFEH from Prince of Wales Hospital, internal restructuring to facilitate growth of the Centre, innovation in the form of diagnostic aides for optometrists, development of a post-graduate course in ocular disease diagnosis and management, development of a training course on diabetic retinopathy for GP's, and the publication of 11 papers in peer-reviewed journals (with 8 more accepted for 2018). Throughout 2017 we have also continued to explore new collaborative opportunities.

We have been fortunate to have several collaborative relationships that were instrumental in the success of CFEH in 2017. These include, but are not limited to our relationship with the School of Optometry and Vision Science (SOVS), the Prince of Wales Hospital, Sutherland Hospital and GDN. Our funding is predominantly derived through GDN support: we are thankful in the continued support of the Centre. We do however, continue to explore other sources of funding through strategic partnerships with industry and the professions.

Internally we are fortunate to have a talented, dedicated and cohesive team who consistently work together to achieve the goals of the Centre. Our team is one of our greatest strengths and has been instrumental in making CFEH the innovative, evolving organisation we have today. Additionally, the flexible and malleable systems we have developed make our model eminently adaptable for future expansion. Together, these two invaluable assets will help us as an organisation to overcome any challenges presented by our future expansion and to thrive into the future.

Michael Kalloniatis
Centre Director (on behalf of CFEH executive)

January 2018



2 STRATEGIC FRAMEWORK

2.1 Mission

To provide our community with increased access to advanced diagnostic services and ensure the early identification of eye disease.

2.2 Vision

To reduce the incidence of preventable vision loss.

2.3 Core Services

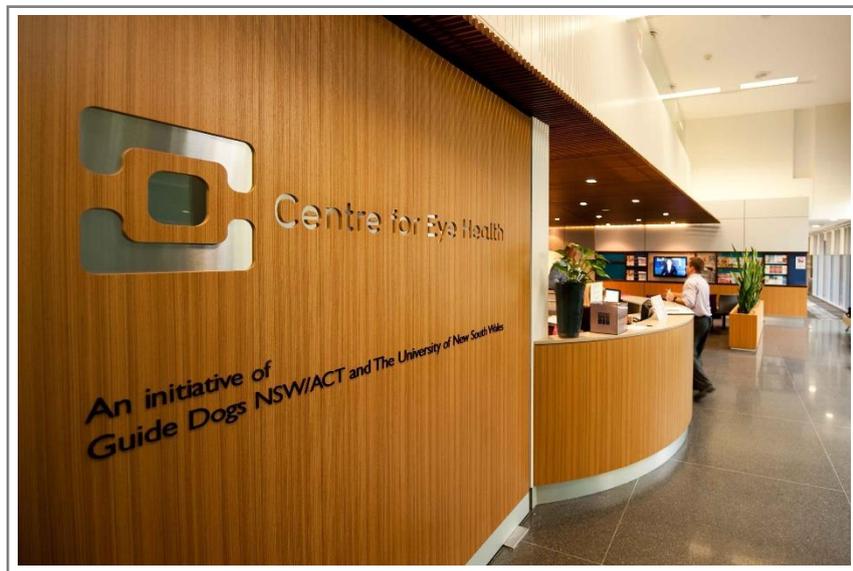
1. Advanced imaging and diagnostics service for early detection of eye disease.
2. Expert clinical recommendations and advice on eye imaging and visual system diagnosis. Where appropriate, CFEH optometrists consult with ophthalmologists from South Eastern Sydney Local Health District for interpretation of test results and to determine suitable management of patients.
3. Provision of clinical services within a public hospital, working with hospital based ophthalmologists in a collaborative-stratified care model.
4. Provision of education and raising awareness of eye disease.

2.4 Policy

Provide services free of charge to the patient.

2.5 Goals

1. To have a substantial impact on eye health in NSW/ACT and Australia by providing **increased access** to advanced eye imaging and diagnostic services that facilitate the early detection and intervention of eye disease;
2. To provide **high quality** advanced eye imaging and diagnostic services;
3. To provide **education and support** for the advancement of eye health;
4. To be a valuable resource for the **public health** system in the area of eye health care;
5. To ensure we remain a **growing, sustainable and socially responsible** provider of services.



