QIMR Berghofer
Medical Research Institute

2019 – 2020 ANNUAL REPORT

Acknowledgement of country

QIMR Berghofer acknowledges the Turrbal and Yuggerah People as the traditional owners of the land where its buildings are located. The Institute also acknowledges the important role of Aboriginal and Torres Strait Islander people and their communities where research is conducted.

Communication objectives

The QIMR Berghofer 2019–2020 annual report provides a record of the Institute's performance in the 2019–2020 financial year and audited financial statements. All achievements are documented against the goals and corresponding key performance indicators of the Institute's Strategic Plan (2019–2023).

To provide your feedback or request copies of this annual report, contact the Department of External Relations, QIMR Berghofer, by telephoning +61 7 3362 0222 or by emailing enquiries@qimrberghofer.edu.au.

The report is also available online at www.qimrberghofer.edu.au/about-us/annual-report.

QIMR Berghofer is committed to providing accessible services to people from culturally and linguistically diverse backgrounds. If you have difficulty understanding the annual report, contact the Department of External Relations, QIMR Berghofer, by telephoning +61 7 3362 0222, to arrange an interpreter to effectively communicate the report to you.

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QIMR Berghofer
Medical Research Institute

1 September 2020

The Honourable Steven Miles MP
Deputy Premier, Minister for Health and Minister for Ambulance Services
GPO Box 48
BRISBANE QLD 4001

Dear Deputy Premier

I am pleased to submit for presentation to the Parliament the Annual Report 2019-2020 and financial statements for the Council of the Queensland Institute of Medical Research (trading as QIMR Berghofer Medical Research Institute).

I certify that this Annual Report complies with:

- the prescribed requirements of the *Financial Accountability Act 2009* and the *Financial and Performance Management Standard 2019*, and
- the detailed requirements set out in the *Annual Report requirements for Queensland Government agencies*.

A checklist outlining the annual reporting requirements can be found on the final pages of this Annual Report or accessed at the Institute's website:

www.qimrberghofer.edu.au/annualreport

Yours sincerely

DISTINGUISHED PROFESSOR ARUN SHARMA AM
Chair
QIMR Berghofer Council

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Vision and values

VISION

To be a world-renowned medical research institution that translates discoveries into clinical practice.

VALUES

In pursuit of its vision, the Institute is committed to:

Translation — the ability to bring research discoveries from the laboratory bench to the hospital bedside

Scientific quality — delivering high-quality research aimed at preventing and curing disease throughout Queensland, Australia and the world

Commercial consequence — connecting with industry to boost health outcomes and economic benefits

Societal impacts — demonstrating the value in improving health and quality of life by addressing the major health needs of society

International reputation — attracting researchers, funding and collaborators from around the world to cement international recognition

Community engagement — working with the community to address health issues affecting their wellbeing through community education and fundraising programs

The State of Queensland — improving the health of all Queenslanders as the state's statutory medical research institute.

Highlights

CANCER

- Co-led an international study that conducted the world's most comprehensive analysis of genetic breast cancer risk to date and concluded 191 genes are likely to affect a woman's risk of developing the disease.
- Discovered why some melanoma patients do not respond well to immunotherapy, a discovery that could lead to better-tailored treatments for the cancer.
- Launched the world's largest genetic study of skin cancer.
- As part of a global collaboration, more than doubled the known number of regions on the human genome that influence the risk of developing melanoma.
- Discovered a potential new cancer immunotherapy target that involves switching off a regulatory cell to stop tumours growing and spreading.
- Identified how an early genetic change in blood and bone marrow cells paves the way for the development of some blood cancers, providing a new target for treatment.
- Discovered 45 new genetic variants that put people at higher risk of developing the most common forms of skin cancers, basal cell carcinoma and squamous cell carcinoma.
- Found that women who breastfeed their babies may lower their risk of developing ovarian cancer by almost 25 per cent.
- Discovered that drinking coffee does not change a person's risk of being diagnosed with or dying from cancer.
- Found evidence that a high-fat diet over a longer period of time may induce early Barrett's oesophagus, which is a precursor condition to oesophageal cancer.
- Identified how a newly approved blood cancer drug works and found the treatment is better than other drugs at targeting cancer stem cells while causing minimal damage to healthy cells.
- Found that over a 30-year period, investing in the promotion of daily sunscreen use and other sun protection strategies in Australia would save more than 50 000 lives and millions more dollars than screening for skin cancers.

