Centre for Eye Research Australia

ANNUAL REPORT 2006





Centre for Eye Research Australia

The Centre for Eye Research Australia is a joint undertaking between the University of Melbourne, the Royal Victorian Eye and Ear Hospital, the Victorian Lions Foundation, Vision Australia, the Victorian Branch of the Royal Australian and New Zealand College of Ophthalmologists, Christian Blind Mission International and the Ansell Ophthalmology Foundation.

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Design: KBR Design Group Telephone 03 9855 1244

Photography: Mark Farrelly Photography Telephone 03 9531 8504

Printing: John Herrod and Associates Telephone 03 9899 1066

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Vision To become the pre-eminent centre for eye research in Australia, renowned for our work in the prevention, treatment and rehabilitation of eye disease, vision loss and blindness, through our research, clinical work and teaching.

Mission To eliminate vision loss and blindness and reduce the impact of vision loss in our community.

Board and Committees

CENTRE FOR EYE RESEARCH AUSTRALIA

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Associate Professor Jill Keeffe

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Professor Bob Williamson

Mr Richard Stawell (from May 2006)

Chairman's Report

MS TINA MCMECKAN



"I am confident that at the dawn of a new decade of research, the Centre will again capitalise on the many opportunities it faces. I look forward with excitement to the year ahead." I am particularly delighted to reflect upon the Centre for Eye Research Australia's achievements during its 10th successful year. Throughout 2006, the Centre and its partners have further contributed to a vibrant, progressive and relevant medical research sector.

The opening of the new Retinal Vascular Imaging Centre and the Lions Eye Donation Service, and the wonderful celebrations of our 10th Anniversary were among the highlights of the year.

The Centre deserves acclaim for its anniversary symposium 'Seeing the Future' in October, when leaders in health, policy and research joined members of the community, practitioners and students to discuss the developments, challenges and opportunities in eye care. The launch of the Centre's third Access Economics report of eye-health, 'Centrally Focussed: The Impact of Age-Related Macular Degeneration,' reflects our stature as a leading advocate of the importance of eye health. This comprehensive report continues the insightful work completed in previous years on the socio-economic impacts of eye health in our community. Congratulations to all involved in these wonderful achievements.

I am also delighted to report on the commencement of Professors Jonathan Crowston and Rasik Vajpayee who continue to establish solid research programs in the Basic Science and Surgical Research Divisions. I conclude by expressing my gratitude and confidence in the stewardship of our Managing Director, Professor Hugh Taylor, AC. His counsel, guidance and expertise in eye health is an asset to the Centre as it enters a new decade of growth, and of significant benefit to the community that we serve. Similarly, I thank my fellow Board members who have again worked tirelessly this year to represent and advance the interests of the Centre, in a busy medical research sector. In particular, I thank David Welsh who retired from the Board after 10 years of dedicated service. The Board wishes David well in his endeavours and welcomes Susanne Owen, who succeeds him as the Victorian Lion's Foundation representative.

Our partnerships with our principal stakeholders are based on trust and integrity and I thank the University of Melbourne, the Royal Victorian Eye and Ear Hospital (RVEEH), Vision Australia, the Royal Australian and New Zealand College of Ophthalmologists, Vision 2020 Australia, Christian Blind Mission International, and the Victorian Lions Foundation and Ansell Ophthalmology Foundations for their committed support throughout 2006.

Finally I thank our loyal supporters – members of the community and private and public benefactors – whose highly valued contributions assist sustain and advance the important work the Centre is pursuing in eye health.

I am confident that at the dawn of a new decade of research, the Centre will again capitalise on the many opportunities it faces. I look forward with excitement to the year ahead.

Jina Mcmeckan

Ms Tina McMeackan

Managing Director's Report

PROFESSOR HUGH R. TAYLOR, AC



"The quality of our research is the true benchmark of our relevance to the community." In 2006 the Centre for Eye Research Australia turned 10. Reaching double figures is a big step for a young child. We will shortly enter teenage years and may face some growing pains. Like any ten-year-old we delight in our successes and hopefully learn from our trials and tribulations.

The Centre enjoyed considerable success in 2006, most notably a two-day 10th anniversary symposium that attracted attendees from across Australia and overseas and commenced with a public lecture on the eve of World Sight Day. We were delighted to welcome as guest speakers, the World Health Organisation's Coordinator, Chronic Diseases Prevention and Management, Dr Serge Resnikoff, and Dr Nag Rao, President of the International Agency for the Prevention of Blindness. The participation of two world leaders of the Vision 2020 alliance at our 10th Anniversary was a true mark of esteem and the symposium, 'Seeing the Future,' was well attended and highly acclaimed.

In addition, we were treated to a wonderful reception at Government House, hosted by the Governor of Victoria, His Excellency Professor David de Kretser, AC, and Mrs Jan de Kretser, Patrons of the Eye Research Australia Foundation and the Royal Victorian Eye and Ear Hospital respectively. It was a fitting celebration, of our research successes over the past decade and enabled us to thank many of our loyal supporters.

In February, the newly renovated Lions Eye Donation Service was opened by our out-going Patron and Governor, His Excellency John Landy, AC, MBE. The reconfigured Eye Bank uses organ culture to store corneal tissue for up to one month, instead of one week with the previous storage. The new storage has significantly improved the service to the community and again, we recognise and thank the Victorian Lions Foundation and the Lions Eye Donation Committee for their ongoing support. In March, the Victorian Minister for Industry, Innovation and Regional Development, Hon John Brumby MLA, opened the new Retinal Vascular Imaging Centre (RetVIC). It is directed by Professor Tien Wong and receives core funding through a Science, Technology and Innovation grant. RetVIC is an exciting collaboration, investigating the role of retinal vascular changes as predictors of cardiovascular health.

The renovated 7th Floor of the Smorgon Family Wing also houses two new senior staff who joined us in the middle of the year: Professors Jonathan Crowston and Rasik Vajpayee. Jonathan, the Centre's Director of Basic Sciences, gained his PhD at the Institute of Ophthalmology in London and fellowship training in Sydney and San Diego. He leads a new basic research program investigating the mechanisms of damage in glaucoma and is the Head of the hospital's Glaucoma Unit. Rasik is an accomplished corneal and cataract surgeon who heads the Centre's Surgical Research Division. He trained in India and was a corneal fellow with us 10 years ago. He has been the head of corneal services at the All India Institute, New Delhi and is now head of both the Corneal Clinic and the General Eye Clinic 5 at the hospital.

We are thrilled to have these two outstanding leaders join us and look forward to seeing their programs develop.

ACHIEVEMENTS

Throughout the year we celebrated the varied achievements and deserved recognition of our hard working staff. Professor Tien Wong had a wonderful year. He was promoted to full professorship, and received the Commonwealth Health Minister's Award for Excellence in Medical Research, the Novartis Prize in Diabetes (Young Investigator) and the Alcon Research Institute Award. At the end of the year, he was awarded a National Health and Medical Research Council Principal Research Fellowship. Tien provides a wonderful example for the younger generation. Associate Professor Jill Keeffe was elected Vice-President of the International Council for the Education of People with Vision Impairment (ICEVI), a group with members in more than 170 countries that provides equal access to education for visually impaired children.

Associate Professor Robyn Guymer was an invited speaker at the Association for Research in Vision and Ophthalmology (ARVO) conference on the prevention of age-related macular degeneration, in Florida. She also presented the 2006 Council lecture at the RANZCO annual scientific congress in November. Robyn also chairs the Research Committee of the Ophthalmic Research Institute of Australia.

Dr Paul Baird joined the Editorial Board of the journal 'Editorial Advisory Board of Recent Patents on DNA and Gene Sequences.' Paul serves as the Secretary of the Australasian Society for Vision Research.

We were proud to launch our third report on the economic impact of vision loss, '*Centrally Focussed: The Impact of Age-Related Macular Degeneration.*' This report was again prepared with Access Economics and was officially launched in February at Parliament House, Canberra.

FUTURE DIRECTIONS

At the start of the year we reconfigured our administrative support. Gerlinde Scholz, our new General Manager, has done a great job. Although it was sad to see some staff leave, we were pleased to welcome new members whose experience and commitment will strengthen our capacity for growth.

We have a solid team of professionals and are well placed to capitalise on the numerous challenges presented in medical research. Romy Johnston manages our External Relations Unit that incorporates the Eye Research Australia Foundation, and has brought together fundraising and public relations. We greatly appreciated the Unit's successful organisation of our anniversary celebrations; our successful Melbourne Marathon team and a delightful evening provided by Village Roadshow.

MANAGING DIRECTOR'S REPORT continued

More importantly, they raised nearly \$1 million dollars to support our research this year, a wonderful achievement.

The University is making significant changes as it modifies its teaching programs under the new 'Melbourne Model' and as it prepares for the Research Quality Framework (RQF), the new Commonwealth program used to fund research at universities. There has been much discussion about the role of medical research institutes and their relationship with the University, and the Centre has been included in this review. Although at times challenging, I think the outcome has been satisfactory and at a recent Board meeting our Dean, Professor James Angus promoted the Centre as a model of this relationship. We highly value our strong and close links to the University and work hard to ensure we maintain our mutually satisfying relationship.

Our links to the hospital are also strong, appreciated and important. We are pleased to work closely with the Hospital as it plans its redevelopment. There was clear and unequivocal support from the Bracks government to support the modernisation of the hospital's current site and provide adequate space for research and teaching. We will work closely with the Hospital, the University and the Bionic Ear Institute to raise the additional funds required to make this exciting new facility a reality. I am confident that this undertaking will significantly benefit our growth and development.

As a medical research institute, the quality of our research output is the true benchmark of our relevance to the community. During the year, the University reviewed our performance against other eye research groups in Australia and internationally. The Centre was cited as Australia's leading institute, on par with the world's best – a great result for which all our staff deserve credit.

More importantly, we realise the need to translate our research findings into practice and to guide the formulation of policy, in order to effect real change in our community. That is why we do research, to ultimately make a difference. And we are making considerable headway. The Office of Science and Technology rank each medical research institute in Victoria on a number of parameters. Although we can not compete with the largest institutes in some parameters, we were the leading institute for knowledge transfer, a very satisfying result.

I conclude by thanking the members of our Board, so ably led by Chairman Tina McMeckan. The Board does an outstanding job and devotes many hours to help the Centre grow and we are most grateful for their commitment and expert advice.

We were pleased to welcome Peter Nankivell to the Board. Peter worked with the Foundation in several roles for a number of years. We recently farewelled David Welsh, the Board's representative from Lions. David has been a great supporter of our work for many years and was a founding Board member. We also congratulate Philip Molyneux on receiving an AM in the 2007 Australia Day Honours list.

We appreciated the ongoing input of Clive Mitchell, and assistance from Peter Dorell, the Board and the senior staff in drafting new strategic plans for our continued growth over the next three to five years.

Similarly, I thank our staff who have done so much good work over the year. I particularly want to thank Tien Wong and Gerlinde Scholz who managed the Centre so efficiently while I took three months of sabbatical leave in Cambridge and also Judy Carrigan, who has again kept me running more or less on time throughout the year.

