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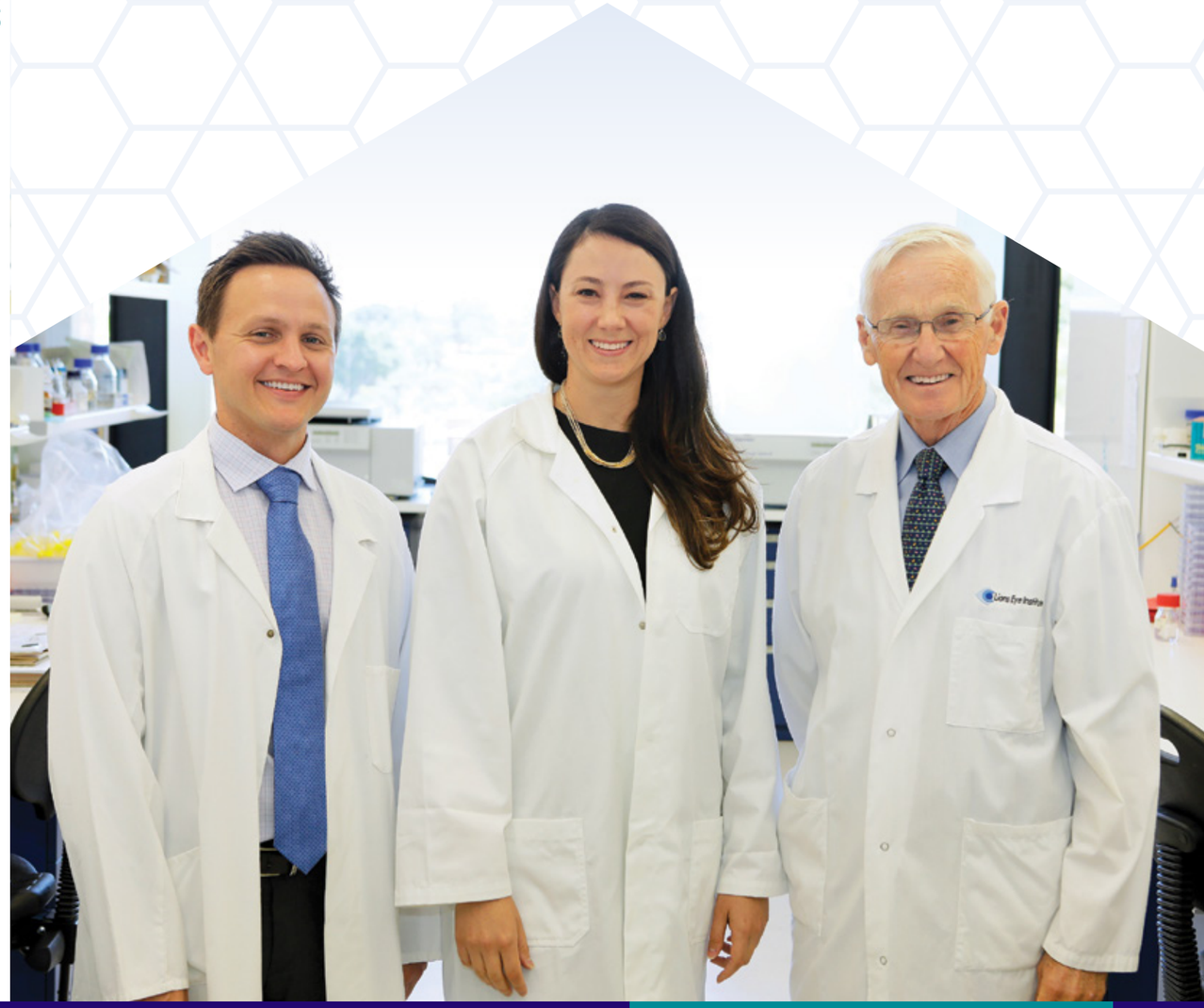
Lions Eye Institute **Annual Report 2018**

Lions Eye Institute

2018 Annual Report



Celebrating our past, looking to the future

The Lions Eye Institute combines excellence in clinical care with world-leading research investigating the causes of eye disease and developing new treatments and cures.

Over 35 years, our doctors, nurses and allied health staff have served the Western Australian community, providing patients with the highest standard of care across all specialty areas. Meanwhile, our research teams have operated at the frontiers of science, working on the next generation and cures for eye disease. Founded in 1983, the Lions Eye Institute has become one of the world's leading eye research institutes. As a not-for-profit organisation, we rely heavily on community support and thank our patients, study participants, donors and benefactors for partnering with us in our quest to save sight.

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A digital version of this report is available on our website:

www.lei.org.au

Our front cover features paediatric ophthalmologist Dr Antony Clark and medical researcher Dr Livia Carvalho with Lions Eye Institute founder and Patron Professor Ian Constable

Lions Outback Vision McCusker Director Dr Angus Turner was one of four outstanding Western Australian finalists in the 2019 Australian of the Year (WA) Awards announced by Governor Kim Beazley in October.

Thank you for partnering with us in our quest to save sight

2018 at a Glance

226
corneal transplants

6,062 donations valued at
$1.46 million

14 bequests totalling
$621,784

91
research papers

94
Clinical Services staff employed to support 16 ophthalmologists

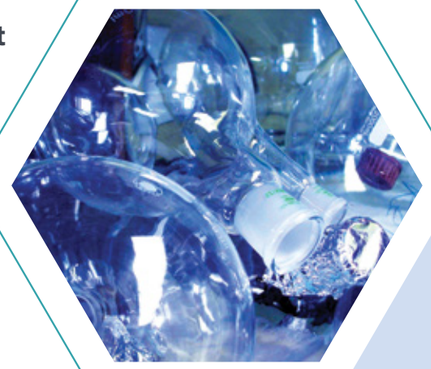
19th annual
Ian Constable Lecture

4
Grateful Patient events

2,518 patients
in 21 communities treated on the Lions Outback Vision Van

More than **40**
active Clinical Trials

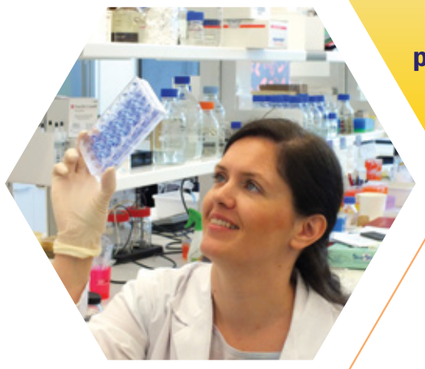
36 grants valued at
$6.5 million



60,000
eye consultations - a new record

1,315
eye examinations by Lions Optics

4,771
patients seen by Lions Outback Vision outreach services



7,900
surgeries and minor procedures - a new record

21,441 kms
travelled by the Vision Van over 353 driving hours

27 volunteers
in the Concierge Program

929
metropolitan patients seen by Lions Outback Vision

Our Values

Excellence

We strive to achieve excellence in all we do.

Integrity

Working towards our vision, mission and organisational goals with respect and honesty.

Respect

Recognition of the abilities and diversity of our colleagues, patients and collaborators.

Dedication

Commitment and passion for achieving our vision and mission.

Our Vision

To prevent and cure blindness and eye disease

Our Mission

To achieve leadership in scientific research and clinical practice in the prevention of blindness and eye disease through:

- global leadership in scientific research
- translation of research into community outcomes
- a commitment to growing the reach of our research capabilities and clinical services
- development and training of outstanding eye care professionals and researchers
- community engagement and education to build awareness, maintain a high reputation and increase funding

Contents

Chairman's Report

Peter Forbes

The Lions Eye Institute (LEI) celebrated its 35th anniversary in 2018 - a year in which we reflected on past achievements while setting our sights firmly on our future potential.

The LEI was founded in 1983 by Professor Ian Constable AO, who created a cutting-edge research institute to discover and develop cures and treatments for blindness and eye disease, supported by a range of world-class clinical services.

He was the LEI's first Managing Director and in 2018, Professor Constable – our true "founding father" - became just the fourth Patron in the history of our organisation.

I am delighted that after such a long association, Professor Constable remains passionate about our vision to prevent blindness and eye disease, committed to the future sustainable growth of the LEI and dedicated to promoting the LEI to our key stakeholders in government, business and the wider community.

We reflected on past achievements while setting our sights firmly on our future potential.

The year also saw Professor Constable celebrate his 50th year in ophthalmology: a truly remarkable achievement.

Toward the end of 2018, Managing Director Professor Mackey announced his intention to formally step down from February 2019 to focus on five funded research projects into the genetics of eye disease.

On behalf of the Board, our stakeholders and staff, I want to thank Professor Mackey for his almost 10 years at the helm, progressing the LEI's standing and reputation as a world-renowned medical research institute.

Professor Mackey will continue his association with the LEI, leading the Genetics and Epidemiology research group and mentoring students and early- and mid-career researchers.

In December, the Board announced the appointment of senior LEI ophthalmologist and researcher Professor Bill Morgan as Acting Managing Director.

An integral member of the LEI team for 25 years, Professor Morgan is also a member of the Board and brings great insight and institutional knowledge to the role.

Appreciation Dinner, October 2018

Following a major strategic review conducted by Mainsheet Capital in 2017, the Board continues to focus upon the future strategic priorities of the LEI to sustain its future.

In 2018, I am pleased to report we have either completed or initiated the key recommendations of the Mainsheet Review.

Our key priorities remain:

- Continual improvement to ensure patients who utilise our clinics experience excellent and safe clinical treatment and service.
- Ensuring our research and clinical trials are well supported within the LEI.
- Establishing a research advisory panel to develop a comprehensive Research Strategic Plan which will prioritise research within the LEI and develop meaningful measurements of outcomes.
- Ensuring our clinicians and patients are provided with the very best equipment and consulting and operating facilities.
- Supporting our staff in working in a safe environment and where career opportunities for improvement and advancement are achievable.
- Growing our eye health service outreach, particularly in Western Australia's rural, remote and Indigenous communities.
- Ensuring our stakeholders are kept fully engaged and form an integral part of our LEI community.

In other Board news from 2018, respiratory specialist Grant Waterer was appointed as a non-executive director from May 2.

Professor Waterer is a Professor of Medicine at Royal Perth Hospital Unit and The University of Western Australia (UWA). He is currently the acting Director of Clinical Services at Royal Perth Hospital.

Diana Forsyth officially concluded her Board role in September following her appointment as Chief Operating Officer at the Harry Perkins Institute of Medical Research. She made a wonderful contribution to the Board and I wish her every success.

All LEI Board members give freely of their time and energy and make a significant contribution to the good governance of the LEI. I thank them all.

A personal highlight of the year was an Appreciation Dinner hosted by the Board in October.

It was a moment to reflect on the LEI's achievements, with many LEI clinicians and researchers in attendance, as well as former Chairs Brian King and David Eiszele and Lions Save-Sight Foundation (LSSF) Chairman Ambrose Depiazzi (pictured).

I particularly wish to acknowledge the important, enduring and productive partnership between the LSSF and the LEI Board.

Finally, the LEI is fortunate to be staffed by a dedicated and passionate team of people who are committed to our values of excellence, integrity, respect and dedication. I thank each and every LEI employee.

Peter Forbes

Peter Forbes
Chairman

Managing Director's Report

Professor David Mackey

2018 was a year of exciting achievements for the LEI, with one of our most significant scientific research programs reaching fruition.

After more than 20 years of painstaking research and development, a new surgical intervention for glaucoma, developed at the LEI by Professors Dao-Yi Yu and Bill Morgan and the **Physiology and Pharmacology** research group and their international collaborators, became commercially available for implantation in Australian patients.

The Xen® Gel Stent is a microfistula implant that reduces intraocular pressure in the eye. Raised intraocular pressure is the biggest risk factor for glaucoma. Before it was introduced in Australia in March 2018, the stent was approved for use in the United States, Europe and other countries.

The enormous innovation of the Xen® Gel Stent highlights the challenges and timelines involved in translating a new therapy from initial concept to commercial reality.

With the Xen® Gel Stent, Professor Yu and his team have greatly contributed to our mission to achieve leadership in scientific research and clinical practice in the prevention of blindness and eye disease.

All LEI research groups reported significant accomplishments in 2018.

All LEI research groups reported significant accomplishments in 2018.

Genetics and Epidemiology secured a $2.5 million National Health and Medical Research Council (NHMRC) Centre of Research Excellence project grant to take new discoveries in the genetics of eye disease and translate them into improved patient care. The five-year project includes teams from across Australia and involves analysing blood and DNA from people with eye diseases as well as those with healthy eyes to provide insight into how genes influence risk of eye disease.

Experimental Immunology published research demonstrating how a common virus triggers long-lasting inflammation in the eyes of individuals with healthy immune systems. Professor Mariapia Degli-Esposti, the group's leader, also announced a move to the Monash Biomedicine Discovery Institute at Monash University while retaining her links with the LEI, opening up exciting opportunities for collaborative research efforts.

Lions Outback Vision published research on the growth in telehealth consultations and engagement with telehealth services – an evolution that has reduced waiting times for patients, provided continuity of care and improved efficiency of outreach ophthalmology trips.