INFECTIOUS DISEASES

- Established a high biosecurity containment facility to grow the virus responsible for COVID-19 to allow testing of anti-viral drugs and vaccines.
- Identified molecules that are responsible for causing heart problems in severely unwell COVID-19 patients and identified drugs that prevent this damage.
- Studied samples collected from patients who have recovered from COVID-19 to understand how the human immune system fights the virus, with the goal of developing immunotherapies to treat very sick patients.
- Tested existing, approved, widely used drugs to determine if they can reduce the SARS-CoV-2 virus's ability to infect cells and to help the immune system fight COVID-19.
- Developed T cell banks for cellular therapies aimed at treating vulnerable patients with severe viral infections.
- Tested new anti-malaria drugs in human volunteers as part of the Institute's ongoing collaboration with Medicines for Malaria Venture.
- Discovered the impact of gut bacteria on responses to infections in other organs such as the lungs.

Launched the world's largest genetic study of skin cancer.

CHRONIC DISORDERS

- Developed a genetic test to detect those at risk of going blind from glaucoma and identified 107 genes that increase a person's risk of the eye disease.
- Identified a key driver of the aggressive gut disorder Crohn's disease, which could eventually lead to new treatments.
- Demonstrated that the lymphatic system is important for heart regeneration after some types of cardiac injury.
- Demonstrated the usefulness of a modified ultrasound-based technology to non-invasively assess the severity of liver disease in children with cystic fibrosis.
- Showed that necroptosis, a form of cell death, is important for the development of bronchiolitis in respiratory syncytial virus infection.
- Identified 173 genes linked to snoring and confirmed that overweight, middle-aged men who smoke are the most likely to snore.

MENTAL HEALTH

- As part of an international collaboration, helped to identify the first eight genes linked with anorexia nervosa.
- Co-led a major international collaboration that produced the first genetic map of the cerebral cortex, identifying more than 300 genetic variants that influence the structure of the key brain region.
- Discovered how the medications given to people with Parkinson's disease cause some people to develop addictive behaviours, and separately, identified ways to make the most widely used advanced treatment for Parkinson's – deep brain stimulation – safer and more effective.
- With collaborators, pinpointed for the first time where in the brain the communication process breaks down for people with chronic ADHD, a finding that could change the way people with the disorder are treated in the future.
- Added weight to the potential benefits of using ultrasound treatment to deliver disease-targeting drugs to Alzheimer's patients in a study that was the first to examine the technique on brain cells derived from human patients with Alzheimer's disease.
- Identified links between seven regions on the human genome and specific symptoms of depression, improving the understanding of the genetic architecture of depression.

Studied samples collected from patients who have recovered from COVID-19 to understand how the human immune system fights the virus, with the goal of developing immunotherapies to treat very sick patients.

GOVERNOR OF QUEENSLAND

Message from the Governor of Queensland

As Governor, Patron, former Chair of the Council of the QIMR Berghofer Medical Research Institute, and as a Queenslander, I am immensely proud to reflect on another productive year for QIMR Berghofer, our State's world-class medical research institute.

Over its 75-year history, the Institute has earned an enviable reputation for undertaking ground-breaking research across an impressively extensive range of health areas. Each one of the Institute's diverse research projects has the potential to improve health outcomes, not only for people in our own State, but globally.

QIMR Berghofer has responded in an admirable and characteristically beneficent fashion to the COVID-19 pandemic. Its major program of research into COVID-19 will hopefully lead to the development of effective treatments and deeper understandings of the disease.

Of tremendous significance to Queenslanders is the Institute's continuing work into the genetic factors contributing to common skin cancers and melanomas, while advances have also been made in understanding Crohn's disease, Parkinson's disease, and depression. Interestingly, a collaborative project with Cambridge University has discovered a way to potentially enable the heart to regenerate itself.

These examples are but a glimpse into the many commendable ways QIMR Berghofer is striving to transform lives, while continuing to bring great esteem to our State.

It is with enormous gratitude that I congratulate the Institute's team of scientists, researchers, administrators, support staff, and students for delivering such impressive results. I also thank both government and private benefactors, in particular Mr Clive Berghofer AM, for their continuing support of such vital work.

Paul de Jersey

His Excellency the Honourable Paul de Jersey AC
Governor of Queensland

Chair's review

2020 has provided a stark reminder of the critical importance of medical research. As the worst pandemic in 100 years swept across the globe, scientists worldwide responded immediately, launching vital research programs to understand how the virus spread, to develop and test drugs, and to make an effective vaccine.

As has often been remarked, scientists will be the ones who solve the dual health and economic crises facing the world. We owe them a huge debt of gratitude. The QIMR Berghofer Council is proud to be the custodian of an Institute that is playing its part in the global effort to deal with this pandemic, with a major program of research into COVID-19 underway.

These research projects were launched thanks to an additional $1 million donation from our major benefactor, Mr Clive Berghofer AM, and a $200 000 donation from the Brazil Family Foundation. Since then, many of our other generous donors have contributed, putting the Institute in a strong position to expedite this critical research. We thank every one of our donors for their support and loyalty. Every single person's support counts and we are immensely grateful to each one of you.