It has been a particularly productive year for a typical, bustling 10 year old with so many interests in so many areas, yet still trying to assimilate who they are as they grow in so many different ways. With watchful guardians and a little nurture, I am sure the Centre will continue to grow as a leading research institute.

Hugh R. Taylor Managing Director

10th Anniversary of the Centre for Eye Research Australia

The Centre for Eye Research Australia has achieved sustained growth and medical research of the highest calibre and relevance to our community. Since its inception in 1996 by Professor Hugh Taylor, AC, the Centre has pursued with scientific vigour, its core objective of eliminating vision loss and blindness.

A group of ophthalmologists led by Joseph Ringland Anderson laid the foundations of progressive and collaborative research in eye health through the establishment of the University of Melbourne Department of Ophthalmology – under a tripartite agreement between the University, the Royal Victorian Eye and Ear Hospital and the Ophthalmic Research Institute of Australia. In 1963, Gerard Crock commenced as the new Department's founding Professor.

The Centre later incorporated and expanded existing research programs, growing within a decade from a small staff of 29 to about 90 specialists working in population health, macular degeneration, glaucoma, corneal, ocular and clinical genetic research.

In 2004, the Centre and Access Economics produced 'Clear Insight,' the nation's first comprehensive snapshot of the direct and indirect costs of vision loss and eye diseases, and the following year released '*Investing In Sight*,' providing a framework of interventions to address the growing burden of Australians at risk of vision loss and blindness.

A new era of advanced research commenced in 2005 with the establishment of the Retinal Vascular Imaging Centre – working to accurately predict cardiovascular and other diseases through the analysis of the retinal vascular system.

A core partner of the Vision CRC, the Centre is Australia's only designated World Health Organisation collaborating centre for the prevention of blindness, and works closely with a host of local, national and international collaborators and partners in eye health.

10TH ANNIVERSARY

In October, the Centre presented 'Seeing the Future,' a community and health industry symposium – the centre-piece of its special 10th Anniversary celebrations. The conference was acclaimed for the broad and in-depth analysis delivered by leaders in health policy and promotion, government, academia and industry of the status and impact of eye diseases.

'Seeing the Future' was preceded by a public lecture at the University, on the eve of World Sight Day, discussing the problems, challenges and solutions to low vision service delivery. The Centre welcomed Dr Serge Resnikoff, Coordinator of Chronic Diseases Prevention and Management at the World Health Organisation and Dr Nag Rao, President of the International Agency for the Prevention of Blindness who presented with Associate Professor Jill Keeffe.

Anniversary celebrations culminated in a reception at Government House, hosted by the Governor of Victoria, His Excellency Professor David de Kretser, AC, and Mrs Jan de Kretser.



Professor Gerard Crock

Activities as a World Health Organisation Collaborating Centre

The Centre for Eye Research Australia was re-designated in 2006 as a World Health Organization (WHO) Collaborating Centre for the Prevention of Blindness.



CENTRE FOR EYE RESEARCH AUSTRALIA

The terms of reference of the Centre are to:

- participate actively in the development of activities for the prevention of blindness
- provide facilities for the training of personnel at different professional levels, especially from developing countries
- conduct applied field research on the epidemiology, management and operational aspects of avoidable blindness
- foster a multidisciplinary approach to the promotion of eye health and to the delivery of eye care, including rehabilitation, to all
- participate in the collection, elaboration and distribution of pertinent information.

The Centre is proud of its WHO designation and complies rigorously with its terms of reference. As part of this commitment, in 2006 the Centre participated in a review of resources for application in the Low Vision Resource Centre in Hong Kong.

Additionally, the Centre's Population Health Division is working with collaborators from the WHO Low Vision Working Group on a global mapping project of low vision programs. The Project is documenting the range of models of low vision care and providing an evaluation of their effectiveness.

Our Centre is also working on the development of the International Training Centre in Low Vision and Community Eye Health, to offer training to eye care, rehabilitation and education personnel from developing countries – particularly the Western Pacific Region.



VISION 2020: The Right to Sight

A GLOBAL INITIATIVE FOR THE ELIMINATION OF AVOIDABLE BLINDESS

VISION 2020: The Right to Sight, a global initiative to eliminate avoidable blindness by the year 2020, was launched in 1999. The successful implementation of Vision 2020, building on an alliance between the World Health Organization (WHO) and the International Agency for the Prevention of Blindness (IAPB) has contributed significantly to a decrease in the number of blind and visually impaired people globally.

Locally, Vision 2020 Australia continues its advocacy of eye health with three main committees covering the community, Aboriginal eye health and a global committee that lobbies for greater government support of eye care through Australian non-government organisations and the network of AusAID health advisors distributed throughout the Region and beyond.

The Centre for Eye Research Australia participated actively in promotional and advocacy activities for World Sight Day, that adopted the theme 'Low Vision: look into it.' The Centre hosted a Wold Sight Day eve public lecture on the problems, challenges and solutions to low vision service delivery.





2006 Western Pacific Region highlights include:

- In July, both the Regional Chairman Professor Hugh Taylor, AC, and Coordinator Dr Richard Le Mesurier, attended the VISION 2020 Strategic Planning Meeting in Geneva, contributing to a new draft for guidelines on the implementation of VISION 2020.
- In September, Professor Taylor, AC, attended the IAPB Council of Members meeting in Geneva, while Dr Richard Le Mesurier headed an advocacy team from a number of different INGOs to the 57th WHO Regional Committee Meeting held in Auckland.
- At a Pacific Islands Sub-Regional meeting in Sydney in November, members discussed low vision monitoring training.
- There has been further VISION 2020 progress in several areas of the Region, particularly in China, and the Pacific Islands.
- In China a National Strategic Eye Health Plan was released by the National Guiding Committee for Blindness Prevention and endorsed by the Ministry of Health in July. The Ministry, the National Blindness Prevention Committee, the Chinese Disabled Peoples Federation, the Provincial Health Bureau and INGOs/ NGOs are discussing challenges relating to the coordination and monitoring of the plan in such a large country.

Vision Co-operative Research Centre

The Centre for Eye Research Australia continues its role as one of the four core participants in the Vision CRC. The Centre for Eye Research Australia's Chairman, Ms Tina McMeckan and Managing Director, Professor Hugh Taylor, AC, are members of the Vision CRC Board.



VISION EXCELLENCE FOR ALL PEOPLE

In 2006, Professor Hugh Taylor, AC, and Associate Professor Jill Keeffe participated in the three-year review of the Vision CRC in Sydney, focussing particularly on the CRC's vision care delivery program.

As part of the Eye Care Delivery Models project, Dr Ana Cama is continuing her work in Fiji, conducting needs analysis and low vision screening for school children in central Fiji.

The refinement and production of a portable bench top retinal screening camera continues. The digital non-mydriatic camera will be used to take images to screen for diabetic retinopathy in remote communities and developing countries.

The Centre for Eye Research Australia prepared and published 'Focus on Low Vision,' a guide to assist people with low vision. The guide examines causes and conditions of low vision and the services available for people who have low vision.



Research Divisions

Advanced medical research of the highest quality and relevance to the community – in pursuit of the elimination of vision loss and blindness.

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Basic Sciences Division

DIRECTOR: PROFESSOR JONATHAN CROWSTON

The Basic Sciences Division was established in July 2006 and incorporates the Glaucoma Research Unit. The Unit is committed to research focused on preventing vision loss from glaucoma.

Using laboratory-based and clinical studies the division is identifying key cellular processes that damage the optic nerve in glaucoma to identify new therapeutic targets to protect the nerve and prevent vision loss from glaucoma.

Four major projects are in progress:

1. Ageing and glaucoma

Numerous population studies have demonstrated that the risk of developing glaucoma increases exponentially with age. Despite this, the cellular mechanisms that predispose the aging optic nerve to glaucoma damage are less well known. This study is using laboratory techniques to investigate the influence of aging on the vulnerability of retinal ganglion cells to pressure-induced damage. By identifying the key mechanisms that render an old nerve susceptible to injury, we aim to identify new therapeutic targets that will allow us to protect the optic nerve and prevent vision loss from glaucoma.

2. Mitochondria and glaucoma

Mitochondria are cellular organelles that produce energy vital for a cell to function and repair itself from damage. Mitochondria also play an important role in regulating cell death pathways and important in determining how a cell will respond to injury.

Mitochondria, in particular mitochondrial genes, are vulnerable to the effects of ageing. Old cells have mitochondria that function poorly and have high levels of mutations in mitochondrial DNA (mtDNA).

This work is investigating the role of mtDNA mutations on the ability of the optic nerve to withstand injury. In collaboration with Professor Vingrys (University of Melbourne) the unit is using sensitive tests of optic nerve function to examine the ability of the optic nerve to recover from injury induced by elevated eye pressure.

3. Identifying sick and dying cells

Current methods of monitoring glaucoma require a significant loss of neurons before disease progression can be reliably identified. The unique optical properties of the eye and the accessibility of the optic nerve provide an opportunity for developing new imaging strategies, aimed at identifying sick and dying optic nerve cells.

The unit has recently developed techniques that permit imaging of fluorescence ganglion cells in genetically modified mice. Further work will seek to identify fluorescent 'biomarkers' that permit identification of sick and/ or dying nerve cells. Ultimate transfer of such technology to humans has the potential to dramatically improve our ability to monitor and treat patients with glaucoma.

4. Wound healing - optimising the outcome of glaucoma surgery

Glaucoma surgery provides the most effective treatment modality for lowering intraocular pressure. Excess post-operative scarring is a major threat to successful surgery and the most common cause of inadequate intraocular pressure lowering. The unit is further advancing previous, extensive work in this area and are investigating the effect of anti-VEGF monoclonal antibodies (new agents that are potent inhibitors on new blood vessel formation), on post-operative scar formation in laboratory and clinical studies.

In addition, the Basic Sciences Division encompasses the work being conducted by Associate Professor Julian Rait and Dr Elizabeth Deveny on the development and implementation of a computerised decision support system for the management of open-angle glaucoma. The final version of the software, which has been designed to guide ophthalmologists with advice tailored for each patient individually according to their clinical and diagnostic test results performed during the consultation, is currently being trialled by 75 ophthalmologists recruited from the Royal Australian and New Zealand College of Ophthalmologists. A number of clinical studies have also been completed including the Memantine study, the first large-scale neuroprotection study in glaucoma.



Clinical Epidemiology Division

DIRECTOR: PROFESSOR TIEN WONG

The Clinical Epidemiology Division comprises the Retinal Vascular Imaging Centre, headed by Professor Tien Wong, and Clinical Genetic Studies, under the direction of Associate Professor David Mackey.

RETINAL VASCULAR IMAGING CENTRE (RetVIC)

The Retinal Vascular Imaging Centre is advancing four major research platforms, while examining the role of retinal imaging as a tool for detecting and predicting retinal vascular disease. This research involves ongoing epidemiological and clinical studies in collaboration with national and international researchers. The Centre's research is being conducted by staff and Fellows and a number of Advanced Medical Science, Master and PhD students.