The **Ocular Tissue Engineering** group focused on generating patient derived stem cells for future testing of novel therapies to treat inherited retinal diseases. This group continues to collaborate widely across Australia with the country's best experts in novel medicine manufacturing, computer science, engineering, epidemiology and clinical trials to bring the novel treatments and technology from the laboratory bench to the patient in clinic.

Retinal Genomics pioneered a study of the world's first and only mouse model of a rare retinal disease called Cone dystrophy with supernormal rod response (CDSRR), paving the way for new treatment pathways. The model closely matches what is seen in humans with CDSRR, allowing the researchers to validate treatment strategies, better understand the physiology of vision and the pathophysiology of this disorder. In collaboration with American research laboratories, the Retinal Genomics research group is also developing a gene therapy for a type of Usher syndrome.

Our **Clinical Trials** team was extremely busy with more than 40 active trials – giving patients with specific eye disorders, or previously untreatable eye conditions, access to new therapies well before they are available to the general public. The WA Atropine for the Treatment of Myopia (ATOM) Study, which is testing the effect of low-dose atropine eye drops on myopia in WA children, was expanded in 2018.

In other news, the LEI was well-represented at the Royal Australian and New Zealand College of Ophthalmology (RANZCO) Golden Jubilee Congress in Adelaide. Lions Outback Vision McCusker Director Associate Professor Angus Turner delivered the Fred Hollows Lecture and a large number of LEI researchers chaired sessions and gave presentations.

Professor Andrew Dick from University College London's Institute of Ophthalmology delivered the annual Ian Constable Lecture – A Tale of Two Diseases: Regulating Immune Responses in the Retina.

Professor Damien Harkin from the Queensland University of Technology gave the 2018 Miocevich Lecture – The Silk Road: A 10-year Journey Evaluating the Potential Use of Silk Proteins for Repairing the Human Eye.

In October, our Annual Open Day attracted an enthusiastic crowd of people wishing to know more about eye disease and LEI research.

Throughout the year, we hosted many dignitaries, including WA Governor Kim Beazley and WA Education Minister Sue Ellery.

We also acknowledged the loss of Emeritus Professor Bernard Catchpole in April. He was a key figure in promoting ophthalmology as a speciality at The University of Western Australia and helped attract Ian Constable away from a promising career in the United States to establish the inaugural Lions Chair of Ophthalmology in 1975.

In November, acclaimed businessman Stan Perron AM also passed away. Mr Perron has shown great kindness and generosity to many charities and not-for-profits (including the LEI) over many years and leaves a remarkable legacy to Western Australian medical research.

Finally toward the end of 2018, I announced my decision to step down as Managing Director after almost 10 years in the role. This allows me to focus all my time on five fully funded research projects into the genetics of eye disease.

It has been a privilege and pleasure to guide the LEI through a period of significant change and growth and I wish Acting Managing Director Professor Bill Morgan every success in the role in 2019.

I especially want to acknowledge and thank the remarkable LEI team, who bring passion and commitment to their work each day.

Professor David Mackey
Managing Director

Board of Directors

Chairman Peter Forbes

Mr Forbes was a founding partner and former managing partner of the WA branch of HLB Mann Judd, chartered accountants. He is the former CEO of specialist medical indemnity mutual MDA National and Managing Director of MDA National Insurance. Previous non-executive director roles include Chair of the Victorian health fund provider Transport Health and Law Cover Insurance, the NSW statutory insurer for NSW solicitors. His current non-executive director roles are: Honorary Chair of the LEI; Board Member of the East Metropolitan Health Service; Board Member of Farmers Mutual Limited; Board Member of the Local Government Insurance Scheme-WA and; External Member of the Law Society of WA's Professional Indemnity Insurance Management Committee.

Richard Alder

Mr Alder has worked in the securities industry since 1965. He was employed by JB Were for 31 years, consulted to Australia's largest ASX listed investment company, Australian Foundation Investment Company, and was Employer Director on the Board of the Government Employees Superannuation Board. He was a Board Director of the Royal Flying Doctor Service (Western Operations) and WA representative to the Federal Board and is involved with the Scotch College Foundation. He joined the Board in 2017.

Rudolf Brunovs

Mr Brunovs is a Fellow of the Institute of Chartered Accountants, CPA Australia and the Australian Institute of Company Directors and holds a Masters of Business Administration. Mr Brunovs retired as a partner of the chartered accounting firm Ernst & Young after 27 years as a partner in a number of their offices. He is currently a Director and the Principal of Mainstay Consulting Pty Ltd and a Director of Deep Yellow Limited. Mr Brunovs joined the Board of the LEI in 2005.

Dr Margaret Crowley

Dr Crowley is an experienced CEO and Board Director and a Graduate of the Australian Institute of Company Directors. She has held senior executive positions in state and national governments, universities and the not-for-profit sector - most recently as CEO of the Association for the Blind of WA Inc. for 15 years. Her Ph.D. focused on the perceived role of professional women in the United Nations Secretariat in New York. Dr Crowley joined the Board of the LEI in 2016.

Tony Joyner

Mr Joyner has over 25 years' experience as a commercial and corporate lawyer and is currently the Managing Partner of the Perth office of international law firm Herbert Smith Freehills. Mr Joyner sits on the global board of the firm, and chairs its Risk Management and Audit Committee. He is also Chair of Scitech and a board member of the WA Chamber of Commerce and the LEI. Mr Joyner joined the Board of the LEI in 2013.

Professor Ian McAllister

Professor McAllister trained in WA with additional sub-specialty training in vitreoretinal disorders in the USA. He is Director of Clinical Services at LEI and a consultant ophthalmologist at Royal Perth Hospital (RPH) and Sir Charles Gairdner Hospital (SCGH). Professor McAllister is actively involved in research for cures for vitreoretinal disorders, especially retinal vascular disorders, and has held 10 NHMRC grants in this area as well as numerous minor grants. He has been involved for many years in Statewide diabetic retinopathy screening and treatment and was Vice-Chairman of the Ophthalmic Research Institute of Australia and Chairman of the Research Board. He is widely published in scientific journals and received an achievement award from the American Academy of Ophthalmology. He joined the Board in 2010.

Professor David A Mackey

Professor Mackey was appointed Managing Director of the LEI, Professor of Ophthalmology/ Director of the Centre for Ophthalmology and Visual Science (COVS) at UWA and Board member in March 2009. Professor Mackey has achieved international recognition as a genetic ophthalmologist/scientist. His original research over more than 25 years into the genetics of glaucoma and in the fields of optic atrophy and congenital cataract has received continued research funding support.

Professor William Morgan

Professor Morgan is a consultant ophthalmologist at RPH, consultant ophthalmologist at Perth Children's Hospital, Professor at UWA and Co-Director of the LEI's McCusker Glaucoma Centre. He has completed a doctorate in philosophy studying the response of the optic nerve to pressure, particularly in relation to glaucoma. He sees patients with glaucoma and other ocular conditions such as cataracts. Professor Morgan maintains an active research interest in glaucoma as well as in the epidemiology of blinding eye disease. He joined the Board of the LEI in 2018 and assumed the role of Acting Managing Director in December, 2018.

Professor Grant Waterer

Professor Waterer serves as a Professor of Medicine at the RPH Unit and UWA as well as adjunct Professor of Medicine at Northwestern University, Chicago, and adjunct Professor of Medicine at Curtin University. Professor Waterer is a respiratory specialist but with a particular interest in pulmonary infectious diseases. He is currently the acting Director of Clinical Services at RPH. He joined the LEI Board in 2018.

Diana Forsyth

Ms Forsyth is a business leader and management consultant and has worked internationally across a range of sectors, industries and organisations. She joined the Board of the LEI in 2017 and resigned in October, 2018. We thank Ms Forsyth for her contribution.

Thank you to former Director Diana Forsyth

Staff A block circa 1988

Lions Eye Institute today

Celebrating our past looking to the future

"The Lions Eye Institute is in the business of solving problems, namely vision threatening disease, through our clinical skills and our research. We have a great team of people who are passionate, dedicated and skilled and we have reached a size where our clinical, research and community streams can pursue exciting new opportunities."

Acting Managing Director Professor Bill Morgan

Celebrating our past

In 2018, the LEI paid homage to the many important figures that have helped shape the institute and the cause of saving sight over 35 years.

Patron

LEI founding father Professor Ian Constable became Patron in 2018 to foster support in the community and promote the achievements of the LEI. Professor Constable also celebrated a remarkable 50 years in ophthalmology in 2018 and remains active today as a clinician and researcher. Among many honours, he was inducted into the WA Science Hall of Fame in 2009.

Vale Stan Perron

Respected businessman and philanthropist Stan Perron AM passed away in November. He was a generous donor and supporter of the LEI, with his financial backing facilitating vital research and treatment of blindness and eye disease.

A piece of history

The LEI's Linton Library was the recipient of a piece of Western Australian ophthalmic history with the donation of a slit lamp owned by Dame Ida Mann.

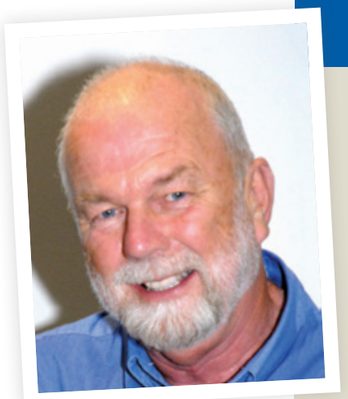


Photo finish

Chris Barry, considered one of the best ophthalmic photographers in the world, retired from the LEI in 2018. He was one of the original staff members, starting at Royal Perth Hospital in 1975.

Ophthalmic pioneer

Emeritus Professor Bernard Catchpole passed away in Perth in April. He was just the second Professor of Surgery appointed at UWA medical school and a key figure in promoting ophthalmology as a speciality at UWA. He helped attract Professor Constable from the United States to establish the inaugural Lions Chair of Ophthalmology at UWA in 1975.

Looking to the future

Also in 2018, the LEI celebrated the hard work and success of a new generation of eye health champions.

Planning

The Lions Eye Institute continued to progress planning for the Ian Constable Chair in Discovery and Translational Ophthalmic Science. The science-based Chair and affiliated research team will honour Professor Constable's outstanding contribution to ophthalmic science and clinical practice over the past five decades. This initiative is a collaboration between the LEI and UWA, and has attracted funding from a range of generous individuals and foundations.

New research

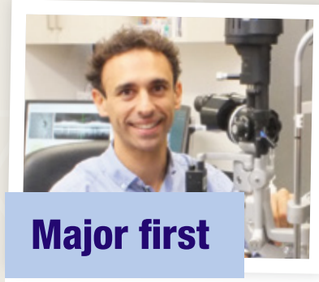
Young LEI researchers Dr Carla Mellough and Dr Livia Carvalho were awarded a Telethon-Perth Children's Hospital Research Fund grant to investigate genetic and environmental factors involved in early onset myopia.

Board talent

The LEI continued to strengthen the composition of its Board with new appointments in Grant Waterer, Professor of Medicine at the RPH Unit, and renowned LEI ophthalmologist Professor Bill Morgan, who also assumed the role of Acting Managing Director of the LEI.

Strong partnerships

Quadrant Energy and Santos, Joint Venture Partners in the Devil Creek Gas Plant, reached an agreement to continue supporting eye health services in the Pilbara region, especially diabetic eye health information, provided by Lions Outback Vision's Outreach Eye Health program.



Major first

LEI celebrated a major first with Dr Kristopher Rallah-Baker becoming Australia's first Indigenous ophthalmologist. Dr Rallah-Baker was based with Lions Outback Vision in 2018 and formally completed the RANZCO Vocational Training Program in June.

Teaching tools

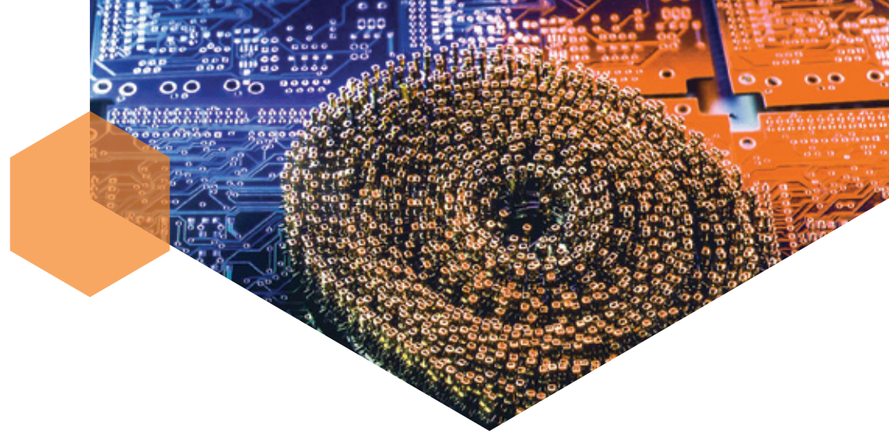
Dr Hessom Razavi has developed and released a new video resource for medical students seeking further information on the eyes. Eyeballs Made Easy is a joint collaboration between the LEI and UWA. Dr Razavi has also helped develop virtual reality software that takes viewers inside the eye.