While our scientists have been working around the clock on these COVID-19 projects, I would also like to thank and acknowledge the support staff who have made this research possible. Our Safety team and the staff who run our high biosecurity PC3 facility have been instrumental in ensuring that our scientists can work safely with the live virus. Many others have also played a vital part in ensuring that the Institute continued to function in the face of COVID-19 restrictions.

In the midst of this global pandemic, QIMR Berghofer welcomed its eighth Director and CEO, Professor Fabienne Mackay, in May 2020. She has replaced Professor Frank Gannon, who retired at the start of the year. Professor Mackay joined the Institute from the University of Melbourne, where she was the head of the Biomedical Sciences School. She has an extremely impressive track record, both in research and senior management roles. I have no doubt that Professor Mackay will lead QIMR Berghofer – and Queensland's medical research sector – to bigger and better things. I also sincerely thank Professor David Whiteman for his outstanding leadership during the transitionary period prior to Professor Mackay's commencement, including during the height of the COVID-19 restrictions in Queensland.

During the past year, the Institute has also welcomed a new head of the Mental Health Research Program, Professor James Scott, who joined QIMR Berghofer from Metro North Mental Health. Professor Scott is a researcher and practicing psychiatrist and his arrival has broadened the Institute's expertise to include child and adolescent mental health. His program of research is particularly crucial during the current pandemic, and will continue to be in its aftermath.

Finally, I take this opportunity to thank the outgoing QIMR Berghofer Council who finished their terms in early July 2019. The new Council is hard at work and, together with Professor Mackay, looks forward to leading this great Queensland Institution through a new era of growth and scientific advancement.

Distinguished Professor Arun Sharma AM
Chair, QIMR Berghofer Council

While our scientists have been working around the clock on these COVID-19 projects, I would also like to thank and acknowledge the support staff who have made this research possible.

Director and CEO's review

It was a great honour to be appointed the eighth Director and CEO of QIMR Berghofer Medical Research Institute and it is my pleasure to report on the Institute's activities for the first time.

QIMR Berghofer was established to investigate infectious diseases affecting Queensland. Seventy-five years on, this legacy continues as our scientists race to identify, test and develop new treatments for COVID-19, a disease that has caused the state's worst outbreak since the Spanish Influenza. Within weeks of the outbreak starting in Australia, QIMR Berghofer reprioritised its program of research and launched nine separate studies into COVID-19. They include:

- Associate Professor Bridget Barber is preparing to conduct a clinical trial of the immunoregulatory drug Tocilizumab in severely unwell COVID-19 patients.
- Associate Professor James Hudson has used miniature model heart tissues, known as organoids, to understand how severe cases of COVID-19 lead to cardiac injury.
- Dr Corey Smith and his team have collected blood samples from 44 recovered COVID-19 patients and are studying them with the ultimate goal of developing a T cell immunotherapy targeting the virus.
- And Dr Sudha Rao is testing existing, approved, widely used drugs to determine if they can reduce the virus's ability to infect cells and to help the immune system fight COVID-19.

I thank Mr Clive Berghofer AM, and all of our other generous donors who have helped to make this research possible. But as our teams strive to defeat this pandemic, we have not lost sight of the many other diseases and disorders that continue to affect Queenslanders.

In the last year, Professor Nick Martin and his team were part of an international effort that identified the first eight genes associated with anorexia nervosa and also showed that the origins of the disorder appear to be both metabolic and psychiatric. This study is a huge step forward in understanding this often-crippling disorder.

In a major step forward in research into eye disease, Associate Professor Stuart MacGregor and his team have developed a genetic test to detect those at risk of going blind from glaucoma. Given that glaucoma is the leading cause of irreversible blindness worldwide, this research will in future help save people's eyesight.

And in a major international collaboration, Professor Georgia Chenevix-Trench and her colleagues have co-led the world's most comprehensive analysis of genetic breast cancer risk to date, concluding that 191 genes are likely to affect a woman's risk of developing the disease. The study provides a clearer picture of the genetic complexity of breast cancer and we hope it will lead to better screening and early intervention.

I thank Mr Clive Berghofer AM, and all of our other generous donors who have helped to make this research possible. But as our teams strive to defeat this pandemic, we have not lost sight of the many other diseases and disorders that continue to affect Queenslanders.

But our advances do not all occur in the laboratory. Our teams have also helped to develop policies and guidelines that will improve the way healthcare is delivered and the way research is conducted. For example, Mr Greg Pratt developed a set of guidelines that will help genomic health researchers to work with Aboriginal and Torres Strait Islander communities in a way that respects cultural protocols.