Research features include:

1. Research into retinal vascular disease:

The objectives of this research are to systematically and comprehensively examine the prevalence, incidence, risk factors, natural history and impact of retinal vascular disease, including diabetic retinopathy, hypertensive retinopathy and age-related macular degeneration, and the relationship of these signs to diabetes, hypertension, stroke and heart disease.

To achieve these objectives, ongoing epidemiological and clinical studies are utilising new image analysis software developed to quantify retinal vascular signs, so as to evaluate their predictiveness as a potential vascular screening tool.

Various studies including: the Melbourne Collaborative Cohort Study (MCCS) with Professor Andrew Tonkin and Professor Dallas English, Professor John McNeil, the Blue Mountains Eye Study with Professor Paul Mitchell and Associate Professor Jie Jin Wang, the Australian Diabetes, Obesity and Lifestyle Study with Professor Paul Zimmett and Associate Professor Jonathan Shaw, the Multi-Ethnic Study of Atherosclerosis with Professor Ronald and Barbara Klein and Dr Mary Frances Cotch, the Atherosclerosis Risk In Communities Study with Professor A. Richey Sharrett and the Singapore Cohort Study of Risk Factors for Myopia with Associate Professor Seang Mei Saw are being conducted to examine the relationship of retinal vascular signs to subclinical and clinical cardiovascular disease, diabetes and hypertension in Australia, the United States of America and Singapore.

Furthermore, clinical studies are examining the predictive ability of these signs as markers in an acute clinical setting and through clinical trials. Results of these studies have led to more than 100 peer-reviewed papers, including papers in the *New England Journal of Medicine (2004), the Lancet (2001, 2007), the Journal of the American Medical Association (three papers in 2002, 2005, 2006), the Annals of Internal Medicine (2004, 2006) and the British Medical Journal (2001, 2004, 2006).*

In addition, RetVIC's students and Fellows are involved in numerous clinical studies including:

- (a) The Retinal Vessel Diameters, Inflammation and Endothelial Dysfunction (IDI Study) with Associate Professor Jonathan Shaw, Dr Richard Simpson, Dr Carol Delaney;
- (b) The Multi-Centre Retinal Stroke Study at the Royal Melbourne Hospital, the Westmead Hospital in Sydney and the Singapore General Hospital in Singapore with Professor Richard Lindley, Professor Steven Davis, Dr Peter Hand, Professor Paul Mitchell, Associate Professor Jie Jin Wang, and Associate Professor Meng Cheong Wong;
- (c) A Sydney Paediatric Diabetic Retinopathy study at Children's Hospital at Westmead in Sydney and St Vincent's hospital in Melbourne with Associate Professor Alicia Jenkins and Associate Professor Kim Donaghue;

CLINICAL EPIDEMIOLOGY DIVISION continued

(d) A twins-based study examining the heritability of retinal vascular signs with Associate Professor David Mackey, Dr Katrina Scurrah, and Professor John Hopper.

2. Epidemiology of Eye Diseases in Australia and Asia-Pacific region:

The objectives of this research are to describe the prevalence, incidence, risk factors and impact of major eye diseases including myopia, diabetic retinopathy, angle-closure glaucoma, and cataract in children and adults.

This research has a particular focus on diseases prevalent in Australia and the Asia-Pacific region and comprises a total of seven local and international studies including the Australian Diabetes, Obesity and Lifestyle Study, the Tanjong Pagar Survey, Singapore Cohort Study of Risk Factors for Myopia (SCORM), the Singapore Malay Eye Study (SIMES), the Singapore Prospective Cohort Study (SP2) and the Singapore Indian Chinese Cohort Eye Study (SICC). Key collaborators include Professor Donald Tan, Professor Kee Seng Chia, Associate Professor Tin Aung, Associate Professor Seang Mei Saw and Dr E Shyong Tai.

3. Clinical Trials for the Treatment of Retinal Vascular Diseases:

These multi-centred trials seek to evaluate treatment options for eye diseases including diabetic macular oedema and retinal telangiectasia. Three clinical trials throughout 2006, one funded by the National Health and Medical Research Council, and others supported by Novartis Pharmaceuticals Australia and Allergan Australia were testing suitable clinical treatments for diabetic macular oedema. Investigators involved in these trials include: Associate Professor Mark Gillies (Save Sight Institute), Dr Jenny Arnold (Marsden Eye Specialists) Associate Professor Ian McAllister (Lions Eye Institute), and Professor Paul Mitchell (Westmead Hospital Eye Clinic, University of Sydney).

4. The development of the Retinal Vascular Imaging Centre (RetVIC):

Previous studies indicate that changes in the retinal vasculature predict the risk of heart disease, stroke, diabetes, hypertension, dementia, kidney disease and other vascular conditions. To promote adoption of the new technology, state-of-the-art computer-based imaging systems with telemedicine capability is being developed. RetVIC is currently investigating a range of avenues to bring the technology to market.

RetVIC has been working closely with its collaborators in the Department of Computer Science and Software Engineering (CCSE) at the University of Melbourne, liaising principally with Professor Rao Kotagiri and Dr Joey Chua. The collaboration with CSSE has been valuable in developing software for the purposes of RetVIC to offer a grading service. In addition, the School of Computing, National University of Singapore (Associate Professor Wynne Hsu and Dr Lee Mong Li) has also been working closely with RetVIC in developing software to examine specific aspects of retinal vessels.

In 2006, RetVIC initiated a grading service for retinal photographs utilising its retinal vascular imaging expertise to document retinal pathology and changes in vessel caliber. Using standardised protocols for retinal vessel analysis, the service is able to provide diagnostic capabilities for image analysis for the early prediction of vascular diseases such as diabetes, hypertension and cardiovascular diseases.

A number of research institutes have begun to utilise this service, including Adelaide's Florey Study (Dr Julia Pitcher), the TRY-1 study in Japan (Drs Ryo Kawasaki and Noriko Mochizuki), the Handan Eye Study in China (Professor Wang Ningli, Dr YuanBo Liang) and the Los Angeles Latino Eye Study and the Multi-Ethnic Pediatric Eye Study in the United States of America (Professor Rohit Varma). RetVIC is also working with the Royal Victorian Eye & Ear Hospital to develop a pilot grading service that will be offered to the public on a referral basis. RetVIC has commenced work on a cost-benefit analysis of retinal image analysis. Working with Access Economics, the report will be an independent assessment of the clinical utility of retinal vessel imaging for risk prediction of vascular disease. The report is expected to be released in 2007.

In 2006, RetVIC published 65 peer-reviewed papers and we acknowledge the collaboration and support of the Baker Medical Research Institute, the Centre For Vision Research, Diabetes Australia, the International Diabetes Institute, Monash University (Department of Epidemiology and the Eastern Clinical Research Unit), the National Stroke Institute, Pfizer Australia, the Royal Melbourne Hospital, the Royal Victorian Eye & Ear Hospital, St. Vincent's Hospital (Melbourne), the University Of Melbourne (Departments of CCSE & Ophthalmology), the Eye Research Australia Foundation, the CASS Foundation, the National Heart Foundation Australia, the Ian Potter Foundation, Sylvia and Charles Viertel Charitable Foundation and the Victorian government.

CLINICAL GENETICS STUDIES

The Clinical Genetics Unit focuses on identifying genes that cause eye diseases and translating this information into improved patient care.

Over the past 15 years the unit has coordinated the Glaucoma Inheritance Study in Tasmania (GIST) to investigate the genetic causes of glaucoma, the second leading cause of blindness in the world. The Twin Eye Study aims to expand the research into the genetics of glaucoma by studying the heritability of specific eye measurements used in diagnosing glaucoma. The unit has successfully identified high heritability of central corneal thickness, intraocular pressure and optic disc cup size. The unit is now in the process of identifying genes responsible for these measurements. This project has been widely publicised, with Associate Professor David Mackey and team examining celebrity Australian twin singers Jessica and Lisa Origliasso from the Veronicas and Melbourne based Ophthalmology Professor Gerard Crock and his twin brother Henry. The twins study has also developed a key twin genetic collaboration with Associate Professor Mingguang of the Zhongshan Ophthalmic Centre in Guangzhou, China. Associate Professor David Mackey and Dr Alex Hewitt will travel to China in 2007 to assist with data collection.

In addition to glaucoma, the unit has conducted extensive family studies on congenital cataracts, strabismus (turned eye), ptosis (droopy eyelid), optic atrophies and retinal dystrophies such as Retinitis Pigmentosa and Bests Disease. This will lead to a better understanding on the natural history of these conditions, useful for genetic counselling and may lead to new gene based therapies that could slow or prevent disease progression.

Dr Jon Ruddle continues his work with the Clinical Genetics Unit, fulfilling duties as Glaucoma Fellow at the Royal Victorian Eye and Ear Hospital. He is assisted by orthoptist Lindsey Scotter who returns from maternity leave and newly appointed orthoptist Sandra Staffieri who has extensive experience in paediatric ophthalmology. Lisa Kearns, Research Orthoptist has recently completed the Graduate Diploma in Genetic Counselling, through the University of Melbourne, Murdoch Children's Research Institute.



Professor Tien Wong



Clinical Research Division

DIRECTOR: ASSOCIATE PROFESSOR ROBYN GUYMER

The Clinical Research Division comprises the Macular Research Unit headed by Associate Professor Robyn Guymer and the Ocular Genetics Unit under the direction of Dr Paul Baird.

MACULAR RESEARCH UNIT

The Macular Research Unit concentrates on research into age-related macular degeneration (AMD), the leading cause of irreversible vision loss in Australia. Seven main avenues of research have been developed to investigate AMD:

1. Determination of the genetic components.

The AMD Inheritance Study concentrates on the collection and maintenance of AMD cases and families to allow the study of genes that might influence this disease. In 2006, in collaboration with Professor Gregory Hageman from the University of Iowa, cases with peripapillary choroidal neovascular membrane were collected to investigate linkages with abdominal aortic aneurisms. Similarly, implication of the complement factor H-gene in both AMD and glomerulonephritis has also instigated collection of cases of glomerulonephritis.

2. Understanding epidemiological risk factors.

One aspect of this research focuses on the simultaneous investigation of dietary, genetic and other protective / risk factors for AMD in a large cohort of elderly participants from Health 2000 – The Melbourne Collaborative Cohort Study that commenced in the early 1990s, investigating prospectively, the role of diet and other lifestyle factors in causing common chronic diseases in middle-aged Australians. A second approach is based on recent observations that exposure to chlamydia pneumoniae infection may be associated with AMD and its progression. This organism was identified in neovascular tissue removed from AMD-affected eyes and this work has been continuing, using donor eyes. The relationship between exposure to chlamydia pneumonia infection and incidence of AMD will also be investigated utilising samples taken from participants of the Blue Mountains Eye Study, that are to be analysed by the Department of Molecular Sciences, University of Tennessee Health Sciences Centre.

Finally, the Cardiovascular Health and AMD (CHARM) Study is focusing on the interpretation of data obtained following an investigation of the association between cardiovascular health and AMD.