Eye safety

The LEI's Annette Hoskin is a leader in eye injury prevention. She is a member of the Asia Pacific Ocular Trauma Society and was a guest speaker at the 2018 Ocular TraumaCON in India. She also spoke at the National University Hospital in Singapore as part of their continuing medical education for ophthalmologists and optometrists.

Vision for the future

Professor Morgan is a renowned ophthalmologist and medical researcher who has worked at the LEI for 25 years. He was appointed Acting Managing Director in late 2018. Here, he outlines his bold vision for the future of the Institute.



I was very honoured when the LEI Board asked me to take on the role as Acting Managing Director in mid-December 2018.

Upon accepting the position, I was very fortunate to have the immediate and total support of all the staff and the Board members.

My immediate focus was upon the continued restructure of the clinical management systems and to work towards the restructure and reinvigoration of the research side of the Institute.

Restructuring of the clinic had begun in March, 2018, with the formation of the Clinical Leadership Committee (CLC) - a core group of senior clinicians who were given more power to make decisions within the clinical space.

We had employed several external practice managers during the preceding years and for various reasons, including the unique complexity and structure of our Institute, this position had proven difficult for any one person to manage.

Mr Rob Bacon led the transition for a period of four months before the CLC could implement a new more horizontally-layered structure. This structure is allowing and fostering local feedback and to build up leadership skills within our own staff members in the clinical sector.

The big advantages of this are that it encourages greater staff input into the management and also brings up people within the Institute who have a good working knowledge of the amazing but also complex nature of our own clinical and research cultures.

There simply is no other Institute in Australia with such a strong combined clinical, research and community ophthalmic focus. Most other Institutes are very strong in one of these areas but not strong in all three.

The management of an Institute like this with such complexity - particularly as it has grown - has formed its own problems over time but I am extremely confident that we are now on track for continued growth, efficiency and great patient outcomes.

An example of the expansion and increased efficiencies that have occurred within the Institute includes the fact that we have set up a new clinic at Midland with Dr Hessom Razavi servicing disadvantaged and other patients in that sector. Long-term we see efficient service delivery particularly to disadvantaged patients as one of our core aims.

Clinic efficiency is turning, making in excess of $1 million dollars more for research and administration in the 12 month period to March 2019 compared with the previous 12 months.

Our clinical services are internationally recognised and this is perhaps best exemplified by the fact that Allergan, the large pharmaceutical and device manufacturer has asked us to be one of only two surgical excellence training centres in the world for the Xen® Gel Stent.

The Xen® Gel Stent was invented and largely developed here at the LEI by Professor Dao-Yi Yu and his team and there have been 75,000 XEN procedures performed worldwide in the last five years. The fact that Allergan wants us to be a worldwide centre of surgical excellence for Xen is testament to our overall clinical surgical skills and infrastructure.

The Xen® Gel Stent is another example of how our basic research in terms of studying a fundamental pathophysiological problem has led to direct clinical outcomes benefiting thousands of patients not only at our Institute but worldwide.

We are just embarking upon a research renewal program and have established a research advisory panel with two external scientists, two senior internal scientists, the Managing Director, two Board members and a leading clinician.

This creates a small, cohesive and transparent research advisory and assessment panel to drive research further into the future here at the Institute.

We are establishing a series of fundamentally important seminars to link the clinical problems with the research staff, their techniques and methodologies to drive forwards linking fundamental clinical questions to research techniques which should deliver results into the future.

Our core vision is to prevent blindness and to treat disabling and painful eye diseases. We now have enough research funds from generous donors to the Ian Constable Chair fund to establish a Research Professor of Ophthalmology at the Institute.

A significant outcome in the next year will be towards deciding how best to fund and employ the best quality scientist for this position. This will be a very important decision for our research base going forward.

Regarding community and teaching, our community outreach work extends to local rural and remote communities as well as overseas. Overseas, clinicians have been teaching surgical and other skills in Indonesia for many years and we have more recently begun collaborating in research with the University of Indonesia based in Jakarta.

We are developing a Memorandum of Understanding with that University and already have two others in existence with the University of Brawijaya at Malang with whom we are beginning research collaboration as well as the University of Udayana in Bali.

We see this work as fundamentally important to our long-term clinical and research expertise as Indonesia grows economically and intellectually.

One outcome of our collaborative research has been the successful design of a glaucoma drainage device specifically built for Indonesian patients to be manufactured in Indonesia at one tenth of the cost of such current devices. This device should be released nationally across Indonesia in mid-2019.

Already some 250 devices have been inserted into patients with severe forms of glaucoma in Indonesia under the supervision of myself and Dr Virna Octariana, Head of Glaucoma at the University of Indonesia.

The other very important development in the community space involves Lions Outback Vision, which services many thousands of patients per year across the rural and remote communities of our state.

Dr Angus Turner and Dr Hessom Razavi are very active in this space and have been able to negotiate preliminary agreements with various industry governmental bodies towards the formation of a Northwest Clinical Ophthalmic Hub. This would greatly increase the service provision to patients residing in the Northwest and also provide a centre for learning and teaching excellence in that area.

So in short it is an incredible privilege to be asked to lead the Institute.

We are witnessing a turnaround in our clinical fortunes and this I believe is driven by fundamental changes in our management structure.

We have also witnessed incredible outcomes from the very active translation of our research focused into clinically fundamental questions now delivering improved glaucoma care to more than 75,000 patients internationally.

This philosophy will no doubt underpin the future development of research across the Institute and allow its expansion.

We also have tremendous opportunities and developments occurring in the community space both locally and abroad. I very much look forward to reporting to you all the developments that occur over the next 12 months.

Professor Bill Morgan
Managing Director (Acting)

Rod photoreceptors (red) in an adult human retina (retinal cell nuclei can be seen in blue). Rods are responsible for our vision under low light conditions. *Image by Dr Carla Mellough.*

Research

Our vision is to prevent and cure blindness and eye disease

Genetics and Epidemiology

Discovering new genes responsible for major eye diseases causing blindness and vision loss remained a major focus for the Genetics and Epidemiology research group in 2018.

Group Leader Professor David Mackey was awarded a highly coveted Practitioner Fellowship from the NHMRC worth almost $600,000 to discover new genes responsible for glaucoma and myopia.

Glaucoma is the second leading cause of blindness while myopia is a risk factor for glaucoma, with rates rising across the world.

The research aims to identify new treatments for both diseases and develop family-screening strategies to identify undiagnosed cases of glaucoma before it affects sight.

The research project builds on a nationwide NHMRC Centres of Excellence, Partnership, Project and Program grants – From Discovery to Therapy in Genetic Eye Diseases.

The $9.4 million Program grant was recognised as the "Top Ranked Program Grant" in the country and the largest ever NHMRC grant awarded for eye research. It is distributed across five Australian centres, with the LEI sharing in this work.

The Genetics and Epidemiology group is a major contributor to this collaborative research program, which is aiming for a future free of most blindness.

Modern ophthalmology has made such great inroads into preventing and treating blinding disorders over the last century that most remaining "untreatable blindness" is due to genetic causes.

The four primary research aims of the project are to:

- Define the natural history of blinding eye diseases with rigorous phenotyping and genetic information.
- Facilitate and initiate treatment trials for inherited ophthalmic conditions.
- Identify genes and mutations leading to blindness in children and adults.
- Develop world-leading models for genetic risk prediction and for the feedback of genetic results for Mendelian and complex eye diseases.

The project brings together experts in genetic eye disease and clinical trials from around Australia covering all the critical aspects required to deliver novel therapies to Australian patients.

The researchers will also work towards improving diagnosis and treatment outcomes for familial and non-familial retinoblastoma (a cancer of the eye that affects young children), establishing genetic testing for developmental and congenital diseases, developing accredited genetic testing for risk prediction in complex diseases and developing protocols for feedback of results to patients and their families.

The $9.4 million grant was recognised as the "Top Ranked Program Grant" in the country

Researchers are focused on discovering new genes responsible for common inherited eye diseases such as myopia

Members of the Genetics and Epidemiology research group

Experimental Immunology

The Experimental Immunology group published important new research in 2018 on the role a common virus plays in triggering long-lasting inflammation in the eyes of hosts with healthy immune systems.

Published in the medical journal PLOS Pathogens, the research reported on the work of Dr Valentina Voigt, Professor Mariapia Degli-Esposti and the Experimental Immunology group.

Healthy eyes have been considered largely inaccessible to viruses, as well as "immune privileged", meaning that exposure to foreign agents, such as viruses, had been thought not to trigger an inflammatory response.

LEI researchers conducted a series of experiments using a mouse version of the common virus cytomegalovirus (CMV) and examined the effects of systemic infection on the eye of healthy hosts.

They found that this common virus targets the eye much more frequently than appreciated, and that healthy eyes become an unexpected reservoir for the CMV virus.

CMV infections are common, with more than half of the adult population infected, but clinical symptoms are usually seen only in patients with compromised immune systems.

The research highlighted that CMV infection triggers sustained inflammatory responses in healthy eyes, including the neural retina.

While more research is needed to determine whether these unexpected findings extend to humans, they suggest that researchers and doctors may need to rethink the effect of CMV – and, potentially, other viruses – on the eyes.

Some eye problems caused by dormant or reactivated CMV in people with healthy immune systems may be misdiagnosed, leading to improper treatment that could damage vision.

The research was funded by the Hardie Foundation, the Stan Perron Charitable Trust and the NHMRC.

Dr Valentina Voigt's research into the impact of viruses on the eye is challenging long-held assumptions

Monash Biomedicine Discovery Institute

Move boosts collaborative power

Professor Mariapia Degli-Esposti announced in late 2018 she would take up a professorial appointment at the Monash Biomedicine Discovery Institute while retaining strong links with the LEI.

Professor Degli-Esposti, the LEI's Director of Research and Head of the Immunology Division, is using the move to expand her internationally-recognised research programs and build collaborative research partnerships between the two Institutes.

Under her supervision, the Experimental Immunology group at the LEI will continue its leading work in a number of important areas, including: the impact of viral infection on the functionality of the eye; the impact of viral infection on neurological tissues including the retina and brain; improving the outcome of bone marrow transplantation and avoiding complications that affect the eye; investigations of novel therapeutics for dry eye disease; and understanding the cause of uveitis and the processes that need to be targeted therapeutically.

Under her supervision, the Experimental Immunology group at LEI will continue its leading work in a number of important areas

Professor Mariapia Degli-Esposti is building cross country research links

Ocular Tissue Engineering

In 2018, the Ocular Tissue Engineering group focused on generating patient derived stem cells for future testing of novel therapies to treat inherited retinal diseases.

Led by Dr Fred Chen, this group continues to collaborate widely across Australia with the country's best experts in novel medicine manufacturing, computer science, engineering, epidemiology and clinical trials to bring the novel treatments and technology from the laboratory bench to the patient in clinic.

Scientists in the group have focused on growing stem cells from patients with retinitis pigmentosa and Stargardt disease. Potential medicines to restore faulty genes are currently being tested in patient cells by the group and the six Ph.D. students co-supervised by Dr Chen.

During 2018, many patients with inherited retinal disease finally received a genetic diagnosis after waiting for many years or decades thanks to the boost in research funding from the McCusker Foundation.

The 2018 Miocevich Retina Fellow, Dr Sukanya Arunachalam, contributed significantly to the recruitment and assessment of many more participants with inherited retinal diseases to prepare them for future therapies.

For many of these individuals, a genetic diagnosis is the beginning of new research projects and collaborations to develop personalised treatment and detailed monitoring of disease progression prior to future treatment is essential.

Several trials in geographic atrophy, led by Dr Chen, were also completed in 2018.

Two of the three drugs tested showed promising results, which will be announced at international conferences in 2019.

Encouraging results from the LEAD trial (nanosecond laser) for drusen treatment was announced in 2018 with further analysis and publications planned for 2019.

New clinical trials are due to commence in 2019, including therapies for geographic atrophy and newer generation of injections medicine for wet macular degeneration and diabetic retinopathy.

Dr Chen's clinical trials team appreciates the continued support and referrals from ophthalmologists and optometrists of patients who might be suitable for these clinical trials.

The Ocular Tissue Engineering team is focused on developing personalised therapies for patients with inherited retinal diseases

Major cause of childhood blindness in the spotlight

The Ocular Tissue Engineering group announced in 2018 the creation of a Centre of Research Excellence in Juvenile Macular Disease to highlight an important cause of childhood blindness.

Juvenile macular degeneration is one of the most common causes of legal blindness in Australian children. Childhood blindness affects one in every 5000 children and adolescents with profound educational, personal development and economic impacts.

Inherited retinal diseases account for 44 per cent of blindness in children and adolescents in WA and the most common form is juvenile macular degeneration.

The Centre of Research Excellence is being funded with a $250,000 Telethon Perth Children's Hospital Research Fund grant.