Our research achievements have once again seen QIMR Berghofer scientists acknowledged with a number of prestigious awards. A team including the former head of the Institute's Cancer Program, Professor Geoff Hill, and post-doctoral researcher Paulo Martins was awarded a Eureka Prize for their immunology research. Associate Professor James Hudson was awarded a Metcalf prize, as well as an inaugural Snow Fellowship. Associate Professor Hudson and Associate Professor Severine Navarro were recognised with Young Tall Poppy Science Awards, while Professor Mark Smyth was named in the highly cited researchers list 2019. Professor Adele Green AC was elected as a Fellow of the Australian Academy of Science, and Professor Sarah Medland was awarded a Medal of the Order of Australia in the Queen's Birthday Honours List.

Grant funding is another way in which scientists' success is recognised and I am very pleased to report that our teams have recently been awarded $5.5 million from the Medical Research Future Fund (MRFF) for a number of projects, including into COVID-19. These grants have been given to areas of need, and our scientists will use them to produce research with real consequences for patients, now and into the future.

I am greatly looking forward to leading QIMR Berghofer into this new decade and to building on the legacies of previous Institute Directors. Never has medical research been more urgently needed and I will help ensure that Queensland is part of the global health effort.

Professor Fabienne Mackay
Director and CEO, QIMR Berghofer

Grant funding is another way in which scientists' success is recognised and I am very pleased to report that our teams have recently been awarded $5.5 million from the Medical Research Future Fund (MRFF) for a number of projects, including into COVID-19.

About QIMR Berghofer

QIMR Berghofer was established in 1945 as a statutory body under the *Queensland Institute of Medical Research Act 1945*. It had the very humblest beginnings, starting operations in a disused World War II army hut in Brisbane's Victoria Park. Since then, it has established itself as a world leader in scientific research while retaining its proud role as Queensland's own medical research institute.

QIMR Berghofer focuses on the research areas of cancer, infectious diseases, mental health and chronic disorders. It also has a long-established Indigenous research program. The Institute's priority is to translate research from the laboratory bench to the hospital bedside and the broader community to improve human health. It does that by developing new and better prevention strategies, diagnostic tools and treatments. In conducting its research, the Institute supports different Queensland scientific and medical sectors, and promotes and develops links with industry.

Based next to the Royal Brisbane and Women's Hospital at Herston, QIMR Berghofer is home to approximately 1000 scientists, support staff and students. It is home to a facility, approved by the Therapeutic Goods Administration, for the manufacture of cellular immunotherapies. An early-phase clinical trial facility is also based on the premises.

Over its 75-year history, QIMR Berghofer has led global advances in understanding, preventing, diagnosing and treating some of the world's most deadly and debilitating diseases. The Institute is recognised as a world leader in research into the cutting-edge fields of immunotherapy and genomics. It also has an international reputation for its research into skin cancer, malaria and other mosquito-borne diseases, and the genetic risk factors associated with various cancers and mental health disorders.

Over its 75-year history, QIMR Berghofer has led global advances in understanding, preventing, diagnosing and treating some of the world's most deadly and debilitating diseases.

Governance

Basis of authority

The Institute was established as a statutory body under the *Queensland Institute of Medical Research Act 1945*. Controlled entities have been established under the authority of the Queensland Treasurer and the Deputy Premier, Minister for Health and Minister for Ambulance Services in accordance with the *Statutory Bodies Financial Arrangements Act 1982*.

Governing body

The Council of the Queensland Institute of Medical Research

In accordance with Part 2, Section 4A of the *Queensland Institute of Medical Research Act 1945*, QIMR Berghofer is controlled and governed by The Council of the Queensland Institute of Medical Research (the Council). Under the *Statutory Bodies Financial Arrangements Act 1982*, the Council is a statutory body.

Under the *Queensland Institute of Medical Research Act 1945*, the Council's role is to:

- control and manage the Institute
- raise and accept monies for the purposes of the Institute
- invest monies raised or accepted by the Council for the purposes of the Institute
- invest monies derived from any property or other invested monies of the Council for the purposes of the Institute.

Council membership

The Council must consist of at least seven, but not more than 11, members appointed by the Governor in Council. Under the *Queensland Institute of Medical Research Act 1945*, the Minister is to recommend people for appointment as members of the Council. The Minister may have regard to a person's skills, experience and expertise in any of the following areas:

- corporate governance
- public or academic administration
- health or clinical research
- health ethics
- financial management
- fundraising
- any other area the Minister considers to be relevant to the functions of the Council.

The Council met nine times in the 2019–2020 reporting year.

Distinguished Professor Arun Sharma AM

Council Chair (from 4 July 2019)

Distinguished Professor Arun Sharma was appointed as Chair of the QIMR Berghofer Council on 4 July 2019.