3. Delaying the progression of age-related macular degeneration.

The age-related maculopathy statin study aims to determine whether statin treatment for three years, to people with high risk fundus changes, can slow the progression of AMD.

Traditional fundus photography and grading of the fundus lesion, as well as a range of novel visual function tests, are being employed to monitor this. The observation that statins can improve retinal function and perhaps limit the decline in function caused by high fat diets has also led to the development of a rat model of high cholesterol intake that may provide a model of compromised Bruch's membrane that may reflect AMD changes.

4. A functional predictive test of age-related macular degeneration.

The aim of this project is to identify visual function tests that are highly sensitive and specific indicators of risk of progression to visually devastating complications of AMD. With the assistance of Associate Professor Algis Vingrys from the University of Melbourne Department of Optometry and Visual Sciences, the testing suite has been developed to produce best results and approximately 150 people have now been tested.

CLINICAL RESEARCH DIVISION continued

5. Pathogenesis of AMD.

In collaboration with Professor Colin Masters from the Department of Pathology, University of Melbourne, the Macular Research Unit has continued to co-ordinate the collection of retinal tissue for immunohistochemical studies to determine the presence of AMD.

6. Macular telangiectasis.

An international collaboration has commenced to follow the natural history of this rare disease that manifests as a permanent dilation of groups of capillaries and venules in the macula. It is hoped that understanding this disease may help in its management and provide clues to a better understand other macular diseases such as AMD.

7. Six international drug company sponsored intervention studies in AMD (one Alcon, four Novartis and one Pfizer) are currently in progress.

OCULAR GENETICS UNIT

Research in this unit focuses on two of the major causes of visual impairment and blindness in Australia: myopia and AMD.

As part of the unit's work with the Vision Cooperative Research Centre, research commenced in 2003 to investigate the genetics of myopia:

1. Identification of myopia disease genes in families.

(a) Heritability and modelling: spherical equivalent and biometric traits were obtained from 120 families collected through the Genes and Environment in Myopia (GEM) Study. A best-fitting model for heritability estimates was established, the results indicating that variance can be attributed to both genetic and environmental components for spherical equivalent whereas for axial length, a substantial proportion of the variance is due to genes. Model fitting for both traits indicates that an additive, common and unique environmental model best fits the data.

- (b) Linkage analysis: Three of the larger families collected as part of the GEM Study have been genotyped against 400 markers at the Australian Genome Research Facility in Melbourne. A significant log of odds score was detected on chromosome 2 for both parametric and non-parametric linkage analysis, this region also overlaps with a previously described region for high myopia. Marker saturation is underway to narrow the disease gene interval in order to identify the disease gene.
- (c) Quantitative trait analysis is continuing in order to identify regions of the genome most likely to contain other loci for myopic traits, particularly for spherical equivalent as well as biometric traits such as axial length.

2. Identification of genes using twins:

Heritability analysis of 620 twin pairs has been completed, with correlation statistics and heritability estimates indicating a strong genetic component to spherical equivalent and axial length, providing further evidence for a genetic basis to myopia. Additional studies using the twin data set are ongoing to identify gene-environmental interactions.

3. Case control gene association studies:

- (a) SNP analysis of the MYP2 region: the Myopia-2 locus (MYP2) on chromosome 18p11 was identified originally as a region exhibiting linkage to high myopia (<-6D). Subsequent studies have limited the minimal disease interval to approximately 2.2cM. Sixty single nucleotide polymorphisms (SNPs) of this locus have been genotyped across 150 hypermetropes, 150 emmetropes, 150 low/ moderate myopes and 150 high myopes. Association analysis in this region continues.
- (b) SNP analysis of the HGF gene: the hepatocyte growth factor (HGF) gene has been found to be associated with high myopia in Asian populations. A similar study has been undertaken to investigate this relationship in a Caucasian population.

4. Environmental influences on myopia

Personality and myopia: the short version of the big 5 personality factors deriving information on personality has been undertaken on 600 twin pairs and families in the GEM Study. Analysis has revealed some aspects of personality that are correlated with myopia and/ or education in both twins and family members and this analysis is ongoing.

Four major studies were undertaken in age-related macular degeneration disease in 2006:

1. Donor eye collection

Protein expression studies in AMD eyes: donor eyes continue to be collected through the Lions Eye Bank, St Vincent's Hospital in Melbourne, and Flinders Medical Centre in South Australia. Sections from these samples have undergone testing for a range of antibodies against proteins typically associated with neurodegenerative disorders including Alzheimer's disease. In addition, collaborative research is being undertaken with the University of Melbourne and St Vincent's Hospital to investigate the expression of a number of genes and their pathways in samples from these eyes.

2. Genetic analysis in AMD

(a) Analysis of the complement factor H gene: the recently described Y402H change in the complement factor H (CFH) gene of the alternative complement pathway was examined in the Unit's collection of AMD patients. A significantly increased association of this variant with disease was identified, with further analysis of additional SNPs revealing risk and protective haplotypes for this gene. Genotype-phenotype analysis is currently underway, with the haplotypes to be investigated in AMD progression, twins and AMD families. The interaction of C. pneumoniae will also be investigated to ascertain if there is any gene-environmental interaction with CFH haplotype.

- (b) Analysis of SNPs in other genes: analysis of a range of SNPs within 14 genes previously showing some association with AMD has identified several of these genes to be associated with AMD in our population.
- (c) Analysis of SNPs in the RDS gene: the RDS gene is a candidate gene for involvement in AMD due to its role in a number of other retinal diseases. However, the Unit's analysis did not detect any association of SNPs in this gene with AMD indicating that it is unlikely to play a role in AMD.
- (d) Linkage analysis in AMD families: three of the Unit's largest AMD families, each with a minimum of eight affected individuals, have undergone whole genome scan analysis. Several genome regions suggestive of linkage have been identified and these are being followed up with additional markers.

3. Twin study

Dissection of genetic features of AMD: a questionnaire, eye examination and DNA sample have been taken from 340 twin pairs aged 50 years or more, recruited through the Australian Twin Registry from Victoria, to examine those phenotypic features of AMD that have a genetic basis. Statistical analysis of features of the aged retina and AMD are in progress to identify those phenotypic features that have a genetic basis.

4. AMD biomarkers

Proteomic analysis of AMD: In collaboration with Dr Matt Perugini at Melbourne's Bio21 Australia, we have undertaken proteomic analysis in several individuals to identify candidate biomarkers for disease. These studies are ongoing.



Population Health Division

DIRECTOR: ASSOCIATE PROFESSOR JILL KEEFFE

The Population Health Division comprises the Health Services Research Unit, headed by Dr Ecosse Lamoureux and the Prevention of Blindness Unit under the direction of Associate Professor Jill Keeffe.

HEALTH SERVICES RESEARCH UNIT

Six major projects were conducted in 2006:

1. Vision impairment and quality of life: The development of a new education and self-management program.

Vision impairment affects quality of life and significantly inhibits healthy ageing. Evidence suggests that current multidisciplinary low vision rehabilitation programs have a limited impact on improving quality of life in individuals with low vision. To rectify this, the effectiveness of a new low vision rehabilitation model, that incorporates a self-management program using a randomised controlled trial design, is being investigated. A structured course that aims to improve the participants' abilities and confidence to manage vision related problems will be evaluated as a supplement to the current low vision care. This program, 'Living with Low Vision,' focuses on self-management techniques to empower individuals to manage low vision effectively. The pilot phase of this program was completed in November 2006, with evaluation interviews being conducted thereafter. It is anticipated that this project will be a multi-centred trial with the collaboration of Professor Marylou Jackson from the Massachusetts Eye and Ear Infirmary.

2. The impact of low vision rehabilitation services on family and friends.

Vision loss affects individuals as well as people close to them – partners, children, family and friends, and carers. To date, little is known about the involvement of significant others in low vision rehabilitation or the impact of this involvement on the patient or significant other. To address this, a study has commenced to assess the impact of a significant other attending the self-management program together with a person with low vision.

3. Falls, gait characteristics and vision impairment.

Visually impaired individuals are three times more likely to fall, with visual impairment being identified as a critical determinant of falls. However, there is limited information about the relationship of components of vision function such as contrast sensitivity, depth perception and visual fields with falls. Furthermore, little is known about the impact of the type and severity of eye diseases on falls as well as the rate and circumstances of falls among visually impaired individuals. To better understand this association, 130 patients from the Royal Victorian Eye and Ear Hospital clinics have been assessed. Gait characteristics will also be investigated in normal sighted and visually impaired elderly people to gain a better understanding of the high rate of falls in visually impaired people during locomotion.

4. Depression in individuals with vision impairment.

This study extends previous research by examining depression in a sample of Australians with vision impairment, attending a public hospital for a routine appointment. Although individuals with vision impairment are likely to suffer from mental health problems, the prevalence and severity of depression and its impact on general health and vision-specific quality of life is not clear. The outcome of this study will allow the identification of those individuals at risk of depression who can potentially be treated at an early stage. Furthermore, a greater understanding of factors associated with depression in this group can guide the development of interventions to prevent distress in individuals with vision impairment.

POPULATION HEALTH DIVISION continued

5. A needs assessment study to improve eye donation referrals in hospitals.

Corneal transplantation is currently the most common form of tissue or organ transplanted worldwide. Annually in Australia, more than 1,000 people have their sight either restored or significantly improved by this procedure. Recent shortages of eye tissue, however, have resulted in many cancellations of surgery which have also contributed to increased waiting lists. This study aims to improve the current referral rates of eye donors in hospitals and address the barriers contributing to this lack of referrals.

6. An item bank for visual disability measurement.

Currently, there is much interest in the flexible framework offered by item banks for measuring patient relevant outcomes. This study, utilizing data from 340 patients attending clinics at the hospital, examines the measurement properties of an item bank using three vision specific quality of life questionnaires, assessing the ability to perform activities of daily life in people with visual impairment.

PREVENTION OF BLINDNESS UNIT

Research in this unit concentrates on the development of effective models of vision care delivery.

1. Innovative models of eye and low vision care and development of tools for needs analysis and outcomes of care:

- (a) The children's version of the Impact of Vision Impairment (IVI) has been used to collect data on children in Victoria so that a model can be developed to estimate and plan services for children with low vision in both developed and developing countries.
- (b) A new low vision clinical service has been established in Fiji's main hospital in Suva. Referral networks are being established to ensure that all children with low vision can use the low vision clinic, the first in the Pacific Island nations.
- (c) The IVI has been translated for use in Vanuatu. The Melanesian version comprises 28 items with those in the emotional health section replicating items in the Australian version. Activities were modified for relevance to the Melanesian culture.



Photograph courtesy of Dr Heathcote Wright

 (d) The survey for the global mapping of low vision services has been completed, translated into six languages and distributed for analysis. The data will be used by WHO in the planning of low vision services as part of the global Vision 2020 initiative.

2. Economic evaluation of rehabilitation programs for people with impaired vision.

There are two components to this research, the Vision and Quality of Life Index (VisQoL) that has been demonstrated to be a useful add-on dimension to the existing generic quality of life utility instrument, AQoL11, and the investigation of personal costs for people with vision impairment. The analysis on the VisQoL has been completed and in another first for this instrument, direct comparisons can now be made between vision and other health states.