3 2017 KEY ACHIEVEMENTS

1. **Service Delivery:**

- Referrals increased 9.5% to 7,938, and the number of patients evaluated increased 9.7% to 7,373.
- Occasions of service increased 15.4% to 45,237.
- 1400 appointments have been completed in the Glaucoma Management Clinic (GMC) since its inception and the clinic is now approaching clinical personnel cost recovery.
- Ophthalmology consults increased 22.7% to 3209.

2. **The Sutherland Hospital (TSH) clinic** was opened in April this year with 409 patients evaluated during 2017: this number will continue to grow in 2018.

3. **The student model** has led to continued efficiencies while maintaining excellent health care delivery. Student evaluations of the clinical rotations have continued to be excellent. Increased student numbers in 2018 and the implementation of the student model at Sutherland hospital has required adaptation of this model and this will continue to be refined throughout 2018.

4. **Learning for Vision** (Continuing Professional Development – CPD) and other partnerships

We have formed strategic partnerships with Optometry NSW/ACT, New Zealand Association of Optometrist (NZAO) and the Association of Optometrist Ireland (AOI). Through these associations we provide on-line CPD to around 3,000 optometrists.

Our optometrists continue to be invited to present at both national and international conferences with 29 invited lectures given in 2017 in addition to the 10 CFEH webinars produced annually. We also produced an on-line diabetic retinopathy training course for GPs that has been accredited by the Royal Australian College of General Practitioners (RACGP) and the Australian College of Rural and Remote Medicine (ACRRM). This course was developed as part of a government-funded program aimed to improve eye care for indigenous Australians (the consortium is led by the Brien Holden Institute and also includes the Australian College of Optometry, Optometry Australia and the Aboriginal Health Council of South Australia). There are currently 90 GP's registered for this course with more expected in 2018 as the retinal camera continue to be rolled out into rural practices.

5. **Research informing clinical practice:**

CFEH staff published 11 peer-reviewed papers, an additional three have been accepted and are available 'on line' and five others accepted and to be published in 2018 (six publications in A/A* journals). We also continue to publish clinically relevant material in non-peer-reviewed in professional publications.

We have activated the two arm triage study with Prince of Wales Hospital Ophthalmology (POWHO) which is outlined later in this document (section 6.5.1).

6. **Innovation**

CFEH has developed and patented a computer program that helps optometrists detect change over time by "flicking" between images. This has proved clinically valuable in patient follow-up evaluations and discussions are underway with a pharmaceutical company to bring this resource to Australian optometrists as part of an educational program.

We have also activated a second provisional patent entitled "Multi-modal pattern recognition bio-imaging of the eye" with the inventors being Kalloniatis M, Ly A and Nivison-Smith L. This patent incorporates work undertaken by Ms Ly as part of her PhD studies.

4 2017 PROGRESS REPORT

4.1 Glaucoma Management Clinic

We have grown the glaucoma management clinic (GMC) with a 73% increase in patient appointment numbers (compared with 2016 numbers). Almost 1,400 patient appointments have been completed since the clinic was opened in 2015. This is the result of increased referrals, increased efficiencies and the addition of extra clinics. An on-going PhD research project is concerned with evaluating the demographics of glaucoma patients to determine their suitability for collaborative care as well as developing referral pathways.

4.2 CFEH services at the Sutherland Hospital (TSH)

April 2017 saw the launch of CFEH's first satellite clinic at the Sutherland Hospital (TSH). The primary goal of this optometry-ophthalmology collaboration was to allow continued access to quality, public ophthalmology care for patients of the Sutherland Shire (cataract surgery, emergency assessments and hospital in-patient consultations). Other goals include launching a new diabetic retinopathy screening and management service in response to a need identified by the internal hospital endocrinology service and allowing local access to CFEH's imaging services

Since opening, 529 referrals from local optometrists have been made while 29 additional referrals have come from GP's and internal endocrinology. Initial issues associated with the establishment of the clinic have been resolved and we look forward to greater growth of this service in 2018.