He was formerly the Deputy Vice-Chancellor (Research and Innovation) at the Queensland University of Technology (QUT) (2004–2019) where he played an enabling role in founding the Translational Research Institute (TRI) and served on its board from 2009 to 2017.

Professor Sharma has played a leading role in the development of Australian ICT research capability. He was a co-founder of National ICT Australia Limited (NICTA) – now CSIRO's Data61. At QUT, he played an enabling role in the establishment of three Australian Research Council Centres of Excellence – Robotic Vision, Digital Child, and Creative Industries and Innovation. As Head of the School of Computer Science and Engineering at the University of New South Wales, he co-founded the Cooperative Research Centre for Smart Internet Technology and played a critical role in the establishment of its successor, the Smart Services Cooperative Research Centre.

Professor Sharma has served as a member of the World Economic Forum Global Future Council on Innovation Ecosystems (2018–2019), was appointed to the inaugural Advisory Council of the Australian Research Council (2008–2009) and is a member of the Advance Queensland Expert Panel.

He has fostered strong business links between Australia and India. As National Chair of the Australia India Business Council (AIBC), he led a governance reform of the organisation during 2010–2011 and served as the President of the AIBC Queensland Chapter from 2011 to 2015. He is an advisor to the Chairman of Adani Group on sustainability and renewable technologies.

Professor Sharma is a graduate of the Australian Institute of Company Directors. He completed an undergraduate degree in Computer Science at the Birla Institute of Technology and Science, Pilani and obtained a PhD in Computer Science from the State University of New York at Buffalo. He completed post-doctoral training at the Department of Brain and Cognitive Sciences at the Massachusetts Institute of Technology.

Professor Sharma is also the Chair of the Executive Employment and Remuneration Committee and is a member of the Finance and Audit Committee and the Commercialisation Committee.

Mr Michael Sargent

Deputy Chair

Mr Sargent has been a member of the QIMR Berghofer Council since November 2014.

He has more than 45 years' experience working with some of the world's leading financial groups. His experience includes stockbroking, merchant banking, financial planning and money market operations.

He was a Fellow of the Certified Practicing Accountants and a Fellow of the Securities Institute of Australia, now known as Finsia. He served as the Queensland President and Australian Vice-President of the Institute. Mr Sargent is an active supporter of the community. He was a charter member of the Rotary Club of Brisbane Mid-City. He has served as the club's President twice and has also been a Rotary District Treasurer. He is also a past President of the Royal Automobile Club of Queensland and a former Chairman of RACQ Insurance Ltd and its subsidiary companies.

Mr Sargent is the Chair of the Institute's Commercialisation Committee and a member of the Finance and Audit Committee and the Investment Committee. He is also Chair of the Institute's subsidiary company, genomiQa Pty Ltd.

Dr Sonya Bennett

MBBS FRACGP MPHTM FAFPHM GAICD

Dr Bennett is a practicing public health physician and has Fellowships with both the Royal Australian College of General Practitioners and the Australasian Faculty of Public Health Medicine. During her career, she has worked in Queensland Health, the Australian Defence Force, and in the academic research sector acquiring a broad range of management, leadership and governance experience to complement broad technical expertise in the fields of communicable diseases and general medicine.

Dr Bennett's more recent roles have included serving as Research Manager and Chief of Operations at The Centre for Military and Veterans Health from 2004 until 2009 and as a member of the Australian Technical Advisory Group on Immunisation from 2015 until 2019.

She is currently the Executive Director of the Communicable Diseases Branch, and Deputy Chief Health Officer at Queensland Health, where she is responsible for the state-wide strategic direction and policy for communicable diseases, leading state-wide incidents of public health significance. Dr Bennett is the current Chair of the Communicable Disease Network of Australia and is an adjunct Associate Professor of Griffith University. In December 2019, she was promoted to Commodore in the Royal Australian Navy and she is the current Director-General, Navy Health Reserves.

Dr Bennett is a member of QIMR Berghofer's Appointments and Promotions Committee.

Dr Donna Callaghan

MBBS (Qld) Dip Anaes (UK) Dip Obs (RANZCOG) FRCA (UK) LLB (QUT) Hons Grad Dip Law (QUT)

Dr Callaghan was called to the Bar in 2009. Her interest and expertise lies in personal injuries and health law – areas in which she has been engaged for more than 25 years. Dr Callaghan obtained her medical degree from The University of Queensland and practiced clinical medicine for more than 10 years, obtaining diplomas in both Obstetrics and Anaesthetics and her Fellowship of the Royal College of Anaesthetists in London.

Dr Callaghan was employed as State Claims Manager for Australia's largest medical indemnity company while studying law at the Queensland University of Technology. Having obtained her LLB Hons 2, she worked as a solicitor and then senior associate at a large national firm in the area of litigation and dispute resolution.