It will focus on early clinical recognition of juvenile macular degeneration, accurate genetic diagnosis, clinical protocol for disease monitoring, modelling of disease in the petri dish and personalised medicine development.

Dr Fred Chen with a young patient who has Stargardt disease - the most common form of inherited juvenile macular degeneration.

Physiology and Pharmacology

The use of the Xen® Gel Stent, invented at the LEI, has been increasing rapidly around the world - particularly in the USA, United Kingdom, Germany, Switzerland and Australia.

The Xen® Gel Stent, a surgical treatment for glaucoma, was approved for use in Australia in March, 2018.

The Physiology and Pharmacology Group continue to provide their knowledge and experience with this procedure gained from more than 20 years of research and development and clinical applications.

LEI glaucoma specialists, Dr Antonio Giubilato and Dr Antony Clark, have also contributed to further improving surgical outcomes from a clinical perspective.

Conjunctival lymphatic drainage plays a critical role in outcomes of any glaucoma filtration surgery including the Xen® Gel Stent procedure. However, there is no commercially available device which can non-invasively image the conjunctival lymphatics.

The Physiology and Pharmacology group has been working with leading engineering teams to develop a non-invasive and label free lymphangiography to image lymphatic capillaries before and after glaucoma surgery.

The Physiology and Pharmacology group has also worked on developing a novel glaucoma surgical approach using ultraviolet laser ablation.

The concepts have been proven experimentally. We are currently attempting to improve the efficiency and reliability of the optical fibre delivery system. This approach could be an ideal glaucoma surgery to achieve the best surgical outcome.

In addition, such ultraviolet laser surgery also can be used for other high precision intraocular surgeries at the micron level.

Increased intraocular pressure is a major risk factor for glaucomatous optical nerve damage.

The Goldmann Applanation Tonometer has been the gold standard for intraocular pressure measurement for decades.

The Physiology and Pharmacology group is developing a new Applanation Tonometer which could avoid the possible errors associated with the Goldmann Applanation Tonometer. More than 200 experimental studies have been performed to identify the errors and improve the prototype device.

We have extensively studied retinal vein pulsation pressure and are developing a non-invasive intracranial pressure measuring technique both experimentally and clinically.

A new field of orbital pressure measurement will be expanded and cover three critical and interlinked pressure compartments. The knowledge gained will help us to understand the pathogenesis of glaucoma, orbital and cerebral diseases and their interactions and provide new strategies for developing new diagnostics and therapeutics for these important diseases.

Retinal vascular diseases such as diabetic retinopathy and retinal vein occlusion are common vision threatening diseases.

The Physiology and Pharmacology group is focused on early functional diagnosis and early therapeutic interventions. One of our new techniques for the diagnosis of diabetic retinopathy is to non-invasively detect spatial and temporal variations of retinal capillary perfusion clinically.

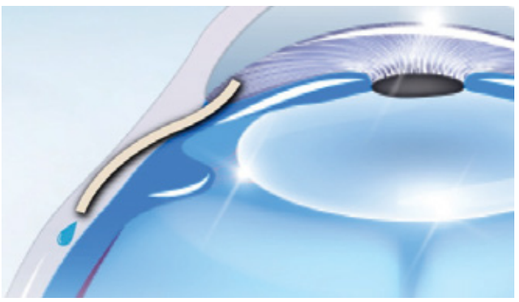
We recently published a paper in the highest ranked journal in ophthalmology specifically describing our progress in this field.

Researchers and clinicians are working with highly talented image analysis specialists and engineers performing both experimental and clinical studies.

For therapeutics of retinal vascular diseases, we are developing specific interventions to target the causes of the diseases rather than the complications. For example, in branch retinal vein occlusion, we are developing a site-specific technique to release the occlusion site and reduce endothelium hemodynamic stress.

At a glance: the Xen® Gel Stent

Invented at the LEI, the Xen® Gel Stent is a microfistula tube that successfully reduces intraocular pressure. The tube is about the size of an eyelash, thinner than a human hair and almost transparent.



Surgeons implant the microfistula tube using a needle-type implanter in the space between the eye's anterior chamber and the conjunctiva, the tissue covering the white part of the eye. This creates a bleb, allowing excess fluid to drain from the eye, thereby lowering intraocular pressure – the biggest risk factor in glaucoma.

Retinal Genomics

The Retinal Genomics team is working to better understand and provide possible treatment pathways for a rare retinal disease which affects children and causes life-long visual loss.

The research team, led by Emeritus Professor David Hunt and Dr Livia Carvalho, have pioneered a study of the world's first and only mouse model of cone dystrophy with supernormal rod response (CDSRR).

The model was developed by the Welcome Trust Sanger Institute and brought to Western Australia from the United Kingdom by Professor Hunt in 2013.

Whilst still in the United Kingdom, Professor Hunt led the first study that linked the genetic cause of CDSRR to mutations in a gene called KCNV2. The gene specifies a channel responsible for the movement of potassium ions across cell membranes in the retina.

The retina is unique in the number of different mutations that cause vision loss, with 240 different disease genes now identified.

As phenotypes do not always correlate with the respective genotypes, molecular analysis is the only way to detect the causative gene. However, CDSRR is the exception because it can be diagnosed via electrophysiology testing.

Dr Livia Carvalho is part of the Retinal Genomics research team studying a rare eye disorder

This testing measures the electrical responses of various cell types in the retina. People affected by CDSRR show very depressed rod and cone cell activity which switches to a supernormal rod response when presented with a very bright flash of light.

This makes the ERG testing an easy diagnostic tool, which is unique to this disorder. The abnormal ERG phenotype at high light intensities suggests a dysfunction affecting the first stage of photoreception in the retina.

With a prevalence of less than one in a million, CDSRR is a very rare autosomal recessive retinal disorder. Patients have a progressive deterioration of visual acuity and colour vision and most of them also present with myopia. Symptoms of visual loss begin in early childhood and deteriorate rapidly by the second decade of life. Unfortunately, there is no treatment for CDSRR and the small number of studies about the mechanism and cause of this rare disease has limited progress towards a cure.

As the only group in the world that owns the Kv8.2 KO, the Retinal Genomics and Therapy Group is in a prime position to further study the disease mechanism behind CDSRR. They also believe that CDSRR would be an ideal candidate for a gene therapy based treatment as their Kv8.2 mouse provides the ideal pre-clinical model to test the treatment.

LOOKING TO OUR FUTURE

Little fish is a big lure for childhood myopia researchers

LEI scientists are using zebrafish – a relative of the minnow – to study how environmental factors and genetics interact in the development of childhood myopia.

Dr Livia Carvalho and Dr Carla Mellough have secured a $250,000 grant from the Telethon-Perth Children's Hospital Research Fund for the project.

Their research is, for the first time, combining genome-wide association studies, cutting-edge gene editing techniques and a zebrafish model to specifically target the mechanisms behind early-onset myopia.

Myopia, or short-sightedness, starts in childhood and involves axial growth of the eye ball so that it becomes more egg-shaped.

"We chose a zebrafish model rather than a mouse model because zebrafish are easier to manipulate and study eye development from a very early stage," Dr Carvalho said.

"Zebrafish breed every 10 days and can produce hundreds of eggs each time. They are also transparent so we are able to observe their growth under the microscope from fertilised egg to fully formed fish in just a matter of days."

The researchers are hoping to answer how genes and environmental factors influence the development of myopia in children.

The zebrafish may contribute to better understanding of childhood myopia

Clinical Trials

Active people who spend a lot of time outdoors are more prone to developing pterygium – or surfer's eye. The aptly named "SURPH" Trial is examining whether eye drops can reduce eye redness associated with the condition and even reduce the need for surgery

In 2018, the Clinical Trials team began recruiting people with a pterygium to test whether a new medication given as eye drops can reduce eye redness associated with the condition and potentially replace surgery as a treatment option.

Pterygium – also known as surfer's eye - is a fleshy growth on the surface of the eye. As its growth progresses, it can obscure the optical centre of the cornea, causing visual impairment.

Currently, surgery is the only option for people with a pterygium that affects their vision.

Australia has one of the highest rates of pterygia in the world. It's estimated that 1.1 per cent of Australians are affected, rising to 12 per cent in men over the age of 60.

A combination of genetics and environmental factors - including excessive exposure to sun, dust or wind - are believed to be factors in developing the condition.

The SURPH (**S**t**U**dy of the **R**esponse to AG-86893 in patients with **P**terygium **H**yperemia) Trial, led by the LEI's Dr Jean-Louis deSousa, forms part of a multi-centre study to ascertain the safety, tolerability and effectiveness of eye drops in the treatment of pterygia.

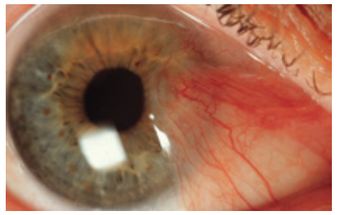
Researchers believe AG-86893, given as eye drops, has the potential to reduce conjunctival hyperemia (red eye) with short-term use as well as reduce new blood vessel growth and fibrosis that may contribute to the growth of pterygium.

The SURPH Trial represents a move by the Clinical Trials team into testing new treatments for eye disease that affect the front of the eye, as well as continuing studies on the back of the eye.

The LEI's Clinical Trials team is one of the largest ophthalmological research centres in the world, with more than 40 active trials.

The team tests new drugs or devices, collects information from patients to better understand a particular ophthalmic condition and audits patient medical notes to establish treatment outcomes and ways in which patient outcomes may be improved.

Patients with specific eye disorders, or previously untreatable eye conditions, gain access to new treatments and therapeutic approaches well before they are available to the general public.



Example of a pterygium

Renowned scientist continues association with the LEI

Award-winning scientist Professor Elizabeth Rakoczy was awarded Emeritus Professorship and Senior Honorary Research Fellow appointments at UWA in 2018 in recognition of a 32-year contribution to research.

Professor Rakoczy was a key driver of the pioneering research at the LEI that led to the development of a new gene therapy for wet age-related macular degeneration.

The new gene therapy, which is proving to be safe and well-tolerated in human trials, promises to replace monthly injections with a one-off treatment.

The science behind the new treatment began more than 20 years ago. It was the first research in Australia using gene therapy in ophthalmology or any other medical field and was named by the NHMRC in its 10 of the best national research projects in 2005.

In 2017, Professor Rakoczy won the prestigious Australian Institute of Policy and Science Florey Medal, which recognises significant lifetime achievement in biomedical science and /or human health advancement.

Professor Rakoczy's Molecular Ophthalmology research group was wound up in late 2017. However she is continuing to mentor junior scientists and contribute to research activities at both UWA and the LEI.

Professor Rakoczy was a key driver of the pioneering research at the LEI that led to the development of a new gene therapy

Florey Medal winner Professor Elizabeth Rakoczy is mentoring a new generation of medical researchers

Clinical Services

Dr Chandra Balaratnasingam performs the first vitrectomy operation at the LEI following the acquisition of a vitrectomy machine.

The 2018 year saw a significant strategic shift in the LEI's approach to managing its Clinical Services.

Recognising and building on the enormous contribution its highly experienced clinicians make to delivering on the mission and vision of the LEI, the Institute has formally appointed glaucoma specialist and chair of its Medical Advisory Committee Dr Antonio Giubilato as Director Clinic, supported by a key group of sub-specialists and a new management team focused on service and patient care.

Dr Giubilato has begun instituting wide ranging reforms to devolve management decisions to the clinical units in order to improve efficiency, flexibility and staff engagement.

Investments of time and resources continue to be made in continuously improving patient safety, quality of care and matters such as patient waiting times.

A new quality management system, learning management system and patient satisfaction survey system were implemented in the year.

During 2018, an LEI clinic opened in Midland, and in January 2019 moved to share premises there with a small group of other highly respected eye specialists.

We also worked closely with the newly opened Perth Children's Hospital to set up and begin to deliver excellent dedicated paediatric eye care.

Ophthalmology increasingly relies on the use of sophisticated specialised medical equipment.

During 2018, the LEI acquired an Endocyclodiode machine to assist in the treatment of glaucoma – currently the only one in Western Australia, and the capability of the Day Surgery was expanded through the acquisition of a vitrectomy machine, which was commissioned in early 2019.

A vitrectomy is an operation to remove the vitreous gel from the inside of the eye.

This is necessary in order to carry out procedures that cannot be performed with the fluid in its place, and this will enable our ophthalmologists to offer a more comprehensive surgical service and perform more sight-saving operations.

A new intracranial pressure assessment clinic was established in collaboration with neurology and neurosurgery to assist with some complicated neurological disorders using techniques derived from our research.

2018 also saw the increased use of refined corneal grafting techniques using thin tissue sections and novel retinal techniques imaging blood flow.