The GDN/CFEH and TSH affiliation has ensured expansion of public ophthalmology service in the region and the continuation of an accredited RANZCO registrar training position. It has also made available ophthalmic equipment additional to that available in the public ophthalmology services. Over 40 TSH patients in 2017 have received vital imaging studies that were not previously available at the hospital

4.3 Financial sustainability

The cost recovery for the GMC is 91% CY and 95% FYTD for clinical personnel costs. Increases in billing will see this cost recovery approach 100% with further refinement of efficiency gains. TSH-CFEH project is currently achieving cost recovery of 42% for personnel costs however this is expected to rise in 2018 with rostering changes and better utilisation of student technicians. We continue to generate alternate funding through CPD delivery, Medicare income, intellectual property, strategic partnerships and other sources.

4.4 External Services and Expanding Relationships

The Centre for Eye Health continues to develop relationships with key organisations in eye health. These include Vision 2020, Optometry Australia (OA), Glaucoma Australia, Lions Eye Health Programme, Benevolent Society, Sydney Partnership for Health Education and Research and Enterprise (SPHERE), Australian Health Research Alliance (AHRA), I-Care (Finland), Heidelberg Engineering (Germany), the School of Optometry and Vision Science (SOVS) at UNSW Sydney, the members of the consortium led by Brien Holden Vision Institute (Australian College of Optometry, Optometry Australia, Aboriginal Health Council of South Australia) and Guide Dogs.

4.5 Research and Publications (credibility and trust)

Scholarly articles published by staff at CFEH numbered 11 in 2017 and a further 8 have been accepted and for publication 2018. Numerous other, non-peer-reviewed articles were also published in optics/optometry magazines, all providing useful information to clinicians.

The necessity to evaluate new clinical pathways has led to implementing a full evaluation of the TSH clinic (in collaboration with Macquarie University and the George Institute) and a registered clinical trial of the POWHO triage service.

5 2017 KEY PERFORMANCE INDICATORS

5.1 Overview

	2010	2011	2012	2013	2014	2015	2016	2017	
Occasions of service	15,184	31,321	34,116	37,341	33,589	35,853	39,204	45,237	271,845
Referrals	3,388	5,732	6,001	6,088	6,369	5,861	7,248	7,938	48,625
Appointments	2,696	5,256	5,513	6,375	6,071	6,299	6,719	7,372	46,301
Active Referrers	410	529	558	573	593	660	838	755	
Registered practitioners	788	956	1057	1144	1,205	1,277	1,367	1,466	
Ophthalmology Consults	208	551	1168	1262	1,332	1,743	2,615	3,209	12,088

Key KPIs of referrals, appointments and occasions of service all increased in 2017.

CFEH has now registered approximately 80% of optometrists in NSW/ACT and about one third of ophthalmologists in NSW. Referral and appointment numbers have significantly increased from 2016 (9.5% and 9.7% respectively). Ophthalmology consults in 2017 increased significantly, however this is largely influenced by the expanded GMC.

5.2 Glaucoma Management Clinic (GMC) costs (clinical personnel only)

Recovery of clinical staffing costs in the GMC is approaching 100% primarily due to the higher Medicare billing possible during glaucoma consultations (examination and visual field assessment are both billable).

5.3 Patient Feedback

Feedback from all CFEH patients is collated and analysed. Overall, the feedback in 2017 was excellent with high praise for the CFEH staff, the service and equipment. As part of the feedback process, any aspect of a patient’s experience that is perceived to identify areas of improvement, where possible, steps are made to improve procedures based on this feedback. In 2017 the key areas addressed related to parking and the communication of imaging results with patients.