Dr Callaghan has broadened her experience and expertise in health law with memberships on medical research ethics committees for The University of Queensland and BlueCare. She has written articles for, and has been on the editorial panel of, the *Australian Health Law Bulletin* for more than 10 years. Dr Callaghan was the lawyer member of the Queensland Pharmacists Board from 2007 to 2010. She has been involved as a volunteer and board member of health-related not-for-profit organisations for many years. Dr Callaghan is a long-term member and former committee member of the Medico-Legal Society of Queensland.

Apart from her experience with negligence claims, disciplinary matters, coronial inquests and prosecutions of health practitioners, Dr Callaghan has ongoing experience with WorkCover claims, other personal injury claims and appeals by and against the WorkCover Regulator in the Queensland Industrials Relations Commission and Industrial Court.

Dr Callaghan is a member of the Institute's Executive Employment and Remuneration Committee.

Ms Celeste Neander

B.Comm Dip FP GAICD

A graduate of the Australian Institute of Company Directors, Ms Neander is a senior finance professional with extensive experience in financial and investment markets spanning 38 years.

She was Senior Portfolio Manager for BT Managed Accounts with responsibility for the discretionary management of bespoke investment portfolios for private and institutional clients from 2009 until her retirement in late 2017. She has also held senior relationship management roles with the Commonwealth and Westpac Private Banks and was a private client advisor with JB Were (now Goldman Sachs).

Ms Neander has extensive experience in the preparation and delivery of tailored investment-market-related information in both individual and group forums, as well as a strong knowledge of investment markets across key asset classes. She also has solid experience in direct equity investment.

Ms Neander also has a strong sense of community. She was a charter member of the Zonta Club of Brisbane Metro Inc., serving as club president and chair of the membership committee. She has trained as an unmanned aerial vehicle pilot and flies drones for the local surf club during surf life saving patrol season and, as required, for both sea- and land-based search and rescue operations.

Ms Neander is Chair of the Institute's Investment Committee.

Mr Mitchell Petrie

Mr Petrie is a former partner of KPMG Australia and an experienced director. He was a partner with KPMG Australia for 16 years and retired from the partnership in December 2015.

He has significant experience in corporate governance and enterprise risk management, board advisory, internal controls, statutory financial reporting and governance, risk and controls for major capital projects.

Mr Petrie is currently a member of the audit committees of Brisbane City Council, Gold Coast City Council, Bundaberg Regional Council and LGIA Super, and an adjunct lecturer at Bond University.

He is currently the Chair of the QIMR Berghofer Finance and Audit Committee and a member of the Commercialisation Committee.

Emeritus Professor Alan Pettigrew

BSc (Hons) PhD Sydney, FAICD

Emeritus Professor Pettigrew has been a member of the QIMR Berghofer Council since September 2011.

He has held senior academic and executive appointments at the Universities of Sydney (Deputy Chair, Academic Board), Queensland (Pro Vice-Chancellor and Executive Dean), and New South Wales (Deputy Vice-Chancellor Academic). He was Vice-Chancellor and CEO of the University of New England from 2006 to 2009. From 2001 to 2005 Professor Pettigrew was the inaugural CEO of the National Health and Medical Research Council (NHMRC) of Australia. He has been an adviser to the Chief Scientist of Australia (2010–2014), a Professorial Fellow of the L.H. Martin Institute at the University of Melbourne (2010–2018), a member of the Board of the Australian Universities Quality Agency (AUQA) Ltd (2006–2010) and a member of the Cooperative Research Centres Committee (2011–2015). Professor Pettigrew has been a consultant on leadership, management and research strategy for 11 Australian universities and several international projects. He was Chair of the Board of the Illawarra Health and Medical Research Institute from 2014 to 2019. He is currently a Fellow of Senate and Pro-Chancellor at the University of Sydney and a Vice-Chancellor's Representative for Research School Reviews at the Australian National University.

Professor Pettigrew is currently Chair of the Institute's Appointments and Promotions Committee and a member of the Executive Employment and Remuneration Committee.

Ms Susan Rallings

Ms Rallings is a former Senior Vice President of a global financial services firm and was a senior financial advisor for nearly 15 years.

For several years, she was Regional Director of the UK and Europe for Tourism Queensland based in London. She established and ran a successful consulting and management bureau for 10 years. Ms Rallings has held other management positions in several financial services organisations. She started her career as a nurse and medical centre manager.

Ms Rallings is an alumnus of Griffith University and is a graduate of their inaugural MBA. She is a Fellow of the Australian Institute of Company Directors.

She has passion for philanthropy and her work in this area has been recognised through several awards, including Philanthropist of the Year 2015 for Queensland Community Foundation, and 2013 winner of Australia's CEO Challenge.