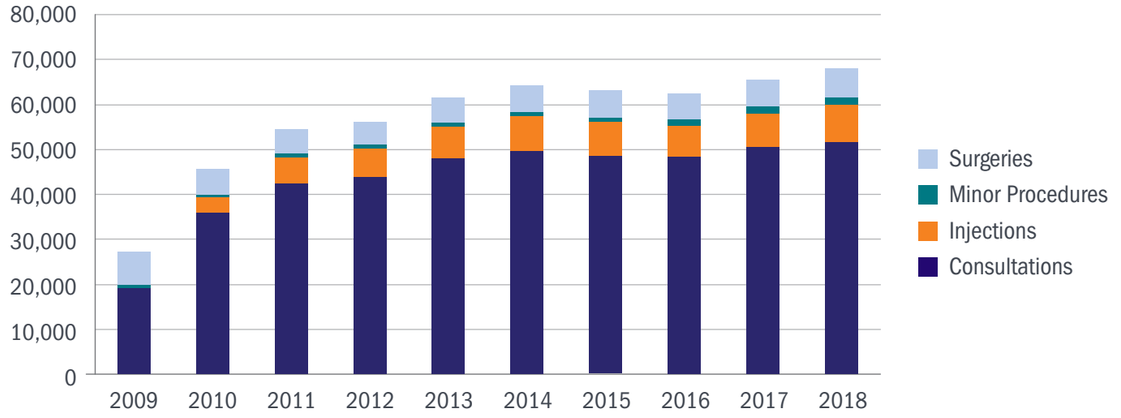
The result has been a solid improvement in the performance of the Clinical Services function, which is well placed to improve further in the coming years.

Eye consultations including injections reached a new high of 60,000 patient visits for the year, with surgeries and minor procedures performed by the Institute's clinicians also approaching a new peak of 7900.

At December 31, 2018, the Institute's Clinical Services employed 94 people supporting our 16 exceptional ophthalmologists.

Thank you to all of them for their hard work and commitment to helping people at risk of vision loss.

Rate of growth in LEI's Clinical Services over the past decade



Clinical Services

The Clinic Leadership Committee (CLC), formed in March 2018, is composed of senior clinicians and one senior manager to guide decisions within the LEI clinic. The new structure aims to improve and foster local feedback and build the leadership skills of clinical staff.

Dr Chandra Balaratnasingam

Dr Antonio Giubilato (Chair)

Mr Chris Whitelock, Chief Operating Officer

Professor Steve Wiffen (Acting)

Associate Professor Mei-Ling Tay-Kearney

In March, 2018, the LEI introduced a new clinical service called the ICP Assessment Clinic – Ophthalmology.

ICP stands for intracranial pressure, which is also known as cerebrospinal fluid pressure (CSF pressure). This is the fluid pressure surrounding the brain which passes up around the optic nerve to the back of the eyeball and is a fundamental pressure in diseases affecting the optic nerve, in particular glaucoma. Other diseases where high ICP is a feature include idiopathic intracranial hypertension, brain tumours, traumatic head injuries and numerous other neurological and neurosurgical disorders.

This clinic is a collaborative service developed in concert with the departments of neurosurgery and neurology at Sir Charles Gairdner Hospital and the Neurological Intervention and Imaging Services of Western Australia (NIISwa).

The clinic was initiated as a result of the LEI developing a system for non-invasively measuring and estimating ICP in patients.

Our technique specifically allows clinicians to identify patients with elevated ICP – and therefore most likely to be suffering disorders related to the condition.

It draws on many years' work by the LEI's Physiology and Pharmacology research group, which invented a new system for measuring retinal venous pulsation and novel mathematical algorithms for analysing video footage taken from special retinal photographs in such patients.

The other novel part of this work is the use of devices built at the LEI to alter ICP whilst taking high quality images from the retinal circulation.

The mathematics and research concepts are complex but the outcome is very simple in allowing patients to potentially have ICP measurements without the need for a hole being drilled into their head or needles inserted in the back (via a lumbar puncture).

The latter two techniques were the only methods previously available to measure ICP and were obviously invasive and prone to complications and problems.

The LEI began this new clinic to help neurologists and neurosurgeons manage various disorders. This is already saving patients the need for some invasive measurements and is providing vital information to neurosurgery and neurology concerning optic nerve function and parameters related to their ICP. With this, we can also advise on the management of ICP-related disorders.

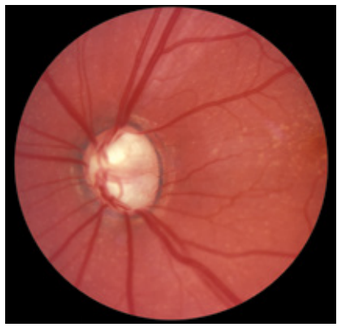
This work also aids our research to further improve and modify our existing ICP estimation techniques.

The LEI is very excited to have developed this new clinic and it would not have been possible without the total support from neurosurgery and neurology at Sir Charles Gairdner Hospital and NIISwa.

Dr Jo Khoo, a young doctor, has been fundamentally important in supporting and liaising with these departments and helping to build the clinic.

The LEI has also had fantastic support from external ophthalmologists, in particular Dr Steven Colley, a well-known and very well respected neuro-ophthalmologist in Perth.

The LEI looks forward to continuing this service and modifying it to best meet the needs of our clinical colleagues and our patients.



An example of end-stage glaucoma in the eye. The LEI has developed a system for non-invasively measuring and estimating intracranial pressure (ICP) in patients. ICP is implicated in many diseases, including glaucoma, brain tumours and neurological disorders.

Community

Professor Ian McAllister treating a Balinese girl who was injured in the 2002 Bali bombing. She had a large piece of glass embedded in her eye requiring an operation to remove. Her care was arranged by the John Fawcett Foundation, and part of the LEI's long-standing commitment to Bali and Indonesia.

Professor Bill Morgan, Dr Danti Ayu and the LEI's Anna Sheehan

The LEI continued its long history of supporting, training and upskilling overseas ophthalmologists in 2018, with Indonesia's Dr Danti Ayu spending three months with the glaucoma team.

Dr Ayu, from Surabaya, was supervised during her stay by Dr Antonio Giubilato, Dr Antony Clark and Professor Bill Morgan as part of the LEI-Indonesian overseas teaching program. She also spent time at Royal Perth and Sir Charles Gairdner hospitals.

Dr Ayu attended theatre and saw a range of glaucoma surgeries including trabeculectomies, Xen® Gel Stent and glaucoma drainage device implants, as well as laser treatments for angle closure glaucoma.

Glaucoma is the second commonest cause of blindness in Indonesia following cataract blindness. Unfortunately it presents very late, usually when a patient has gone blind in one eye already and has severe disease in the other eye.

It frequently requires surgery given the severity at presentation. An additional consideration for glaucoma sufferers in Indonesia is the cost of eye drops which tends to be well in excess of the cost of surgery long term. This tends to drive the treatment paradigm towards earlier surgery.

Dr Ayu returned to Indonesia after her stint with the LEI, taking back new skills and a determination to build a glaucoma department in Surabaya and train young ophthalmologists.

The LEI's overseas standard model of teaching generally involves young ophthalmologists undertaking observations at the LEI, with follow-up visits from some of our senior consultant staff to help supervise and teach live surgery and clinical skills.

We anticipate this will occur with Dr Ayu's home hospital in Surabaya, as has occurred in Jakarta and Denpasar.

In 2019, the LEI will host three observers from the University of Udayana, Denpasar, with whom the LEI has a Memorandum of Understanding as well as a separate observer from Jakarta.

A Nigerian doctor will also spend time with Professor Morgan at the LEI and RPH in 2019.

Lions Outback Vision

The Lions Outback Vision Van (LOVV) is proving effective in boosting attendance rates and access to sight-saving treatment among regional and remote patients.

A report published by Lions Outback Vision (LOV) in 2018 evaluated the results of an audit from the first year of the van's operation.

The LOVV was launched in 2016 to provide comprehensive mobile eye health services to rural and remote communities throughout Western Australia, where residents suffer poorer visual outcomes compared to their urban counterparts.

Starting with 16 communities in 2016 and increasing to 20 in 2018, the Vision Van visits sites from Albany in the south to Kununurra in the north at least twice a year, travelling up to 25,000kms.

Staffed by ophthalmologists, the van consists of in-built consulting rooms with specialist equipment on board. It augments existing outreach services provided by LOV that includes outreach specialist and optometry clinics, diabetic retinopathy screening and telehealth consultations.

The report compared service provision before and after the introduction of the LOVV and found:

- Outreach clinic days increased from 107 to 152 (up 42 per cent).
- Outreach ophthalmology consults increased from 2341 to 2837 (up 21.2 per cent).
- Of the 14 pieces of specialist ophthalmological equipment carried on-board the LOVV, seven were previously not available at any of the 16 regional locations.
- In 2016, 7086 ophthalmological-related Patient Assisted Transfer Scheme (PATS) claims were made across WA travelling 3.38 million kilometres and costing the government $1.6 million. The observed value for PATS expenditure of $1.6 million was significantly lower than the predicted interval of $1.8-$2.26 million expected from the trend of the previous three years, but no significant change was observed in the number of ophthalmological PATS claims and distance travelled.

The report included a case study of Derby comparing the previous year's records. The introduction of the Vision Van saw statistically significant odds ratio of attendance double and the odds ratio of being transferred out of town reduced four-fold.

The report concluded that the LOVV has improved regional WA service delivery by increasing specialist outreach availability and access to equipment while saving government expenditure on patient travel.

The service has also demonstrated high accessibility, acceptance and integration from the community.

During 2018, LOV Aboriginal Eye Health Coordinator Kerry Wood met with Indigenous Health Minister Ken Wyatt at the Parliamentary Friends Group Dinner for Eye Health and Vision Care in Canberra

2018 Highlights

LOV McCusker Director Lions Outback Vision Dr Angus Turner was awarded the inaugural 2018 Leaky Pipe Award for Service Delivery. The award recognised significant contribution towards Closing the Gap for Vision and was presented at the Vison2020 Indigenous Eye Health Conference in Melbourne.

Dr Kristopher Rallah-Baker formally completed the RANZCO Vocational Training Program, becoming Australia's first Indigenous ophthalmologist. Dr Rallah-Baker was a member of the LOV team for six months in 2018.

Dr Turner was one of four Western Australians shortlisted for the 2019 Australian of the Year (WA) Awards, announced by WA Governor Kim Beazley.

Dr Turner delivered the Fred Hollows Lecture at the RANZCO Golden Jubilee Congress in Adelaide.

The Lions Outback Vision Van on the road

CELEBRATING OUR PAST

Early work in Indigenous eye health

From 1964, the Australian Foundation for the Prevention of Blindness began glaucoma screenings of Western Australians from a mobile caravan.

After its formation, the Lions Save-Sight Foundation expanded these programs to include amblyopia in children and diabetic retinopathy. At the peak of the mobile eye program, screenings were offered out of 69 regional locations, ensuring many people received early treatment and diagnosis, as well as raising public awareness of eye disease and preventable blindness. The LEI continued its commitment to outreach work in South-East Asia, through early research into the potential of tele-ophthalmology and in 2016, in launching Lions Outback Vision.

1964

The original glaucoma caravan

Development

Professor Andrew Dick (centre) is pictured with Professor Ian Constable and Professor David Mackey at the 2018 Ian Constable Lecture

Dr Fred Chen speaks at the 2018 Visionaries Luncheon at The UWA Club


In his SIGHTS

Ian Constable has been helping us see better for 50 years, writes **Amanda Keenan**.

A profile on Ian Constable featured in The West Magazine

The annual Open Day showcased the LEI to the community with a range of fun, interactive events

At the LEI, we know that a good reputation is hard won and easily lost.

The Development and Communications team aims to build LEI's reputation through engaging constructively with a wide range of stakeholders. This means bringing people along on our journey as we find cures and treatments for eye disease, through telling our stories in a meaningful and compelling way.

Philanthropy accounts for almost half of the funds we are able to invest in research, and we are extremely grateful to our generous and committed donors, including individuals, foundations, families, civic groups and corporations. They share our goal for a world without blindness and help to sustain the LEI.

On this note, we were saddened to learn of the passing of businessman and philanthropist Mr Stan Perron AM, a long-term and committed supporter of the LEI and a man who was highly respected by all who knew him.

During 2018 we undertook a range of fundraising and donor stewardship activities, including campaigns through direct mail and online platforms, clinician-patient events, research tours and lectures.

The annual Ian Constable Lecture featured Professor Andrew Dick, Director of the University College London Institute of Ophthalmology, while Dr Damien Harkin, Professor in the School of Biomedical Sciences at the Queensland University of Technology and Director of Ocular Cell Therapies at the Queensland Eye Institute, was the 2018 Miocevich Lecture guest speaker.

LEI hosted important guests such as Western Australia's Governor, the Honourable Kim Beazley AC and the Hon Sue Ellery, Minister for Education and Training for tours of our research facilities, as well as many members of the community at our Open Day.

Our annual Visionaries luncheon was once again a popular event, and in 2018 featured presentations by LEI's Dr Fred Chen and Dr Carla Mellough.

The LEI is fortunate to regularly receive gifts in wills, and we are deeply appreciative of people's generosity in thinking of the LEI when organising their affairs.

One of our ophthalmologists, Dr Andrea Ang, featured in the compelling documentary, 'Dying to Live', along with Henry, a patient of Lions Outback Vision. The WA premiere of 'Dying to Live' was part of the Cinefest Oz event in Busselton, while LEI hosted a community screening at the Windsor Cinema in Perth.