The personal costs of vision impairment have been documented for the first time. Commonly, people spend about \$2,500 per year on equipment, services, transport, home and personal care. For some, the cost exceeds \$10,000.

3. Aboriginal eye health.

A health impact study of the construction of swimming pools in two Aboriginal communities in the Northern Territory has been undertaken to measure the reduction in prevalence of eye (trachoma), ear and skin infections. This study is an integral part of the swimming pools in remote communities project funded jointly by the Commonwealth and Territory governments and the communities concerned. Baseline data has demonstrated the high prevalence of trachoma in both the coastal and central desert communities, with a significantly higher rate in the latter. With the delay in the environmental intervention and the implementation of the SAFE (Surgery, Antibiotics, Facial cleanliness, Environment) Strategy for trachoma, interviews and analysis are now being conducted to determine barriers to the implementation of the various components of this Strategy.

4. Development of a non-mydriatic fundus camera.

In collaboration with Vision Instruments, the prototype of a non-mydriatic fundus camera optimised for retinal screening in developing countries and remote areas has been developed and field tested. A second model, incorporating significant modifications is to be tested at the hospital, in remote Australian communities and in the Asia Pacific region during 2007.

5. National Trachoma Surveillance and Reporting Unit.

In an effort to eliminate trachoma from Australia, the Commonwealth government announced funding to establish a National Trachoma Surveillance and Reporting Unit. The Centre won the tender to establish and manage the Unit which commenced in November.

6. Accessible eye care services.

People from culturally and linguistically diverse backgrounds often experience barriers accessing eye care. Using interpreters, people from neighbourhood renewal projects in Collingwood and Fitzroy housing estates have been interviewed to gain an understanding of barriers that can assist in the planning of accessible eye care services.

7. The Centre for Vision Independence (CVI)

The Centre for Vision Independence (CVI), set up by Guide Dogs Victoria in collaboration with the Royal Victorian Eye and Ear Hospital, commenced during 2006. The outcomes of this new service are being evaluated to ensure the sustainability and effectiveness of the CVI.



Surgical Research Division

DIRECTOR: PROFESSOR RASIK VAJPAYEE

The newly created Surgical Research Division is led by Professor Rasik Vajpayee who joined the Centre in 2006. It comprises the Corneal Research Unit and the Education Unit.

CORNEAL RESEARCH UNIT

This Unit incorporates the Lions Eye Donation Service, the research activities of the Melbourne Excimer Laser Group, and corneal studies.

Corneal studies currently include:

1. Moraxella Keratitis: Predisposing factors and clinical review of 95 cases.

A retrospective analysis of hospital records was conducted on culture-proven cases of Moraxella keratitis during a 10 year period (1995 – 2005) at the Corneal Unit, Royal Victorian Eye and Ear Hospital. This analysis investigated clinical presentation, to identify predisposing risk factors and evaluate the outcome of therapy of Moraxella keratitis. Local ocular predisposing factors were found to play a major role in Moraxella keratitis, and this infection has a poor visual outcome attributable to both the nature of the infection and predisposing factors.

2. Microbial keratitis following corneal transplantation.

A retrospective analysis of hospital records of all patients who presented with microbial keratitis in their corneal graft between July 2000 and June 2005 at the hospital's Corneal Unit was conducted to determine the range and frequency of predisposing risk factors and to analyse the clinical and microbiological profile of microbial keratitis following corneal transplantation. Failed graft was found to be a long-term risk factor for graft infection in addition to ocular surface disease and Herpes simplex keratitis. All the predisposing risk factors increase the risk of recurrent graft infection.

3. Topical Cyclosporin-A for acute corneal graft rejection: a double-masked randomised controlled study.

A prospective double-masked, randomised placebo, controlled clinical trial of topical Cyclosporin-A was assessed to investigate whether it has a demonstrable effect when used in conjunction with topical steroids in the treatment of acute graft rejection. To date, 111 of 125 patients have been recruited, an interim analysis demonstrating a non significant time in weeks to reversal between the two groups, although a significant time in weeks to resolution between the two groups.

4. Construction of bio-engineered basement membrane combined with ex-vivo amplification of corneal epithelium for ocular surface transplantation.

Cell sheets developed from the ex-vivo amplification of limbal stem cells can be used to replace a corneal surface damaged by limbal stem cell deficiency. The purpose of this project was to compare a variety of basement membrane-rich alternatives for suitability of growing limbal epithelium. Reliability, rate of growth, outgrowth pattern and cellular differentiation were investigated, an important goal in developing a new culturing method being to reduce the reliance on animal products. Denuded amniotic membrane and Myogel were determined to be reliable basement-rich extracts for cultivating limbal stem cells in culture using an explant method. Myogel can be derived from human muscle and therefore has the potential to be autologous to the person requiring corneal replacement. Using an explant methodology, a combination of donor cells from a contralateral healthy eye and a patient's own serum in the culture media has the potential to provide an entirely autologous bioengineered corneal surface replacement, with a subsequent decrease in risk of disease transmission and an increase in immune tolerability.

SURGICAL RESEARCH DIVISION continued

Cross-linking clinical trial: keratoconus stabilization clinical trial with riboflavin / ultraviolet-A treatment. Effects of collagen cross-linking on the cornea in keratoconus.

Collagen cross-linking, using topical riboflavin and ultraviolet light, has recently shown promising results in stopping the progression of keratoconus by increasing corneal rigidity. A randomised clinical trial to evaluate the clinical usefulness and efficacy of this treatment and to confirm its safety profile has commenced that will also investigate the effects of treatment on keratocyte behaviour, corneal sensitivity, thickness, curvature and the accuracy of tonometric measurements in vivo and test enzyme resistance of human corneas, normal and keratonic, after cross-linking in vitro. Preliminary results show encouraging trends. The benefits to keratoconic patients if this treatment is proven to be effective include better long-term vision without the need for corneal transplant surgery.

EXCIMER LASER REFRACTIVE SURGERY RESEARCH

The Centre continues to evaluate excimer laser procedures, both in the correction of refractive error and in the treatment of corneal disease. Although now regarded as a relatively mature procedure, there is still significant interest in monitoring and evaluating the outcomes of procedures performed with this device.

Current priorities in this area include:

- Evaluation of current treatment algorithms for LASIK using Bausch & Lomb 217z excimer laser and the AMO Amadeus Microkeratome in the treatment of myopia, astigmatism and hyperopia.
- 2. The genetics of myopia and keratoconus.
- 3. The role of excimer laser phototherapeutic keratectomy in the treatment of painful bullous keratopathy. This study has been completed and the data are currently being analysed.
- 4. Evaluation of the new technology of wave-front guided laser refractive surgery.
- 5. The evaluation of quality of life pre and post refractive surgery.
- 6. The Keratoconus Inheritance Study, a new project analyzing keratoconus kindreds for a Mendelian pattern of inheritance using the Orbscan II.
- Cataract and excimer laser, a new project to explore the suggestion that people who have undergone laser refractive surgery may have a higher incidence of cataract compared to the general population.



Centrally Focussed

THE IMPACT OF AGE-RELATED MACULAR DEGENERATION

The third in a series of reports by the Centre for Eye Research Australia and Access Economics, *'Centrally Focussed: The Impact of Age-related Macular Degeneration,'* provides a comprehensive analysis of the costs of age-related macular degeneration (AMD) – Australia's leading cause of blindness.

The report follows earlier projects 'Clear Insight: The Economic Impact and Cost of Vision Loss in Australia' (2004) and 'Investing In Sight: Strategic Interventions to Prevent Vision Loss in Australia' (2005).

Launched in February at Parliament House Canberra, 'Centrally Focussed' delivers a contemporary review of the epidemiology of AMD, viable options for treatment and presents an economic model, designed to inform and guide policy development and best practice management.

Critically, 'Centrally Focussed' reports that nearly twothirds of the population will develop age-related macular degeneration and that one in four people will lose their vision as a result of the condition. Further, the report shows that AMD costs Australians \$2.6 billion per annum – a sum that's expected to increase to \$6.5 billion by the year 2025. Presently, less than 20% of people with AMD can be treated to adequately retain or improve their vision.

Age-related macular degeneration affects the central area of the retina known as the 'macula' – a small part at the back of the eye, responsible for fine vision – and can cause blurred, darkened central vision. The cause of macular degeneration is still unknown. The economic model developed three intervention scenarios for analysis: the first, a targeted quit smoking campaign, the second a research breakthrough and finally, a new potential therapy.

'Centrally Focussed' reported that anti-smoking campaigns to prevent AMD are highly cost effective when the other health benefits, including a reduced incidence of cardio-vascular disease, are considered. Further, the report showed that running either a community awareness campaign or an individualised quit short course every year, would provide substantially more impact than the one-off reduction awareness campaign statistically modelled in 'Investing In Sight' (2005).

The second scenario highlights the need for continued research to develop new ways to prevent and treat AMD. It shows that a new treatment that could reduce the progression rate of AMD by as little as 10% would save \$5.7 billion over the next 20 years. A 50% reduction would save \$25 billion.

Finally, the economic model shows the cost effectiveness of new therapies is largely dependent on their delivery costs.

All three reports, published jointly with Access Economics, are available at www.cera.org.au



Education and Training

EDUCATION

Under the auspices of the Standing Committee on Ophthalmology, the Department of Ophthalmology develops curriculum and co-ordinates teaching and assessment in ophthalmology.

In addition, undergraduate medical graduates are selected for enrolment in the Advanced Medical Science year that gives them training in various aspects of ophthalmology research.

Undergraduate training of optometry students is undertaken in liaison with the Department of Optometry. Both the Department and the Centre also assist with the provision of lecturers and help facilitate the clinical training in the clinics of the Royal Victorian Eye and Ear Hospital.

Postgraduate education in ophthalmology is conducted under the direction of the Hospital's Clinical School. Postgraduate research training is also an important component of the Centre's activities, with postgraduate candidates listed later in this report.

POSTGRADUATE RESEARCH TRAINING

Postgraduate research training is an important component of the Centre's activities.

THESES IN PROGRESS

Doctor of Philosophy

Christine Chen 'Identification of genes in myopia.'

Elaine Chong

'New dietary factors in age-related macular degeneration.'

Lei Chen

'Development and validation of appropriate methods for the prediction of risk of future cardiovascular events in the contemporary Australian population.'

Shiao-Lan Chou

'Economic evaluation of rehabilitation programs for people with impaired vision.'

Beula Christy

'Comprehensive rehabilitation at all levels of eye care service delivery.'

Gillian Cochrane

'The development of a model for support services for children with low vision.'

Peter Dimitrov

'Predicting progression of age-related macular degeneration.'

Mohamed Dirani

'The heritability of refractive errors and ocular biometrics – a twin study.'

Rishita Nutheti

'Structural equation modelling and its application to the quality of life of visually impaired people.'

Cong Sun

'Gene-environmental interaction of retinal microvascular signs and cardiovascular disease.'