Some examples of the feedback received during 2017:

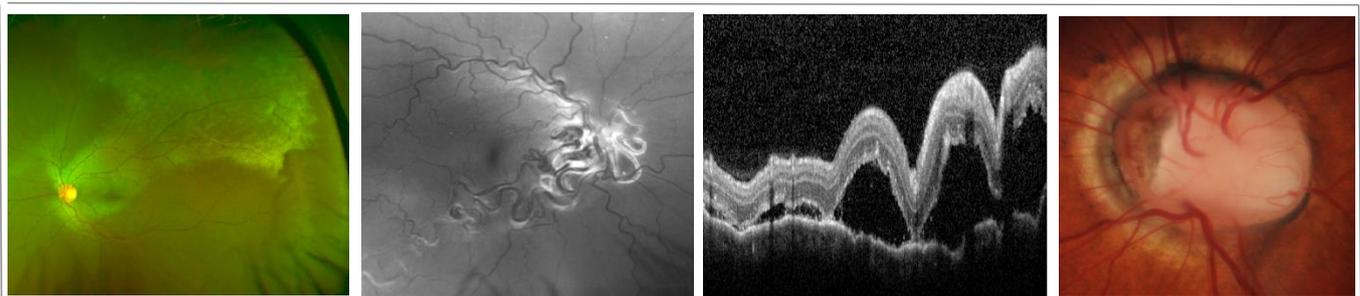
“Very Impressed with the staff and the service.” (T. Yew)

“The Staff were great and extremely professional. Many Thanks” (P. Cachia)

“Best facility I have been to. Clean, modern, very helpful, polite, respectful staff. A pleasure.” (Andrew)

“Best Ever experience at a Healthcare centre.” (R. Cossen)

“As a long time user of services, they are just wonderful.” (S. Barry)



6 LOOKING AHEAD AND ACHIEVEMENTS

6.1 Centre for Eye Health Continuation and Expansion

The key strategic areas for 2018 are as follows:

- Securing an affiliation agreement for the continuation of the Centre with UNSW. This will allow continuation of the MoU with the local health district (SESLHD) relating to POWH and TSH.
- Continuing negotiations with potential partners to set up new CFEH satellite clinics with the goal of making our facilities available to more people and further relieving the strain on the public health system.
- Expand the GMC and evaluate and implement triaging for referred patients (in association with POWH).
- Implement integrated care including GP referrals and provision of vision evaluation and rehabilitation services (with TSH and GDN)
- Co-ordinate clinical care education for local optometric practitioners and co-ordinate low vision services to GDN patient service centres throughout NSW/ACT.
- Education, Support for Referrers and Research - Continue to build a reputation and expand activities in these areas.

6.2 Published Work

6.2.1 Publications:

CFEH staff published 11 peer-reviewed papers in 2017, an additional three have been accepted and are available 'on line' and five others accepted and to be published in 2018 (six publications in A/A* journals). We also had 4 articles published in non-peer-reviewed professional publications.

Peer-reviewed publications by staff from CFEH (2017)

1. LY, A., NIVISON-SMITH, L., HENNESSY, M., KALLONIATIS, M. (2017). The advantages of intermediate-tier, inter-optometric referral of low risk pigmented lesions. *Ophthalmic and Physiological Optics* 37: 661–668.
2. PHU, J., SIEU, K., NIVISON-SMITH, L., ZANGERL, B., CHOI, A., JONES, B., PFEIFFER, R., MARC, R., KALLONIATIS, M. (2017). Pattern Recognition Analysis Reveals Unique Contrast Sensitivity Isocontours Using Static Perimetry Thresholds Across the Visual Field. *Investigative Ophthalmology and Visual Science*. 58(11):4863-4876.
3. YOSHIOKA, N., ZANGERL, B., NIVISON-SMITH, L., KHUU, S. K., JONES, B. W., PFEIFFER, R. L., MARC, R. E., & KALLONIATIS, M. (2017). Pattern recognition analysis of age-related retinal ganglion cell signatures in the human eye. *Investigative Ophthalmology and Visual Science*. 58(7):3086-3099.
4. LEVENKOVA, A., SOWMYA, A., KALLONIATIS, M., LY, A., & HO, A. (2017). Automatic detection of diabetic retinopathy features in Ultra-Wide Field retinal images. *SPIE Medical Imaging*, 101341M-101341M-8.
5. ZANGERL, B., WHATHAM, A., KIM, J., CHOI, A., ASSAAD, N. N., HENNESSY, M. P., & KALLONIATIS, M. (2017). Reconciling visual field defects and retinal nerve fibre layer asymmetric patterns in retrograde degeneration: An extended case series. *Clinical and Experimental Optometry*, 100(3), 214-226.
6. YOSHIOKA, N., WONG, E., KALLONIATIS, M., & ZANGERL, B. (2017). Repeatability of Heidelberg retinal tomography 3 and effect of alignment algorithm on glaucoma suspects. *Clinical and Experimental Optometry*, 100(1), 41-48.
7. PHU, J., KHUU, S. K., ZANGERL, B., & KALLONIATIS, M. (2017). A comparison of Goldmann III, V and spatially equated test stimuli in visual field testing: The importance of complete and partial spatial summation. *Ophthalmic and Physiological Optics*, 37(2):160-176.