More than 100 stories about LEI appeared across print, electronic and online media outlets, with a particular highlight a profile piece in the Weekend West magazine about our new Patron, founding Managing Director of LEI Professor Ian Constable.

Volunteers provide much-needed assistance to visually-impaired patients

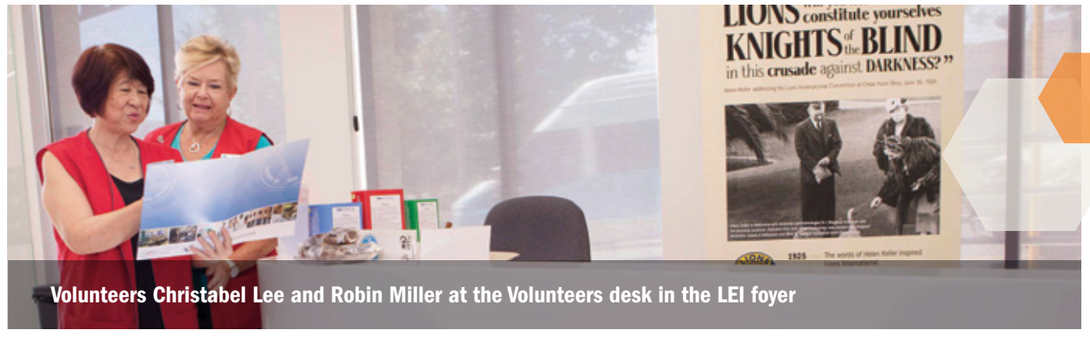
Our Volunteers

The LEI takes huge pride in our Volunteer Concierge Program, established in 2010 to assist patients attending the LEI for medical treatment.

LEI volunteers give friendly and informed assistance to patients and visitors and help provide a positive and welcoming environment. Duties consist of escorting the elderly and vision impaired to their appointments, collecting prescriptions, conveying patients from treatment areas, arranging transport and making tea or coffee while they wait in the clinic.

During 2018, volunteer numbers remained stable at 27. They are rostered on morning and afternoon shifts from Monday to Friday.

A highlight was a lunch hosted in May to celebrate Volunteer Week. The LEI thanks all our volunteers for doing so much to support our patients.



Volunteers Christabel Lee and Robin Miller at the Volunteers desk in the LEI foyer

Publications

Top publications with a Journal Impact Factor of five or above

Clinical Trials

Guymer RH, Markey CM, **McAllister IL**, Gillies MC, Hunyor AP, Arnold JJ; FLUID Investigators. Tolerating Subretinal Fluid in Neovascular Age-Related Macular Degeneration Treated With Ranibizumab Using a Treat and Extend Regimen: FLUID Study 24 Month Results. Ophthalmology. **2018** Nov 28. pii: S0161-6420(18)32316-9. doi: 10.1016/j.ophtha.**2018**.11.025. [Epub ahead of print] PMID: 30502372 **[IF: 7.479]**

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For a full list of 2018 publications by LEI researchers visit www.lei.org.au/research/publications/#accordion-2018-sa-1

Experimental Immunology group researcher Peter Fleming

Our Ophthalmologists

Dr Andrea Ang

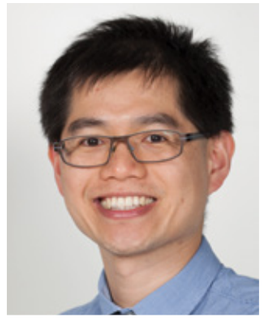
Dr Andrea Ang is a consultant ophthalmologist at the LEI (Nedlands and Murdoch) and Royal Perth Hospital. She graduated with the gold medal in medicine from UWA and also completed a Masters of Public Health at Harvard University. She has undertaken fellowships in cornea, anterior segment and external diseases at the Cincinnati Eye Institute and the Singapore National Eye Centre. She specialises in corneal and refractive surgery including corneal transplantation, cataract and laser refractive surgery. Dr Ang is the director of training for the WA RANZCO training program, OBCK examiner and is on the RANZCO CPD committee and RANZCO Surgical Taskforce committee. She is currently a participant of the RANZCO leadership development program. She is an active volunteer with the Myanmar Eye Care Project.

Dr Chandra Balaratnasingam

Dr Balaratnasingam undertook ophthalmology training in Perth, Western Australia, after which he completed subspecialty training in vitreoretinal disorders in Vancouver, Canada, and New York City, USA. Following this, he was appointed to the clinical faculty at New York University School of Medicine and worked as a vitreoretinal surgeon in Manhattan for a year before joining the LEI. He is also a consultant ophthalmologist at Sir Charles Gairdner Hospital. Dr Balaratnasingam has completed a PhD and continues clinical and laboratory-based research in diabetic retinopathy and other retinal vascular diseases. He has published over 80 papers in ophthalmic and neuroscience journals, written book chapters for key retina texts and has been an invited speaker at a number of international meetings.

Professor Graham Barrett

Dr Barrett trained in ophthalmology in Perth, Western Australia, and undertook specialty training in the USA. He is a consultant ophthalmic surgeon and Head of Department at Sir Charles Gardiner Hospital. Professor Barrett is founding and current president of the Australasian Society of Cataract & Refractive Surgeons and president of the Asia Pacific Association of Cataract and Refractive Surgeons. He is the recipient of major international awards including the Ridley Medal (European Society of Cataract & Refractive Surgeons), the Binkhorst Medal (American Society of Cataract & Refractive Surgeons) and the Ridley Medal (Congress of German Ophthalmic Surgeons).

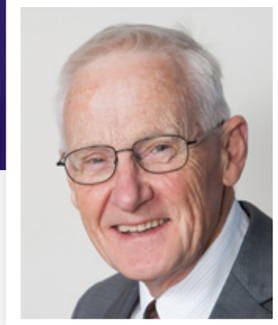


Dr Fred Chen

Dr Chen studied medicine at UWA. After completion of ophthalmology training at Royal Perth Hospital in 2006, he moved to London for advanced training in medical and surgical retina at Moorfields Eye Hospital. He also completed a Doctorate of Philosophy (PhD) in surgical techniques of retinal pigment epithelium transplantation for treatment of dry and wet macular degenerations at the University College of London Institute of Ophthalmology. Dr Chen returned to Perth in 2010 as a senior lecturer at the UWA Centre for Ophthalmology and Visual Science. His research teams are involved in testing of new treatments in dry age-related macular degeneration, monitoring of inherited retinal disease progression and application of stem cell technology in developing personalised medicine for rare retinal diseases. His research group is funded by philanthropic donations, NHMRC grants, Macular Disease Foundation, McCusker Foundation, Retina Australia and Telethon Institute. He consults and operates at the LEI, Royal Perth Hospital and Perth Children's Hospital. His special clinical interest is in macular degenerations and inherited retinal diseases.

Dr Antony Clark

Dr Clark completed his ophthalmology training in Western Australia before undertaking two years of sub-speciality fellowship training at the University of Toronto in Canada. His first fellowship was in glaucoma and anterior segment surgery, and the second in paediatric ophthalmology and strabismus at The Hospital for Sick Children. Dr Clark has a PhD in public health and continues his interests in epidemiology and clinical ophthalmic research. In addition to consulting at the LEI, Dr Clark is a consultant ophthalmologist at Sir Charles Gairdner Hospital and Perth Children's Hospital.



Professor Ian Constable AO

Professor Constable trained in ophthalmology in New South Wales before being appointed as Clinical Retinal Fellow at the Massachusetts Eye and Ear Infirmary. He later became a consultant surgeon and Lecturer at Harvard University. He was appointed the foundation professor of ophthalmology and retinal surgeon at Royal Perth Hospital in 1975 before establishing the LEI in 1983. He continues to practice as a consultant ophthalmologist at the LEI and at Sir Charles Gairdner Hospital with a special interest in diabetic retinopathy, macular degeneration and second opinions for complex eye problems. He was Managing Director at the LEI from 1983 to February 2009 and was appointed Patron of the LEI in 2018.

Professor Geoffrey Crawford

Professor Crawford completed his ophthalmic training in Western Australia and is a Fellow of the Royal Australian and New Zealand College of Ophthalmologists and a Fellow of the Royal Australasian College of Surgeons. He completed further sub-specialty training in oculoplastic surgery at Moorfields Eye Hospital in London and then cornea and refractive surgery at Emory University in Atlanta, Georgia, USA. He is the Director of Surgical Services and the Director of the Laser Vision Centre at the LEI. He is a co-inventor of the AlphaCor™ artificial cornea and AlphaSphere™ orbital implant and developed the techniques for insertion of these devices. He also introduced LASIK surgery into Western Australia. He serves on the committees of the Australian and New Zealand Cornea Society and the Australasian Society of Cataract and Refractive Surgeons. Professor Crawford specialises in all forms of refractive surgery including LASIK, PRK and insertion of phakic intraocular lenses. He performs lens surgery for cataracts and for refractive errors. He also specialises in corneal and conjunctival diseases of the eye and performs all surgeries related to these conditions including all types of corneal transplantation, pterygium removal, tumour removal and correction of keratoconus with intracorneal ring segments (Kerarings) and corneal collagen cross-linking. He is a pioneer in many of these techniques in Western Australia.

Dr Jean-Louis deSousa

Dr deSousa trained in ophthalmology in Perth before completing fellowships in ophthalmic plastic and reconstructive surgery in Oxford and East Grinstead in the UK. He is the Head of Department of Ophthalmology and consultant ophthalmologist at Royal Perth Hospital and is a member of the Australian and New Zealand Society of Ophthalmic Plastic Surgeons. He also provides ophthalmic services to the central Wheatbelt from Merredin. Dr deSousa is a consultant and visiting surgeon and lecturer for humanitarian eye projects in Bali and East Timor.

Dr Adam Gajdatsy

Dr Adam Gajdatsy trained in ophthalmology in Western Australia before undertaking fellowship training at the University Hospital of Wales in Cardiff and at Moorfields Eye Hospital in London in oculoplastic, lacrimal and orbital surgery. Dr Gajdatsy is currently operating as an ophthalmic surgeon consultant at Sir Charles Gairdner Hospital, LEI, Osborne Park Hospital and Murdoch Surgicentre. He also acts as an honorary ophthalmologist consultant at Perth Children's Hospital. Dr Gajdatsy sits on the Curriculum Review Committee of the Royal Australian and New Zealand College of Ophthalmologists, as well as holding the position of State Councillor. He also sits on the Executive Committee of the Australian and New Zealand Society of Ophthalmic Plastic Surgeons (ANZSOPS). Dr Gajdatsy is the coordinator of ophthalmology teaching at UWA.

Dr Antonio Giubilato

Dr Giubilato underwent specialty fellowship training in glaucoma at the Royal Victorian Eye and Ear Hospital after training in ophthalmology in Perth, Western Australia. This included both clinical and surgical management of glaucoma as well as research into new therapies for the condition. He is presently consultant ophthalmologist in the Glaucoma Clinic at Royal Perth Hospital and operates at Bentley Hospital for public patients. He consults at both the Nedlands and Murdoch LEI clinics. He is also a WA committee member of the Australia and New Zealand Glaucoma Interest Group and is on numerous advisory boards, both medical and surgical.

Professor David A Mackey

Professor Mackey was appointed Managing Director of the LEI and Professor of Ophthalmology/Director of the Centre for Ophthalmology and Visual Science at UWA in March 2009. Professor Mackey has achieved international recognition as a genetic ophthalmologist/scientist. His original research over more than 25 years into the genetics of glaucoma and in the fields of optic atrophy and congenital cataract has received continued research funding support. Dr Mackey announced that he was stepping down from the role of Managing Director of the LEI in late 2018 to focus on several major research projects.

Professor Ian McAllister

Professor McAllister undertook training in Western Australia with additional sub-specialty training in vitreoretinal disorders in the USA. He is a consultant ophthalmologist and a member of the board of directors at the LEI and is also a consultant ophthalmologist at RPH. Professor McAllister has a doctorate in medicine which is the highest post-graduate degree at UWA and is actively involved in research for cures for vitreoretinal disorders, especially retinal vascular disorders, and has held 10 NHMRC grants in this area as well as numerous minor grants. He has been involved for many years in State-wide diabetic retinopathy screening and treatment and was vice-chairman of the Ophthalmic Research Institute of Australia and chairman of the Research Board for many years. He has published more than 140 papers in scientific journals and has given over 180 papers at meetings as an invited guest speaker. Professor McAllister recently received an achievement award for distinguished service to ophthalmology from the American Academy of Ophthalmology.

Professor William Morgan

Professor Morgan joined the LEI Board in 2018 and in December, was appointed Acting Managing Director. He is a consultant ophthalmologist at Royal Perth Hospital, consultant ophthalmologist at Perth Children's Hospital, Professor at UWA and Co-Director of the Lions Eye Institute McCusker Glaucoma Centre. He has completed a doctorate in philosophy studying the response of the optic nerve to pressure, particularly in relation to glaucoma. He sees patients with glaucoma and other ocular conditions such as cataracts. Professor Morgan maintains an active research interest in glaucoma as well as in the epidemiology of blinding eye disease.