Heathcote Wright

'An evaluation of the health impact of swimming pools in remote indigenous communities of the Northern Territory.'

Peggy Pei-Chia Chiang

'Mapping low vision models and programmes in developed and developing countries.'

Ana Cama

'Low vision services for children in Fiji.'

Elke Ponczek

'The effect of a vision-specific self management program on depression, anxiety, and stress for older people with low vision.'

Thanh Nguyen

'Novel predictors of vascular changes in diabetes and prediabetes.'

EDUCATION AND TRAINING continued

Krishnaiah Sannapaneni

'Modeling the risks of cataract, refractive errors and its associated economic impact in India.'

Srinivas Marmamula

'Development, validation and comparison of population based rapid assessment methodologies for detection of significant refractive errors.'

Vilas Kovai

'Understanding factors that contribute to the success of the Vision Centre Model in rural parts of Andhra Pradesh.'

Master of Medicine

Michelle Baker

'Retinal microvascular signs in acute stroke.'

David Francis

'Development of a bioengineered corneal surface replacement.'

Master of Public Health

Tamara Mackean

'A qualitative review of the Victorian Eye Health Program with regard to sustainability.'

Advanced Medical Science

Bronwyn Scarr

'Low vision eye care in Vanuatu.'

Chit Loong Saw

'The Contents of a Self-management Tool for Visual Rehabilitation'.

Sharon Ong

'AV Diameter Ratio Grading in Age Related Maculopathy and Diabetic Retinopathy.'

Gargi Kothari

'Gender and the Socio-Economic Aspects of Cataract as manifested in Medical Student and Eye Registrar Curricula'.

Sandeep Gadgil

'The Determinants of Falls in the Visually Impaired'.

Danielle Zhang

'Evaluating a new non-mydriatic retinal camera designed to be used in developing countries'.

Master of Science

David Shearer

'Maximising the Potential for Eye Donation- an Exhaustive Audit of Deaths at a Major Public Hospital.'

Advanced Medical Science

Cheng Liu

'Ocular manifestations in inherited kidney diseases and their genotype-phenotype correlations.'

Hui Wen Tee

'Depression in individuals with vision impairment.'

Hui Yin Lim

'Barriers to accessing eye care services for people from culturally and linguistically diverse backgrounds.'

Lisa Mu

'Critical Success Factors in the Utilisation of a New Low Vision Service: the Centre for Vision Independence.'

Nathan Wong

'Blood pressure awareness levels in patients with Diabetes attending a tertiary ophthalmic clinic.'

Stacie Shiqi Wang

'Haemoglobin A1c awareness levels in patients with diabetes attending a tertiary ophthalmic clinic.'

Sundar Veerappan

'Candidate gene analysis in myopia.'

Rajeev Deva

'An eye to the kidney; the ophthalmic diagnosis of inherited kidney disease.'

Research Grants

GRANTING BODY	CERA	DEPARTMENT OF OPHTHALMOLOGY	TOTAL		
Basic Sciences Division					
Miss Dorothy Adele Edols Trust	148,600		148,600		
Allergan Australia	22,671	124,641	147,312		
Alcon Australia	29,500	75,000	104,500		
Vision Group		25,000	25,000		
Glaucoma Australia		25.000	25.000		
RVEEH MUST Bequest Fund		22,000	22,000		
RANZCO		10,000	10,000		
RANZCO Victorian Branch		5,000	5,000		
Nitecs Pty Ltd	2,508		2,508		
Clinical Epidemiology Division					
Dept of Innovation, Industry & Regional Development: STI	583,000		583,000		
National Health & Medical Research Council	235,950	86,000	321,950		
Alcon Research Institute	134,282	· · · · · · · · · · · · · · · · · · ·	134,282		
Pfizer Australia	100.000		100.000		
University of Sydney	82.652		82.652		
Peggy & Leslie Cranbourne Foundation	70,000		70,000		
Ophthalmic Research Institute of Australia	69,736		69,736		
National Heart Foundation	53,729		53,729		
American Health Assistance Foundation	52,978		52,978		
Singapore National Eve Centre	36,536		36,536		
American National Institutes of Health	,	18,335	18,335		
RANZCO Eye Foundation	16,000		16,000		
Novartis Pharmaceuticals	14,975		14,975		
RVEEH Research Committee	14,691		14,691		
Clifford Craig Medical Trust	9,000		9,000		
Clinical Research Division					
Commonwealth Government CRC	286,680		286,680		
National Health & Medical Research Council	57,417	228,500	285,917		
Novartis Pharmaceuticals	125,034		125,033		
Novotech (Australia)	120,239		120,239		
Lowy Medical Research Institute	99,644		99,644		
The William Buckland Foundation	96,020		96,020		
Vision Australia	90,909		90,909		
Alcon Australia	70,000		70,000		
Jack Brockhoff Foundation	68,000		68,000		
Joan & Peter Clemenger Trust	50,000		50,000		
H & L Hecht Trust	46,300		46,300		
The Angior Family Foundation	44,000		44,000		
RVEEH Research Committee	38,599		38,599		
The J A COM Foundation	32,000		32,000		
Ophthalmic Research Institute of Australia	31,550		31,550		
Pfizer Australia	28,650		28,650		
Victorian Department of Human Services	25,000		25,000		
Macular Vision Loss Support Society	19,400		19,400		
American Health Assistance Foundation	16,411		16,411		

RESEARCH GRANTS continued

GRANTING BODY	CERA	DEPARTMENT OF OPHTHALMOLOGY	TOTAL	
Clinical Research Division (continued)				
Wagstaff Fellowship	12,500		12,500	
The Callanan Foundation	10,000		10,000	
Eyetech	5,454		5,454	
Sunshine Foundation	4,450		4,450	
Population Health Division				
Commonwealth Government CRC	334,080		334,080	
Wagstaff Fellowship	195,833		195,833	
Christian Blind Mission	134,300		134,300	
Vision Australia	100,000	17,000	117,000	
Commonwealth Department of Health & Ageing	90,909		90,909	
International Agency for Prevention of Blindness	75,260		75,260	
Australian Research Council		72,822	72,822	
John T Reid Charitable Trust	63,000		63,000	
National Health & Medical Research Council		50,438	50,438	
Victorian Lions Foundation	50,000		50,000	
Victorian Department of Human Sevices	45,000		45,000	
Lions Clubs International Foundation	41, 812		41,812	
RVEEH Research Committee	4,227		4,227	
Ian Potter Foundation	2,500		2,500	
William Angliss Charitable Fund	2,000		2,000	
Surgical Research Division				
Bausch & Lomb (Australia)		200,000	200,000	
Ophthalmic Research Institute of Australia	32,000		32,000	
Victorian Lions Foundation		20,000	20,000	
REECE Australia	20,000		20,000	
The Wenkart Foundation	15,000		15,000	
The Wenkart Foundation		14,100	14,100	
RANZCO		10,000	10,000	
RVEEH Research Committee	8,420		8,420	
RANZCO Victorian Branch		5,000	5,000	
Totals	5,380,442	1,188,836	6,569,278	

Eye Research Australia Foundation

GRANTS

Through funds raised during 2006, the Eye Research Australia Foundation supported five research units of the centre. On behalf of the research divisions and units and people who have benefited from our research we thank the community very warmly for its support and investment in the Centre's valuable work.

CLINICAL EPIDEMIOLOGY DIVISION

Grants also assisted in the establishment of a dedicated retinal imaging grading facility at the Retinal Vascular Imaging Centre (RetVIC). The grading facility provides a team of four researchers with the capability for effective retinal analysis currently being used in numerous studies of vascular disease. Current studies include the AusDiab (idi) study, a major study investigating Type Two diabetes in Australia, including prevalence, incidence and cardiovascular complications. RetVIC is currently exploring options to commercialise the technology.

BASIC SCIENCES DIVISION

Donations supported the purchase a Nano-drop spectrophotometer and a CO2 incubator with sterilization feature in the recently established state-of-the art glaucoma wet lab. A Nano-drop spectrophotometer allows researchers to measure RND, DNA and protein in tissue samples. An Incubator allows researchers to propagate cells in culture.

Both of these pieces of modern scientific equipment will be used in experiments to better understand how the optic nerve is damaged in glaucoma and to find treatments for protecting the optic nerve and preventing vision loss.

SURGICAL RESEARCH DIVISION

Grants to the Division's Corneal Studies Unit supported research into the clinical trial of 'Corneal Collagen Cross-Linking in Keratoconus.' Cross-linking is a new method in treating keratoconus, introduced to Australia by Research Fellow Dr Christine Wittig. It is a cost-effective and minimally invasive treatment using Riboflavin (Vit B2) and UVA irradiation to trigger a chemical reaction in the cornea.

This trail, in its preliminary stages, will determine the effectiveness and safety of collagen cross-linking in Australia. It is hoped that this research will confirm encouraging results from Europe, leading to a deeper understanding and wider availability in treatment.

CLINICAL RESEARCH DIVISION

Grants to the Clinical Genetics Unit assisted the purchase an IOPac Advanced Pachymeter for use in the Twin Eye Study of Glaucoma Screening Parameters. An IOPac Advanced Pachymeter is an easy to use hand-held device that provides accurate and reliable corneal thickness measurements. It is a relatively new piece of technology and is portable for remote Australian and overseas trips and home visits.

POPULATION HEALTH DIVISION

The Health Services Research Unit of the Population Health Division received grants to support the 'Living with Low Vision' randomised controlled trial. The five-year project is investigating the effectiveness of a vision-specific self management program in improving particular areas of daily life in people with low vision. The program is a psycho-social approach, designed to empower individuals to manage low vision effectively, increase self-efficiency, maintain good health and improve quality of life.



Eye Research Australia Foundation

REPORT

The Eye Research Australia Foundation supports the research undertaken at the Centre for Eye Research Australia through fundraising, media, public relations and marketing capabilities.

10TH ANNIVERSARY 'THANK YOU' RECEPTION AT GOVERNMENT HOUSE

To celebrate the occasion of the Centre's 10th Anniversary and to thank our supporters, Foundation donors enjoyed at a late afternoon reception at Government House, hosted by Governor of Victoria, His Excellency Professor David de Kretser, AC, and Mrs Jan de Kretser. Governor de Kretser is the Patron of the Eye Research Australia Foundation and Mrs de Kretser is the Patron of the Royal Victorian Eye and Ear Hospital. The reception was a special opportunity for the Foundation and Centre to express appreciation for the support of its donors.

2006 CERA DONOR TOURS

The Foundation hosted three donor tours during July and November. The tours gave donors the opportunity to learn how their contributions assist the Foundation's work towards eliminating preventable blindness. Guests were shown through the research facilities, met our team of researchers and ophthalmologists and discussed latest developments in eye health.

At the November tour, the Foundation welcomed members of the Cheltenham Ladies Probus Club.

2006 MELBOURNE MARATHON

A team of more than 130 staff, family and friends participated in the 2006 Samsung Melbourne Marathon in October, to assist raise funds for Foundation. The Foundation was delighted to again enter a joint team with our friends at the Metropolitan Fire and Emergency Services Board (MFB).