8. NIVISON-SMITH, L., KHOO, P., ACOSTA, M. L., & KALLONIATIS, M. (2017). Pre-treatment with Vinpocetine protects against retinal ischemia. *Experimental Eye Research*, 154, 126-138.
9. LY, A., NIVISON-SMITH, L., ASSAAD, N., & KALLONIATIS, M. (2017). Fundus Autofluorescence in Age-related Macular Degeneration. *Optometry and Vision Science*, 94(2):246-259
10. PHU, J., KHUU, S. K., YAPP, M., ASSAAD, N., HENNESSY, M., & KALLONIATIS, M. (2017). The value of visual field testing in the era of advanced imaging: Clinical and psychophysical perspectives. *Clinical and Experimental Optometry*. 100(4) 313-332.
11. LY, A., NIVISON-SMITH, L., ZANGERL, B., ASSAAD, N., & KALLONIATIS, M. (2017). Self-reported optometric practise patterns in age-related macular degeneration. *Clinical and Experimental Optometry*. 100(6): 718-728.

6.2.2 Research funding

Funding for CFEH clinical research in 2017 (including research money from grants and industry support), totaled \$454,110. This funding covered research personnel, PhD student stipends, equipment purchases and related research expenses.

6.3 Continuing Professional Development and other presentations

During 2017, CFEH staff produced 10 in-house webinars and were also invited to present at both international and national conferences including:

- Association for Research in Vision and Ophthalmology (ARVO)
- Baltimore USA Asia ARVO Brisbane Optometry NSW/ACT
- Super Sunday Sydney Optometry WA WAVE conference Perth WA
- NZAO conference Hamilton NZ Optometry NSW/ACT
- Canberra conference Optometric Glaucoma Society Annual Meeting, Chicago USA
- American Academy of Optometry meeting Chicago USA
- Agency for clinical innovation eye forum Sydney
- Cornea and contact lens congress conference Sydney Australian College of Optometry, invited clinical lecture
- Melbourne School of Optometry and Vision Science, University of Melbourne
- Harwerth Fest-A Celebration, University of Houston College of Optometry University of Houston
- University of Houston College of Optometry, USA

During the American Academy of Optometry meetings, Angelica Ly and Elizabeth Wong were made Fellows of the American Academy of Optometry.

Additionally, in recognition of his career achievements, Centre director Michael Kalloniatis awarded the University of Houston Distinguished Alumnus award for sustained and outstanding service to the profession and college of optometry.



6.4 SOVS Teaching

CFEH staff were involved in teaching activities with the School of Optometry and Vision Science during 2017 in the following capacities:

- Undergraduate teaching: delivering the 3rd year course on ocular disease and hosting each of the 5th year students for a 6 week clinical rotation.
- Post-graduate teaching (Masters level): delivering 2 post-graduate courses on the diagnosis and management of ocular disease.
- Post-graduate teaching (research): Five students are undertaking their PhD research projects with supervision from Professor Kalloniatis. The topics being undertaken include:
 - *Structure-Function in Glaucoma*
 - *Spatio-temporal characteristics in ocular disease*
 - *The role of visual function, optical imaging and electrophysiology in age-related macular degeneration*
 - *Multimodal evaluation of macular structure and function in age-related macular degeneration (AMD),*
 - *A novel collaborative care model designed to improve patient outcomes, satisfaction and health fund allocations for glaucoma patients.*