Ms Rallings is Chair of the Griffith University Business School Strategic Advisory Board, a position she has held since 2016. She is also on the Strategic Advisory Board of the Yunus Social Business Centre at Griffith University, and is an Executive in Residence with the Dean of Engagement at Griffith Business School.

Ms Rallings is a founder and director of Making Good Alliance Pty Ltd, a co-founder of the Centre for Regenerative Arts and a director of Intrinsic Business Solutions Pty Ltd.

She is the chair of the QIMR Berghofer Philanthropy Committee and a member of the Investment and Commercialisation committees.

Professor John Shine AC

BSc (Hons 1) PhD DSc (Honoris Causa) PresAA FRS (to 9 March 2020)

Professor Shine became a member of the QIMB Berghofer Council in November 2014 and completed his term on 9 March 2020.

He is President of the Australian Academy of Science, an Emeritus Professor at the Garvan Institute of Medical Research and a Professor of Medicine and Professor of Molecular Biology at the University of New South Wales.

He was the Executive Director of the Garvan Institute of Medical Research from 1990 until 2011. He is a past Chairman of CSL Limited and the NHMRC, and a past President of the Australian Genome Research Facility. Until 2011, he was a member of the Prime Minister's Science, Engineering and Innovation Council. Until mid-2016, he was President of the Museum of Applied Arts and Science (Powerhouse Museum and Sydney Observatory).

Professor Shine obtained his PhD from the Australian National University in 1975. From 1975 to 1978, at the University of California, San Francisco, he was instrumental in developing many of the techniques of genetic engineering. He was the first person to clone a human gene and was a central figure in the cloning of the insulin and growth hormone genes. He also determined the first sequence responsible for replication of a cancer-causing virus.

In 2010, Professor Shine was awarded the Prime Minister's Prize for Science, the nation's highest scientific award. He was made a Companion (AC) in the General Division of the Order of Australia in the Queen's Birthday Honours List 2017 for eminent service to medical research.

Until 9 March 2020, Professor Shine was a member of the Institute's Commercialisation Committee.

Associate Professor Clair Sullivan

MBBS (Hons) MD FRACP FACHI CHIA

Associate Professor Sullivan is an endocrinologist and a medical informatician. During 2019–2020, she was the Chief Digital Health Officer at Metro North Hospital and Health Service and an Associate Professor of Medicine at The University of Queensland.

Associate Professor Sullivan obtained her medical degree with honours from The University of Queensland in 1996. She is a Fellow of the Royal Australasian College of Physicians, a Fellow of the Australian College of Health Informatics and a Fellow of the Australasia Institute of Digital Health.

She is a member of QIMR Berghofer's Appointments and Promotions Committee.

Emeritus Professor Janet Verbyla

BSc (Hons) GAICD IECL

Emeritus Professor Janet Verbyla is currently an Honorary Professor at the University of Southern Queensland (USQ) where she was Senior Deputy Vice-Chancellor heading the academic division from 2012 to early 2018.

Commencing as an active teaching and research academic in software and information engineering, Professor Verbyla has progressed through a wide range of university academic, executive and management roles culminating in serving as Interim Vice-Chancellor for much of 2017. She was for a number of years the President of the Australian Deans of ICT.

Professor Verbyla has led successful bids for external (non-research) funding totalling more than $60 million. She has extensive experience chairing appointment, promotion, study leave and (internal) major equipment panels and being responsible for the associated policies and procedures. Professor Verbyla has a strong, sustained track record in internal coaching and development of academic and professional staff. Most recently, she became a certified executive and performance coach as well as a higher education consultant.

Professor Verbyla is a member of QIMR Berghofer's Finance and Audit Committee and the Appointments and Promotions Committee. She is also Chair of the Institute's subsidiary company Endpoint IQ Pty Ltd.

Council meetings

Terms of appointment and meetings attended for the 2019–2020 reporting year were as follows:

Position	Council members	Term	Meetings attended 2019–2020
Chair	Distinguished Professor Arun Sharma	04/07/19 – 03/07/23	8 of 8
Deputy Chair	Mr Michael Sargent	27/11/14 – 03/07/23	7 of 9
Deputy Chair / Acting Chair	Mr Christopher Coyne	27/11/14 – 03/07/19	1 of 1
Members	Emeritus Professor John de Jersey	27/11/14 – 03/07/19	1 of 1
	Mr Ian Fraser	8/10/15 – 03/07/19	1 of 1
	Professor Paula Marlton	27/11/14 – 03/07/19	1 of 1
	Professor John Shine	27/11/14 – 09/03/20	6 of 6
	Dr Jeannette Young	27/11/14 – 03/07/19	1 of 1
	Dr Sonya Bennett	04/07/19 – 03/07/23	6 of 8
	Dr Donna Callaghan	04/07/19 – 03/07/23	8 of 8
	Ms Celeste Neander	04/07/19 – 03/07/23	8 of 8
	Mr Mitchell Petrie	04/07/19 – 03/07/23	6 of 8
	Emeritus Professor Alan Pettigrew	27/11/14 – 03/07/23	9 of 9
	Ms Susan Rallings	04/07/19 – 03/07/23	7 of 8
	Associate Professor Clair Sullivan	04/07/19 – 03/07/23	8 of 8
	Emeritus Professor Janet Verbyla	04/07/19 – 03/07/23	8 of 8
Secretary	Ms Donna Hancock	N/A	9 of 9