Managing Director Professor Hugh Taylor, AC, hospital Chief Executive Officer Graeme Houghton and former Channel 7 newsreader David Johnston joined an enthusiastic team that helped raise more than \$40,000.

The Foundation wishes to acknowledge Associate Professor Justin O'Day for his significant contribution to the fundraising effort.



Foundation staff Lauren Metcalfe, Kelly Mikunda, and Romy Johnston, with Mrs Holloway

STAFF AND MEMBERS

Patron

His Excellency John Landy, AC, MBE Governor of Victoria (until April 2006) His Excellency Professor David de Kretser, AC

Governor of Victoria (from May 2006)

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Mr David Rath (until May 2006)

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Mrs Maria Goss (March – May 2006)

Ms Lauren Metcalfe (from June 2006)

Mrs Kelly Mikunda

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Mrs Susie Daniell

Associate Professor Elizabeth Dax, AM

Mrs Belinda Hope

Mrs Anne Maree Jones

Ms Tina McMeckan

Mr Tony Murphy, AFSM

Mr David Rath

Professor Hugh Taylor, AC

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Staff and Visitors

STAFF

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Ms Elizabeth Deveny Research Fellow (from February 2006)

Ms Sudipta Ghosh Honorary Research Fellow (from October 2006)

Ms Fleur O'Hare Clinical Trials Coordinator (from October 2006)

Associate Professor Julian Rait, Honorary Research Fellow

Ms Nicole Van Bergen Research Assistant / Laboratory Manager (from November 2006)

CLINICAL EPIDEMIOLOGY DIVISION

Professor Tien Wong Division Director

Ms Fulya Torun Executive Assistant

Clinical Genetics Unit

Associate Professor David Mackey Unit Head

Ms Lisa Kearns Research Orthoptist

Dr Yaling Ma Honorary Research Fellow (from September 2006) Dr Jon Ruddle Honorary Research Fellow

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Professor Tien Wong Unit Head

Ms Jessica Alessi Research Assistant (from July 2006)

Mr Stephen Bowditch Business Development Manager (until March 2006)

Ms Theresa Dolphin Photographer / Grader

Ms Julie Ewing Research & Clinical Trials Assistant

Mr Alex Harper Head, RVEEH Medical Retinal Clinic

Dr Amirul Islam Research Fellow / Statistician

Ms Lisa Jones Clinical Trials Assistant (from May 2006)

Dr Andreas Kreis Honorary Research Fellow (from July 2006)

Ms Kim Yu Lee Research Assistant (from July 2006)

Ms Damien Louis Research Fellow (from April 2006)

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Ms Sophie Rogers Epidemiologist / Statistician (from August 2006)

Dr Cong Sun Research Assistant

Dr Khay-Lin Teoh Commercial Manager (from May 2006)

Dr Gabriella Tikellis Deputy Director / Research Fellow

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Ms Ekaterina Alibrahim

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Dr Michelle Baker Dr Danny Cheung

PhD Candidates

Ms Lei Chen Dr Thanh Nguyen Ms Cong Sun

Advanced Medical Science (AMS) Students

Ms Stacie Wang Mr Nathan Wong

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Ms Rebecca Maxwell Executive Assistant

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Associate Professor Robyn Guymer Unit Head

Dr Khin Zaw Aung Research Assistant

Ms Melinda Cain Research Assistant

Mr Peter Dimitrov Research Assistant

Ms Theresa Dolphin Research Assistant / Retinal Photographer

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AMS Student

Mr Sundar Veerappan

POPULATION HEALTH DIVISION

Associate Professor Jill Keeffe Division Director

Ms Jessica Towers Executive Assistant

Eye Health Promotion Unit

Dr Andreas Muller, Unit Head (until December 2006)

Mr John Simpson Lions Eye Health Promotion Program Manager

Ms Betty Tellis Research Assistant

Health Services Research Unit

Dr Ecosse Lamoureux Unit Head and Senior Research Fellow

Ms Jennifer Hassell Research Assistant

Ms Melanie Larizza Research Assistant

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Dr Elaine Wong Research Associate

Prevention of Blindness Unit

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Mr Ross Dunn Database Manager (from November 2006)

Dr Alex Harper Senior Lecturer

Mr Nick Johnson Data Analyst (until May 2006)

STAFF AND VISITORS continued

Dr Richard Le Mesurier IAPB / Vision 2020 Regional Coordinator

Dr Trish O'Connor Research Fellow (from April 2006)

Ms Betty Tellis Research Assistant

PhD Candidates

Dr Ana Cama Ms Gillian Cochrane Ms Peggy Chiang Ms Shiao-Lan Chou Ms Elke Ponczek Mr Heathcote Wright

AMS Students

Ms Yin Lim Ms Lisa Mu Ms Wen Tee Ms Danielle Zhang

SURGICAL RESEARCH DIVISION

Professor Rasik Vajpayee Division Director (from May 2006)

Ms Fiona Warden Administrative Assistant (July – October 2006)

Corneal Research Unit

Professor Rasik Vajpayee Unit Head (from May 2006)

Mr Marios Constantinou Clinical Trial Coordinator and Orthoptist

Dr Mark Daniell Senior Lecturer

Dr Christine Wittig Honorary Research Fellow (from April 2006)

Lions Eye Donation Service

Dr Graeme Pollock Manager

Dr Prema Finn Senior Transplant Coordinator

Dr David Shearer Transplant Coordinator

Dr Grant Snibson Medical Director

Melbourne Excimer Laser Group

Mr Terry Couper Unit Manager Ms Caroline Gibbs Orthoptist

Ms Ilona Probyn Receptionist

Education Unit

Associate Professor Deborah Colville Senior Lecturer and Unit Head

AMS Student

Mr Rajeev Deva

CORPORATE SERVICES DIVISION

Ms Gerlinde Scholz General Manager (from January 2006)

Mr Rod Watts Director Corporate Services (until March 2006)

Ms Judy Coleman Executive Assistant (from June 2006)

Finance / Administration Unit

Mr Robert Palin Finance and Resources Manager (from August 2006)

Ms Elyce Capp Finance Manager (until July 2006)

Mr Peter Coates Finance Officer

Ms Irina Kalpakidis Finance Officer

Ms Anna Giannios Administrative Assistant / Receptionist (until May 2006)

Ms Fiona Warden Senior Administration Assistant

External Relations Unit

Ms Romy Johnston Manager

Mr Stephen D'Arcy Communications Officer (from August 2006)

Ms Lauren Metcalfe Fundraising Officer (from June 2006)

Mrs Kelly Mikunda Executive Assistant

IT Unit

Mr Colin Miles Manager (until December 2006)

Mr Nick Lowe IT Support Officer

Human Resources

Ms Sarah Jordan HR Officer (from June 2006)

Multimedia Unit

Ms Sarah Squire Manager

Ms Emma Ward (until June 2006)

VISITORS

January

Professor Les Irwig University of Sydney

Dr Andrea Grosso RetVIC Research Fellow Resident Ophthalmologist, Department of Ophthalmology, University of Turin School of Medicine

February

His Excellency John Landy, AC, MBE Governor of Victoria

Dr Bartley M Frueh Professor of Ophthalmology, The University of Michigan, Kellogg Eye Center, Michigan USA

Dr Mya Sandar and Mr Gao Jiong Singapore Eye Research Institute

March

Mr David Abraham Cass Foundation

Professor Judy Whitworth Head, John Curtin School of Medical Research, ANU, Canberra

April

Professor Sven Bursell Director, JVN TeleHealth Programs

Joslin Vision Network Beetham Eye Institute, Boston, USA

Dr David Lester Pfizer Pharmaceuticals, USA

Messrs Graham White and Dean Johnstone, Mrs Shirley Evers-Buckland Guide Dogs Victoria

June

Dr Sarah Hosking

CERA Guest Lecturer Reader in Optometry, School of Life and Health Sciences, Aston University, Birmingham, United Kingdom

July

Dr Andreas Kreis

RetVIC Research Fellow, Jules Gonin Eye Hospital, University of Lausanne, Switzerland

August

Professor Robert Casson Alcon Visiting Professor, Royal Adelaide Hospital, Adelaide, SA

October

Professor Paul Healey Alcon Visiting Professor, Sydney, NSW

Professor Ian Constable Alcon Visiting Professor, Lions Eye Institute, Perth, WA

Professor Mary Lou Jackson Director of Vision Rehabilitation, Massachusetts Eye and Ear Infirmary, USA

Ms Sun Jiang-Jiang PR Officer, ORBIS International (China Office), Shanghai

Mr Kevin McGeechan RetVIC Guest Lecturer, Associate Lecturer, Epidemiology and Biostatistics, School of Public Health, University of Sydney

Ms Haslina B Hamzah Singapore Eye Research Institute

November

Mr Robert Read CASS Foundation

Dr Dirk Colditz IMEDOS, Germany

Dr Ralph Audehm Diabetes Australia

Ms Rosemary Pacquol Perpetual Trustees

Ms Frances Betts (OSI) Eyetech Inc, Switzerland

December

Ms Wan Ling Wong Statistician, Singapore Eye Research Institute

Lectures, Conferences and Presentations

PROFESSOR HUGH TAYLOR, AC

Trachoma Scientific Exchange Meeting, 'Immunological correlates with pathogenesis (progression, scarring) and with protective immunity,' Phoenix Arizona USA, January

International Congress of Ophthalmology, 'Regional Highlights;' 'ICO – Report on Advocacy;' 'Chair: 'Vision 2020: The Right to Sight – The First Five Years;' 'Diabetic Retinopathy: Public Health Paradigm;' 'Prevention of Blindness Policies – The Real Cost of Eye Care and Who Will Pay for it (Chair);' 'Governmental Organizations' Role (Public Policies),' Sao Paulo, Brazil, February

WHO 10th Meeting for the Global Elimination of Blinding Trachoma, Geneva, Switzerland, April

Department of Ophthalmology, Sultan Qaboos University, 'The Royal Victorian Eye and Ear Infirmary, and CERA, University of Melbourne, and its educational and training program,' Muscat Oman, April

NEI Workshop on Collaborative International Research Opportunities, Bethesda, MD, USA, April

Alcon Research Institute Meeting, Fort Lauderdale, Florida , USA, April

ARVO Conference, Fort Lauderdale, Florida, USA April

142nd American Ophthalmological Society, 'Discussant – Barabara Klein's paper, 'Intraocular Pressure Effects on Optic Disc Cupping Differ by Age;' 'The Beaver Dam Eye Study,' Half Moon Bay, California, USA May

8th Global International Federation on Ageing, 'The Impact of Age-related Macular Degeneration,' Copenhagen, Denmark, May

11th International Symposium on Human Chlamydial Infections, Niagara, Ontario, Canada, June

COS Symposium on International Ophthalmology, 'Making a difference in the fight for sight;' 'Towards the elimination of trachoma;' 'Taming the scourge of onchocerciasis;' 'The Epidemic of Age-Related Vision Loss Down Under,' Toronto, Canada, June Vision 2020 Strategy Planning Meeting for the years 2006 – 2011, WHO Geneva, Switzerland, July