6.5 Collaborative Projects

6.5.1 Prince of Wales Hospital Triage project

POWH receives a high number of referrals annually and therefore has a long associated wait time (often in excess of 12 months). Ongoing research has indicated that as many as 50% of patients currently seen for glaucoma management at POWH could be suitable for collaborative care at CFEH. Consequently, a research project with the aims to:

- Identify the proportion of patients referred to the PoWH eye clinic that could be managed through the collaborative care setting at CFEH
- Establish a standardised triage procedure
- Reduce patient wait times for non-urgent referrals

This project will continue in 2018, but early indications are that it is on the way to developing the first consensus triage standard for patients referred to a public hospital eye clinic. It also appears to validate the integration of a collaborative care clinic within the public system and will reduce potential for incidental vision loss due to currently unavoidable patient wait times.

6.5.2 The Provision of Eye Health Equipment and Training Project

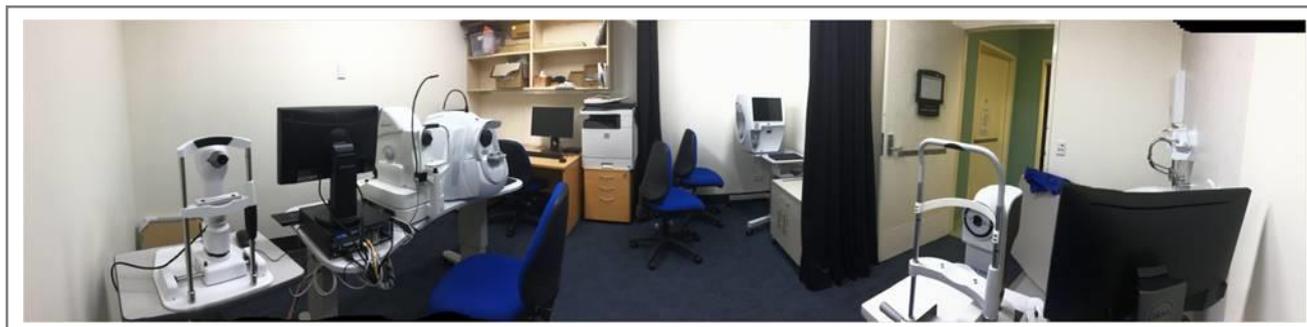
During 2017, the Centre developed an on-line course “Diabetic retinopathy assessment: A training course for GP’s” as part of the Provision of Eye Health Equipment and Training project funded by the Australian Government Department. The Centre is part of a consortium, working in partnership with the Brien Holden Vision Institute, Australian College of Optometry, Optometry Australia and Aboriginal Health Council of South Australia. CFEH has received funding from the consortium for the production of this course.

The course aims to train GP’s to detect signs of diabetic retinopathy and macular oedema in the retinal images of their diabetic patients, and provides detailed management guidelines. The content of the interactive 10-module course received detailed review by both a retinal specialist ophthalmologist and general practitioner. The course received accreditation for 2 years by the Royal Australian College of General Practitioners and by the Australian College of Rural and Remote Medicine (ACRRM) in December 2017. This course will be ongoing in 2018 with increased uptake expected as the camera roll-out continues.

6.5.3 The Sutherland Hospital (TSH)

During 2018 the following projects will be undertaken at TSH:

- **Collaborative-stratified care for the whole patient journey:** Developing a model to link the inpatient, primary care GP and optometrist. We are working toward providing vision assessments to determine the cause of vision loss and for low vision services (CFEH), social welfare and mobility advice (GDN). Implementation of this LV clinic will begin in 2018.
- **Research on this new model:** An ethics protocol is in the process of being submitted to study the outcomes, efficiency and benefits of this collaborative care model. The key research project is entitled: “Evaluation of an efficient and cost-effective hospital-based multidisciplinary model to prevent vision related complications from diabetes.” The project has attracted a new PhD project and student, Vincent Khou.



The imaging and visual field room at TSH