Dr Hessom Razavi

Dr Razavi completed his ophthalmology training in Western Australia before undertaking two fellowships. He was the inaugural Lions Outback Fellow, providing outreach services to remote and Indigenous communities in WA. This was followed by a medical retina fellowship at the Royal Victorian Eye and Ear Hospital and the Centre for Eye Research Australia. Prior to this, Dr Razavi completed a Masters of Public Health in Eye Care at the London School of Hygiene and Tropical Medicine. He consults at the Midland Eye Clinic and is the unit coordinator for ophthalmology teaching at UWA.

Associate Professor Mei-Ling Tay-Kearney

Associate Professor Tay-Kearney completed her ophthalmology training in WA completing postgraduate studies in ocular immunology and infections at the Wilmer Eye Institute in the Johns Hopkins Hospital, Baltimore, USA.

She has held various positions including Head of Department at Royal Perth Hospital, RACE examiner and QEC Chair responsible for the ophthalmological training program in WA.

She is very active in the Royal Australian and New Zealand College of Ophthalmology and is presently a Selection Board member, Training Progression Committee member and a Training Hospital Inspector. She is also a member of The MAC at Royal Perth Hospital and is part of the LEI's Clinical Leadership Committee.

She consults at Royal Perth Hospital and the LEI and is active in Clinical Trials, focused on new drug treatments for infectious and non-infectious ocular inflammation and continues to participate in tele-ophthalmology research.

Associate Professor Angus Turner, McCusker Director Lions Outback Vision

Associate Professor Turner completed medical training at UWA before studying at Oxford University and completing a Masters of Evidence Based Medicine. Ophthalmology training was undertaken in Melbourne. As Director of Lions Outback Vision, Associate Professor Turner is actively involved in the delivery of specialist outreach services to remote and Indigenous communities in the Kimberley, Pilbara, Goldfields, Midwest and Great Southern regions. As an Associate Professor at UWA, Dr Turner is actively engaged in a number of research projects at the LEI, focusing on service delivery for remote and Indigenous people. He is also a clinical lecturer for the Rural Clinical School at UWA and Notre Dame.

Dr Steven Wiffen

Dr Wiffen is a graduate of the University of Queensland Medical School and trained in ophthalmology in Western Australia before undertaking two-year fellowships in cornea and refractive surgery at both the Corneo-Plastic Unit, East Grinstead, UK, and the Mayo Clinic, Rochester, Minnesota, USA. He was Director of the Corneo-Plastic Unit and Eye Bank in East Grinstead from 1993-1994. He has been a Consultant Ophthalmologist at Fremantle Hospital since 1997 and was Associate Professor in the Centre for Ophthalmology and Visual Science, UWA, from 1997-2014. He has been Director of the Lions Eye Bank of Western Australia since 1997. Dr Wiffen has held numerous other positions, including Head of Department of Ophthalmology Fremantle Hospital, Chair of the Qualifications and Education Committee of the WA Branch of RANZCO, Chair of Eye Banks Australia and New Zealand and Chair of the Cornea Standing Committee of the Transplantation Society of Australia and New Zealand. He has special expertise in corneal transplantation, pterygium and cataract surgery as well as refractive surgery.

Lions Laser Vision

Lions Laser Vision was the first laser vision centre established in Western Australia and continues to be the first for patient safety, technology and excellent outcomes.

During 2018, Lions Laser Vision consolidated its position as the first centre for laser vision correction in Western Australia. In November 2018, the laser vision centre held a dinner that attracted more than 115 local optometrists to hear common myths about corneal and refractive surgery. We expect in 2019 we will continue to grow our position as market leader for technology, safety and results for laser vision correction.

With the most experienced refractive surgeons in Western Australia whose experience stretches to the very beginnings of the procedure, Lions Laser Vision is able to celebrate the genesis of refractive surgery in Australia and to lead the field into the future.

It was here at the LEI that the first excimer laser PRK (photorefractive keratectomy) surgery in Australia was performed in 1991 and the first LASIK (laser in-situ keratomileusis) in Western Australia in 1996.

Lions Laser Vision was the first and still is the only accredited laser vision correction centre in WA. The centre has achieved accreditation each year since 2006 with ISO9001 – an internationally recognised quality management system indicating standards of excellence.

Lions Laser Vision provides a full range of refractive procedures that can eliminate the need for glasses or contact lenses in patients with short-sightedness, long-sightedness and astigmatism to produce excellent unaided vision.

These include LASIK – the gold standard of all laser refractive procedures, photoreactive keratectomy (laser surface ablation), phakic IOLs (implantable contact lens) and all types of refractive lens surgery.

Lions Laser Vision takes pride in having the most advanced laser equipment – including the world's fastest, safest and most effective excimer laser, the Schwind AMARIS 1050RS laser.

With the Schwind laser we are able to perform TransPRK which is a touch-free laser eye correction method. The Schwind Amaris laser removes the epithelium, without suction, flap or blade. This touch-free procedure is non-invasive, safe and gentle to the eye in a one-step procedure.

The Schwind laser also integrates SmartSurfACE technology that combines the advantages of SCHWIND's proven TransPRK surface ablation method and revolutionary SmartPulse technology that gives the cornea a very smooth surface.

SmartPulse uses a three-dimensional geometric model with fullerene structure that describes the curvature of the cornea very realistically. This sophisticated method allows better, closer and more even spacing of the laser pulses on the cornea resulting in optimum vision quality in the early post-operative phase and significantly faster healing. The result is clear vision without compromise.

Lions Laser Vision also provides a comprehensive service to treat Keratoconus (conical cornea), which affects one in 1000 Western Australians. Despite its increasing prevalence, the cause of Keratoconus is not well understood.

We perform corneal collagen cross-linking (CXL), insertion of intracorneal ring segments (kerarings) and all forms of corneal transplantation for Keratoconus with the latest equipment.

As part of our future efforts to help people with Keratoconus we are one of the major centres around the world participating in the Keratoconus International Consortium (KIC). KIC will consolidate all research within the field and generates collaborative opportunities to address key issues faced by Keratoconus patients. As part of the consortium there will be opportunities to conduct big data analysis and research in this area.

There are four refractive surgeons at Lions Laser Vision: Professor Geoffrey Crawford, Professor Graham Barrett, Associate Professor Steven Wiffen and Dr Andrea Ang - all of whom have had specialist fellowship training in refractive and corneal surgery in the United States. Two of these surgeons were the initial pioneers of laser refractive surgery in WA.

For more information about Lions Laser Vision, visit www.lionslaservision.com.au

Lions Laser Vision refractive surgeons – Professor Geoffrey Crawford, Professor Graham Barrett, Dr Andrea Ang and Associate Professor Steven Wiffen - are the most experienced in Western Australia

LOOKING TO OUR FUTURE

New laser, new vision

Laser vision correction is about our patients seeing well into the future.

Lions Laser Vision is about to add another first. In 2019, we will be the first clinic in Australia to offer laser vision correction with the Schwind Titan femtosecond laser.

The Schwind Titan represents the latest generation of femtosecond lasers that are used to create the corneal flap during LASIK procedure as well as implantation of corneal ring segments and some corneal graft treatments. The Schwind Titan also offers SMILE (SMall Incision Lenticule Extraction) which expands the range of treatment options for patients at Lions Laser Vision.

The first generation of SMILE capable lasers has many shortcomings that are overcome with this new technology, including the compensation of rotational (cyclotorsional) eye movements, autocentration and also the ability to actively adjust the treatment zone.

The continual investment in the latest technology keeps Lions Laser Vision the first in Perth for laser vision correction.

The Schwind Titan femtosecond laser

Lions Eye Bank

The Lions Eye Bank was established in 1986 by the LEI and Lions Save-Sight Foundation and over its lifetime, has completed more than 5000 procedures.

During 2018, a total of 226 corneal transplants were performed (103 penetrating and 123 pre-cut) with a further 169 procedures involving sclera (the white part of the eye). There were no waiting lists and the Lions Eye Bank was always able to meet demand.

In January 2018, a new microkeratome designed for use by eye bankers was introduced, resulting in improved preparation of pre-cut endothelial tissue.

In May, the Lions Eye Bank became the first eye bank in Australia to implement the national Electronic Donor register (EDR), which was originally used only for organ donation, and allows for the operation of a completely paperless donor environment.

Also in 2018, the Eye Bank Association of Australia and New Zealand (EBAANZ) established a Specialist Certificate in Eye Banking through the University of Melbourne's School of Medicine – the world's first formal university qualification for eye banking as a vocation. All Lions Eye Bank staff successfully completed this postgraduate course.

As a member of EBAANZ, the Lions Eye Bank works collaboratively with other eye banks to maintain consistently high levels of quality, safety, proficiency and ethics. Excess tissue is shared when appropriate and emergency requests for tissue are always supported.

A total of 11 surgeons, including LEI clinicians Professor Graham Barrett, Professor Geoffrey Crawford, Dr Andrea Ang and Lions Eye Bank Director Dr Steven Wiffen, performed corneal grafts for both public and private patients during 2018.

LEI glaucoma surgeons Professor William Morgan, Dr Antonio Giubilato and Dr Antony Clark also use scleral grafts in surgery to reduce intraocular pressure.

All donor tissue is used either for transplantation or, if unsuitable, for ethically approved research or surgical training with the consent of the donor's family. This tissue is crucial to advancing research and developing surgical techniques.

As an independent organisation, the Lions Eye Bank of Western Australia is self-funded through cost recovery.

The key goals of the Lions Eye Bank are to:

- Prevent blindness and improve the outcome of eye disease by providing corneal and sclera tissue for transplantation.
- Raise the profile of the LEI in the community, both locally and nationally, by educating the public and medical providers about the critical role of the Lions Eye Bank in sight-saving procedures.
- Continue to remain a sustainable unit within the LEI by generating sufficient proceeds through the provision of eye tissues for transplantation.

Lions Eye Bank Manager Lisa Buckland with Transplant Coordinators Ben Foreman and Natalie Duncalf

LOOKING TO OUR FUTURE

New standards for the ethical use of eye tissue

In June 2018, Lions Eye Bank Manager Lisa Buckland represented EBAANZ at the signing of the Barcelona Principles – the first ever global agreement on the use of human tissue for ocular transplantation, medical research and future technologies.

The principles are designed to lift eye banking standards globally, encourage ethical practices and improve equitable access to the millions awaiting corneal surgery around the world.

Eye following corneal graft

Acknowledgments

Special Gifts

Anonymous
Dr Ching Howe Chan
Professor Geoffrey Crawford
Mr Vernon Fountain
Genetic Cures Australia
Mr and Mrs Norm and Freda Hogg
Mr Stefan Jordanoff
Mrs Louise Law
Lions Club of Nannup
Mrs Maggie Low and Mr Donald Lee
Mandurah Murray Mayday Inc.
Mr Walter Millsteed
Mrs Carolyn Miocevich
Mr Carlo Orlando
Oxford Compounding
Mrs Lynette Purser
Mrs Gwynneth Roberts
Mr and Mrs John and Lee Saleeba
Mr Keith Spence
Mrs Nora Susac
Mrs Helen Sweet
Dr Angus Turner

Trusts and Foundations

Constantine Family Foundation Pty Ltd
Fred Hollows Foundation
H&H Cohney Foundation
Hardie Foundation Pty Ltd
Lions Save-Sight Foundation
McCusker Charitable Foundation
Raine Foundation
Stan Perron Charitable Foundation Ltd
The Lindsay and Heather Payne Medical Research Charitable Foundation
The Patrick Foundation
Usher 1F Collaborative
Wheatley Family Foundation

Major Institutional Support

Australian Government – Department of Education and Training
Australian Government – Department of Health
Gold Fields Australian Foundation Inc.
Lotterywest
Macular Degeneration Foundation
National Health and Medical Research Council
Ophthalmic Research Institute of Australia
PJ Architecture
Retina Australia
Rural Health West
Santos Limited
Specsavers
Telstra
The University of Western Australia
WA Child Research Fund
WA Country Health Service
WA Department of Health

Bequests

Estate of the Late Catherine Hardy
Estate of the Late Doreen Margaret Letcher
Estate of the Late Ian Bickle
Estate of the Late Vera Lawrence
Estate of the Late Walter Reginald Johnson
Harry & Margaret Kerman Trust Fund
Stallard Family Trust
The Alan and Lilian Cameron Charitable Endowment
Estate of the Late Sheila Peet

Pride of LEI Pledges of Support from WA Lions Clubs

Lions Club of Perth
Lions Club of Ballajura
Lions Club of Busselton
Lions Club of Claremont/Nedlands
Lions Club of Dardanup
Lions Club of Dunsborough
Lions Club of Kojonup
Lions Club of Margaret River
Lions Club of Moora
Lions Club of Morley

Carolyn and Brad Miocevich are important supporters of Dr Fred Chen's research into rare retinal diseases. The LEI thanks and acknowledges all the individuals, businesses, government entities and institutions that help fund our sight-saving medical research.