IAPB Committee and Board of Trustees Meeting, WHO Geneva, Switzerland, September

CERA 10th Anniversary Meeting, 'Seeing the Future,' 'The Centre for Eye Research Australia – Past, Present and Future;' 'Eye Disease in Australia – Refractive Error (Chair),' Melbourne, October

IAPB Pacific Islands Sub-Regional Meeting, Vision CRC, UNSW, Sydney, November

38th Annual Scientific Congress RANZCO, Sydney, November

American Academy of Ophthalmology Annual Meeting, '63rd Edward Jackson Memorial Lecture: Eye Care: Dollars and Sense,' Las Vegas, USA, November

IAPB Bi-Regional Assembly for South East Asia and the Western Pacific Region, **'How can we measure the progress we have made in Vision 2020?'** Korat, Thailand, November

WHO Meeting of the Technical Development Group for the Certification for the Elimination of Blinding Trachoma, Geneva, Switzerland, December

PROFESSOR TIEN WONG

RANZCO Victorian Branch Meeting, 'Retinal vein occlusion: An evidence-based update,' Victoria, May

5th Annual Baker-George Institute Symposium, **'Retinal microvascular changes in diabetes,'** Sydney, May

21st Congress of the Asia Pacific Academy of Ophthalmology, 'Trends and patterns of eye diseases in Asia;' 'Hypertension as a risk factor for diabetic retinopathy – new concepts and clinical significance,' Singapore, June

Committee of Convocations, **'The eye as a predictor** of cardiovascular disease' University of Melbourne, Melbourne, July 6th International Symposium of Ophthalmology, 'The effects of hypertension on the eye and its implications;' 'Age-related macular degeneration and cardiovascular disease: revisiting the evidence;' 'Diabetic retinopathy: current concepts and management,' Hong Kong, China, August

11th International Myopia Congress, 'Is the Pattern of Refractive Errors in Adults an Age-related of Cohort Effect?' Singapore, August

3rd Global Chinese Ophthalmic Conference, 'East West differences in the epidemiology of eye diseases,' Beijing, China, September

20th Anniversary International Scientific Meeting of the Tun Hussein Onn National Eye Hospital, 'Diabetes and Diabetic Retinopathy: Tackling the New Epidemic in Asia,' Kuala Lumpur, Malaysia, September

IMEDOS Academy Meeting 'Epidemiological Studies Regarding Diameters of Retinal Vessels: Basic approaches for diagnostics and prevention,' Berlin, Germany, September

Centre for Eye Research Australia 10th Anniversary Conference 'Seeing the Future,' 'Predicting who gets diabetic retinopathy,' Melbourne, October

American Academy of Ophthalmology, **'Is there an** epidemic of myopia in Asia and why?' Las Vegas, USA, November

The Australian Ophthalmic and Visual Sciences Meeting, 'Is retinal imaging useful for cardiovascular risk prediction?' Canberra, December

Pfizer Macugen Worldwide Advisory Board Meeting, **'Diabetic retinopathy and risk of cardiovascular disease,'** New York, USA, December

ASSOCIATE PROFESSOR ROBYN GUYMER

International Congress Ophthalmology, 'Current treatments for AMD,' Brazil, February

Association for Research in Vision and Ophthalmology, Summer Eye Conference Towards Prevention of Age Related Macular Degeneration, **'Age Related Maculopathy Statin Study,'** Florida USA, July

38th Annual Scientific Congress of the Royal Australian and New Zealand College of Ophthalmologists, Council Lecture, **'Lancelot to the rescue,'** Sydney, November

10th Anniversary Conference 'Seeing the Future,' Centre for Eye Research Australia, 'Where are we in the prevention of AMD?' Melbourne, October

63rd Orthoptic Association of Australia Conference, **'Recent macular degeneration research and treatments,'** Sydney, October

The Australian and New Zealand Society of Retinal Specialists Symposium, 'Genetics of AMD,' Sydney

38th Annual Scientific Congress of the Royal Australian and New Zealand College of Ophthalmologists, **'Molecular Biology and Histopathology of AMD**,' Sydney, November

38th Annual Scientific Congress of the Royal Australian and New Zealand College of Ophthalmologists, **'Cataract Big Picture,'** Sydney, November

38th Annual Scientific Congress of the Royal Australian and New Zealand College of Ophthalmologists, **'Update on genetics of AMD,'** Sydney, November

LECTURES, CONFERENCES AND PRESENTATIONS continued

ASSOCIATE PROFESSOR JILL KEEFFE

World Forum of Non-profit Organisations on Vision and Prevention of Blindness at the World Ophthalmology Congress, **'Quality of Life and Low Vision,'** Sao Paulo, Brazil, February

World Ophthalmology Congress, 'Planning for Low Vision Programs,' Sao Paulo, Brazil, February

CRC Association Conference, **'Communicating to change policy,'** Brisbane, May

Access for All: Disability-inclusive development practice, 'Vision loss in developing countries,' Melbourne, June

ISQOLS Conference, 'The value of sight: Differences in health-related QoL between the visually impaired and non-impaired,' Grahamstown, South Africa, July

12th ICEVI World Conference, 'Achieving equality in education: new challenges and strategies for change,' Kuala Lumpur, July

2nd Annual Nossal Global Health Forum, **'Enhancing the workforce: training health workers in eye care,'** Melbourne, September

Centre for Eye Research Australia World Sight Day Public Lecture, **'Low Vision: Solutions to Service Delivery,'** Melbourne, October

Centre for Eye Research Australia 10th Anniversary Conference 'Seeing the Future,' 'Measuring the Impact of Low Vision,' Melbourne, October

ORIA Symposium, 'Measuring quality of life,' Sydney, November

12th International Mobility Conference, 'Orientation and Mobility Plenary presentation in Low Vision,' Hong Kong, November

American Academy of Ophthalmology Annual Meeting, **'International Vision Rehabilitation and Low Vision Care: Learning from approaches around the world,'** Las Vegas USA, November

ARVO Conference, 'What is the value of sight?

Measuring differences in quality of life between the visually impaired and non-impaired,' Fort Lauderdale USA, April

ARVO Conference, 'The impact of vision impairment questionnaire: an evaluation of its measurement properties using Rasch analysis,' Fort Lauderdale USA, April

ISQOLS Conference, 'The value of sight: Differences in health-related QoL between the visually impaired and non-impaired.' Grahamstown South Africa, July

ARVO Conference, 'The utilisation of eye care services in Victoria,' Fort Lauderdale USA, April

ARVO Conference, 'Evaluation of low cost low vision devices,' Fort Lauderdale USA, April

ARVO Conference, 'A more detailed grading system may help explain the poor correlation between PCR and clinical diagnosis of trachoma,' Fort Lauderdale USA, April

PROFESSOR JONATHON CROWSTON

South East Asian Glaucoma Interest Group, Chennai, India, December

Abridged Financial Statements

FOR THE YEAR ENDED 31 DECEMBER 2006

Centre For Eye Research Australia Ltd

ABN: 72 076 481 984

INCOME AND EXPENDITURE	2006	2005
Revenue		
Federal Government	1,065,206	1,155,881
State Government	1,126,634	978,201
Charitable Contributions & Other Income	3,597,063	3,118,428
Total Revenue	5,788,903	5,252,510
Less Expenditure	4,942,729	4,443,711
Surplus / (Deficit) for the year *	846,174	808,799
BALANCE SHEET		
Current Assets	2,045,520	1.480,534
Non-Current Assets	1,518,182	1,304,390
Total Assets	3,563,702	2,784924
Current Liabilities		
Payables	300,850	518,102
Provisions	404,804	399,842
Other	730,702	585,808
Total Current Liabilities	1,436,356	1,503,752
Non-Current Liabilities	-	-
Total Liabilities	1,436,356	1,503,752
Net Assets	2,127,346	1,281,172
Total Equity	2,127,346	1,281,172

* The Centre for Eye Research Australia Limited operates as a not for profit organisation. Accordingly, accumulated surpluses are held in the form of working capital and fixed assets to support committed and planned research projects.

Abridged Financial Statements

FOR THE YEAR ENDED 31 DECEMBER 2006

Eye Research Australia Foundation

ABN: 25 040 435 191

INCOME AND EXPENDITURE	2006	2005
Revenues from ordinary activities	846,401	959,385
Less Expenditure	219,519	241,302
Profit from ordinary activities	626,882	718,084
Less Distribution to CERA*	75,000	154,500
Surplus / (Deficit) for the year	551,882	563,584
BALANCE SHEET		
Current Assets	1,469,377	913,391
Non-Current Assets	0	0
Total Assets	1,469,377	913,391
Total Liabilities	15,880	111,777
Net Assets	1,453,497	901,614
Total Equity	1,453,497	901,614

* An additional \$120,189.00 was distributed to CERA early 2007, pledged during 2006.

Support the Centre for Eye Research Australia

The Centre for Eye Research Australia is supported financially by its members and stakeholders, grants – government and non-government – and the Eye Research Australia Foundation.

Your support aids the Centre for Eye Research Australia's work treating and preventing eye diseases affecting people globally and providing assistance to people with low vision. Locally, your gift will directly assist more than 500,000 Australians who suffer from some form of vision loss.

Donations over \$2 are tax deductible and can be made to the Eye Research Australia Foundation.

CHEQUE

Cheques can be made payable to the Eye Research Australia Foundation:

Eye Research Australia Foundation

Level 1/32 Gisborne St East Melbourne VIC 3002

CREDIT CARD

Credit card donations can be made by telephoning (TOLLFREE) 1300 737 757

The Foundation accepts MasterCard, Visa and American Express cards.

ONLINE DONATIONS

To make a secure on-line donation, please visit **www.cera.org.au** and click 'support us.'

PLEDGE DONATIONS

Regular giving via pledge donations is a convenient option for those wishing to make a regular contribution to eye research. Pledge donors can establish an automatic monthly, quarterly, half yearly or yearly credit card donation. Pledge donations are an important source of income for the Foundation, your regular donation will help us save valuable recourses and better streamline donations to eye research.

IN-KIND SUPPORT

The Foundation welcomes individuals or organisations wishing to provide in-kind support in the form of goods or services including product donations, professional assistance or volunteering staff time.

BEQUESTS

Leaving a bequest to the Centre is a practical way to contribute towards the elimination of preventable vision loss and blindness leaving a lasting legacy for future generations.

Gifts directed to the Centre through the Eye Research Australia Foundation will assist all areas of research, in particular those in greatest need. If you prefer, you may direct your gift toward a particular area of research.

Please telephone **+61 3 9929 8424** for further information.

Discovering solutions for vision loss and blindness to benefit our community

Centre for Eye Research Australia

32 Gisborne Street, East Melbourne VICTORIA Australia 3002

Telephone:61 3 9929 8360Facsimile:61 3 9662 3859Email:cera-info@unimelb.edu.auWebsite:www.cera.org.au

ABN: 72 076 481 984



Centre for Eye Research Australia