CELEBRATING OUR PAST

Lions Save-Sight Foundation created

1970

Lions Club members voted to create the Lions Save-Sight Foundation at their 1970 convention in Albany.

The LSSF went on to expand the screening programs already begun by Dr Robert Linton and the Australian Foundation for the Prevention of Blindness (AFPB) with considerable success. A research study analysing trends in blindness over 19 years in WA found blindness from glaucoma falling 75 per cent – partly due to earlier diagnosis and commencement of treatment.

But the LSSF's contribution to saving sight did not end with the mass screening programs and in 1973, it helped establish the Lions Chair of Ophthalmology at UWA with Professor Ian Constable at the helm.

Over the years, the LSSF has also supported: community-based education programs aimed at preventing eye disease; the creation of the LEI and its ongoing research programs, the Lions Eye Bank and the PDG Brian King Post-Doctoral and Jack Hoffman fellowships.

The success of the AFPB screening programs, initiated by Dr Robert Linton - "the father of modern ophthalmology" in WA, led to the creation of the LSSF

Lions Save-Sight Foundation

It is now approaching 50 years since the Lions Save-Sight Foundation (LSSF) was incorporated in January 1971. From humble beginnings it grew quite rapidly necessitating the spawning of the LEI in 1983 to better protect and develop the medical and research area of ophthalmology in Western Australia.

This all occurred with the support and blessing of the LSSF; that support continuing (and increasing) over the years through to the present day. In dollar terms for this year the various salaries and research funding to LEI has amounted to some $350,000.

Whilst this is a considerable contribution from the Lions Clubs of WA, it is with some sadness that I report that the membership of our Clubs is declining at a rapid rate, which in time will see less and less financial support to LSSF. This will not create a problem in the next decade but could be a matter of concern beyond then.

The latter part of 2018 has seen considerable changes within the LEI, some of which will impact on the LSSF.

Firstly I would like to acknowledge the considerable contribution and assistance provided to our Board by Professor David Mackey over the last 10 years. Our Board is grateful for his support and we wish him well in his future endeavours. We welcomed Professor Bill Morgan to our Board in December and look forward to having this continuous link to the LEI through Professor Morgan.

The news that, as a result of David's role, the Lions UWA Chair of Ophthalmology will cease to exist was received with some sadness. The Chair came into existence through the efforts and funding by Lions in 1974, and to see the name of Lions no longer part of the Faculty of Medicine at UWA is disappointing. We trust another opportunity arises in the near future that will again see our Lions name re-aligned with medical education in WA.

Whilst still on change, I wish also to acknowledge the efforts of one of our great supporters in Professor Mariapia Degli-Esposti. We wish her well in her future role at Monash University.

I would also like to acknowledge the support received from LEI Chairman Peter Forbes. The increased level of communication from Peter since taking on this role at the LEI is much appreciated especially with the many changes that have been envisaged during 2018.

The link between our two Boards has never been stronger and I look forward to this situation continuing.

In concluding, may I congratulate all involved with the LEI and recognise the many great things that have been achieved in the research and medical consulting areas. LSSF will continue to support you wherever possible and ensure that the strong link between the two bodies continues as we work to ensure our joint goal of eradicating preventable blindness marches on.

Ambrose Depiazzi OAM
Chairman, Lions Save-Sight Foundation (WA) Inc.

Grants

Australian Competitive Grants

NHMRC Program Grant

Immunological therapies for cancer, chronic infection and autoimmunity

Chief Investigator – Degli-Esposti M

NHMRC Centre of Research Excellence

From discovery to therapy in genetic eye diseases

Chief Investigators – Mackey D et al

NHMRC Development

Developing a novel glaucoma surgery for clinical use and commercialisation

Chief Investigators – Yu D, Cringle S, Morgan B

NHMRC Partnership

Glaucoma TARRGET

Chief Investigator – Mackey D

NHMRC Principal Research Fellowship

Degli-Esposti M

NHMRC MRFF Career Development Fellowship

Developing personalised treatment for retinal degeneration

Chen F

NHMRC Early Career Fellowship

CJ Martin Overseas Biomedical Fellowship

Yazar S

NHMRC Project

Effective therapies to treat viral infections and their complications in transplantation

Chief Investigators – Degli-Esposti M, Andoniou C

NHMRC Project

Young adult myopia; genetic and environmental associations

Chief Investigators – Mackey D, Chen F, Milne E

NHMRC Project

The interplay between IL-6 and GVHD on anti-viral and anti-leukaemic immunity

Chief Investigators – Tey S, Andoniou C

Ophthalmic Research Institute of Australia

Liquid biopsy for prognosis uveal melanoma

Chief Investigator – Gray E

Ophthalmic Research Institute of Australia

WA ATOM Myopia

Chief Investigator – Clark A

Ophthalmic Research Institute of Australia

Establishing risk of vision loss in Leber's hereditary optic neuropathy families

Chief Investigator – Mackey D

Retina Australia

Utilising patient-specific retinal organoids in vitro to investigate the effects of an SNRNP mutation causing early onset of retinitis pigmentosa

Chief Investigator – Mellough C

Macular Disease Foundation Australia

Stargardt macular degeneration finding new genetic mutations

Chief Investigator – Chen F

RANZCO

Turner A

Government Grants

Australian Government Department of Health

Lions Outback Vision

Turner A

Government of Western Australia

Department of Health

Telethon Perth Children's Research Fund

Mackey D

Government of Western Australia

Department of Health

WACHS NHMRC partnership (1132454)

Mackey D

Government of Western Australia

Department of Health

Round 21 MHRIF

Government of Western Australia

Department of Health

Research Institute Support (RIS)

WA Country Health Service

Turner A

The Retinal Genomics team won grants in 2018 to further their research into rare retinal diseases

Other Grants

Genetic Cures Australia

Usher 1F Syndrome

Carvalho L

Perpetual Impact – L&H Payne Medical Research Charitable Foundation

Defining cone cell death mechanisms in inherited retinal degeneration

Chief Investigator – Carvalho L

Fred Hollows Foundation

Turner A

Gold Fields Australian Foundation

Diabetic retinopathy screening Goldfields

Turner A

McCusker Charitable Foundation

Ocular Tissue Engineering

Chen F

McCusker Charitable Foundation

Lions Outback Vision

Turner A

Lions Save-Sight Foundation

Research support

The University of Western Australia

Raine Foundation

Balaratnasingam C

The University of Western Australia

Research collaboration award

Yazar S

The University of Western Australia

Healy Award

Lee S

The University of Western Australia

Early Career Research Award

Lee S

The University of Western Australia

Centre for Ophthalmology and Visual Science infrastructure funding

International grants

National Institutes of Health

A novel treatment for retinal ischemia

Chief Investigator – Yu D

Usher 1F Collaborative Inc.

Treatment for Usher 1F

Chief Investigator – Carvalho L

Total grants 2018

$6,546,791

Financial Statements

Profit or Loss and Statement of Other Comprehensive Income	2018	2017
Year ended 31 December 2018	**$**	**$**
Revenue	24,612,040	22,495,138
Materials, supplies and consumables	(3,239,549)	(2,670,254)
Other direct operating expenses	(10,405,613)	(10,679,850)
Gross surplus	10,966,878	9,145,034
Other non-operating income	936,789	1,527,000
Net fair value (loss)/gains on financial assets at fair value through profit or loss	(687,046)	787,717
Marketing expenses	(1,637,002)	(1,372,696)
Research and development	(4,737,398)	(5,094,850)
Occupancy costs	(561,706)	(613,016)
Administrative employee expenses	(2,403,217)	(2,346,847)
Administration expenses	(2,133,958)	(2,973,320)
Deficit before income tax	(256,660)	(940,978)
Income tax expense	-	-
Deficit after tax	**(256,660)**	**(940,978)**
Other Comprehensive Income	-	89,954
Total Comprehensive Loss	**(256,660)**	**(851,024)**

Statement of Changes in Equity	Revaluation of Available for Sale Financial Assets	Retained Earnings	Total
Year ended 31 December 2018	**$**	**$**	**$**
Balance at 1 January 2017	**668,300**	**39,167,774**	**39,836,074**
Surplus After Tax for the year	-	(940,978)	(940,978)
Other Comprehensive Income for the year	89,954	-	89,954
Balance at 1 January 2018	**758,254**	**38,226,796**	**38,985,050**
Adjustment from adoption of AASB 9 (refer to Note 8)	(758,254)	758,254	-
Deficit After Tax for the year	-	(256,662)	(256,662)
Other Comprehensive Income for the year	-	-	-
Balance at 31 December 2018	**-**	**38,728,388**	**38,728,388**

Statement of Financial Position	2018	2017
As at 31 December 2018	**$**	**$**
Current Assets		
Cash and cash equivalents	13,261,990	10,773,083
Financial assets	-	985,312
Financial Assets at fair value through profit and loss	980,777	-
Trade and other receivables	2,801,994	3,060,277
Inventories	44,452	38,479
Other current assets	490,118	188,138
Total Current Assets	17,579,331	15,045,289
Non-Current Assets		
Financial assets	25,769,018	26,947,485
Property, plant and equipment	10,514,235	11,775,823
Total Non-Current Assets	36,283,253	38,723,308
Total Assets	53,862,584	53,768,597
Current Liabilities		
Trade and other payables	13,034,943	12,854,739
Short-term provisions	1,609,253	1,422,808
Total Current Liabilities	14,644,196	14,277,547
Non-Current Liabilities		
Long-term provisions	490,000	506,000
Total Non-Current Liabilities	490,000	506,000
Total Liabilities	15,134,196	14,783,547
Net Assets	38,728,388	38,985,050
Equity		
Revaluation of Available for Sale Financial Assets	-	758,254
Retained Earnings	38,728,388	38,226,796
Total Equity	**38,728,388**	**38,985,050**

Statement of Cash Flows	2018	2017
Year ended 31 December 2018	**$**	**$**
Cash flows from operating activities		
Receipts from customers	25,976,705	21,388,181
Payments to suppliers and employees	(24,459,462)	(24,310,513)
Net cash provided by operating activities	1,517,243	(2,922,332)
Cash flows from investing activities		
Interest received	96,517	117,570
Dividends received	865,699	1,327,336
Proceeds from sale of investment securities	4,140,000	8,544,787
Proceeds from sale of capital assets	-	-
Payments for investment securities	(4,423,113)	(11,454,817)
Payments for property, plant and equipment	(485,828)	(1,040,258)
Net cash (used in) investing activities	193,275	(2,505,382)
Net increase/(decrease) in cash held	1,710,518	(5,427,714)
Cash and cash equivalents at the beginning of the financial year	12,065,506	17,493,220
Cash and cash equivalents at the end of the financial year	13,776,024	12,065,506
Cash and cash equivalents comprise		
- Current cash at bank, on hand and deposits	10,411,842	7,769,072
- Current restricted cash	2,850,148	3,004,011
	13,261,990	10,773,083
- Non-current term deposits	514,034	1,292,423
	13,776,024	12,065,506

Auditor's Report

Grant Thornton

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Independent Auditor's Review Report

To the Members of Lions Eye Institute Ltd

Report on the concise financial report

The accompanying concise financial report of Lions Eye Institute Ltd (the Company), which comprises the statement of financial position as at 31 December 2018, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year then ended and related notes, derived from the audited financial report of Lions Eye Institute Ltd for the year ended 31 December 2018. The concise financial report does not contain all the disclosures required by the Australian Accounting Standards.

Directors responsibility for the concise financial report

The Directors are responsible for the preparation and presentation of the concise financial report in accordance with Accounting Standard AASB 1039 Concise Financial Reports, and the Corporations Act 2001. This responsibility includes establishing and maintaining internal control relevant to the preparation of the concise financial report; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's responsibility

Our responsibility is to express an opinion on the concise financial report based on our audit procedures. We have conducted an independent audit, in accordance with Australian Auditing Standards, of the financial report of Lions Eye Institute Ltd for the year ended 31 December 2018. Our audit report on the financial report for the year was signed on 15 April 2019 and was not subject to any modification. The Australian Auditing Standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report for the year is free from material misstatement.

Our procedures in respect of the concise financial report included testing that the information in the concise financial report is derived from, and is consistent with, the financial report for the year, and examination on a test basis, of evidence supporting the amounts and other disclosures which were not directly derived from the financial report for the year. These procedures have been undertaken to form an opinion whether, in all material respects, the concise financial report complies with Accounting Standard AASB 1039 Concise Financial Reports.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Independence

In conducting our audit, we have complied with the independence requirements of the Corporations Act 2001.

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Grant Thornton

Auditor's opinion

In our opinion, the concise financial report of Lions Eye Institute Ltd for the year ended 31 December 2018 complies with Accounting Standard AASB 1039 Concise Financial Reports.

Grant Thornton

GRANT THORNTON AUDIT PTY LTD
Chartered Accountants

C A Becker
Partner - Audit & Assurance Services

Perth, 15 April 2019

DID YOU KNOW

Lions Eye Institute

IS A

NOT-FOR-PROFIT

ORGANISATION