Council committees

Finance and Audit Committee

The role of the Finance and Audit Committee is to provide independent assurance and assistance to the Council on:

- risk, control and compliance frameworks
- QIMR Berghofer's external accountability responsibilities as prescribed in the relevant legislation
- the appointment of the internal audit function and communications with internal and external auditors.

The committee met quarterly to review business and financial risk, financial operating performance and audit performance. The committee reviewed all issues and recommendations arising from internal audit and the Queensland Audit Office, as well as agreed management actions implemented to address any issues found.

The Finance and Audit Committee has due regard to Queensland Treasury's Audit Committee Guidelines. Its members were:

- Mr Mitchell Petrie (Chair from 7 August 2019)
- Mr Ian Fraser (Chair to 3 July 2019)
- Mr Michael Sargent
- Professor Arun Sharma (from 7 August 2019)
- Professor Janet Verbyla (from 7 August 2019)

Appointments and Promotion Committee

The Appointments and Promotions Committee helps Council to maintain academic standards at QIMR Berghofer. This involves reviewing proposals for the appointment and promotion of Faculty (senior research staff). The members of the committee were:

- Professor Alan Pettigrew (Chair)
- Professor John Shine (to 9 March 2020)
- Dr Sonya Bennett (from 7 August 2019)
- Dr Clair Sullivan (from 7 August 2019)
- Prof Janet Verbyla (from 7 August 2019)
- Emeritus Professor John de Jersey (to 3 July 2019)
- Professor Paula Marlton (to 3 July 2019)
- Dr Joanne Aitken, General Manager of Research, Cancer Council Queensland
- Professor Susan Charman, Centre for Drug Candidate Optimisation, Monash Institute of Pharmaceutical Sciences
- Professor Alan Cowman, Walter and Eliza Hall Institute of Medical Research
- Professor Andrew Grulich, The Kirby Institute
- Professor Michelle Haber, Children's Cancer Institute
- Professor Glenda Halliday, The University of Sydney

Investment Committee

The Investment Committee is responsible for overseeing the investment of Council funds. The members of the committee were:

- Ms Celeste Neander (from 7 August 2019 and Chair from 6 February 2020)
- Mr Michael Sargent (Interim Chair to 6 February 2020)
- Ms Susan Rallings (from 7 August)
- Mr John Allpass (external member)
- Mr David Lane (external member from 31 March 2020)

Executive Employment and Remuneration Committee

The Executive Employment and Remuneration Committee is responsible for reviewing the terms and conditions relating to the appointment and remuneration of senior management. The members of the committee were:

- Professor Arun Sharma (Chair from 7 August 2019)
- Ms Donna Callaghan (from 7 August 2019)
- Professor Alan Pettigrew
- Mr Michael Sargent (from 7 August 2019)
- Mr Christopher Coyne (to 3 July 2019)

Commercialisation Committee

The Commercialisation Committee advises Council and management on innovation and potential commercialisation opportunities. The members of the committee were:

- Mr Michael Sargent (Chair)
- Professor Arun Sharma (from 7 August 2019)
- Mr Mitchell Petrie (from 7 August 2019)
- Ms Susan Rallings (from 7 August 2019)
- Professor John Shine (to 9 March 2020)

Human Research Ethics Committee

The Human Research Ethics Committee, on behalf of Council, ensures the maintenance of ethical standards in human research and compliance with regulatory guidelines. The committee is comprised of 13 members.

Animal Ethics Committee

The Animal Ethics Committee, on behalf of Council, ensures the maintenance of ethical standards in animal research and compliance with regulatory guidelines in the use of animals in medical research. The committee is comprised of 19 members.

Organisation

Institute leadership

Director and CEO, Professor Fabienne Mackay

In May 2020, Professor Fabienne Mackay became the eighth Director and CEO of QIMR Berghofer Medical Research Institute. She has enjoyed a highly successful career spanning both the academic and biotech sectors.

Professor Mackay studied Medicine and Biomedical Engineering before obtaining her PhD in Molecular Biology and Immunology from Louis Pasteur University in Strasbourg, France. She started her research career in the biotech industry at Biogen Inc. in Boston.

In 1999, she joined the Garvan Institute in Sydney as Director of the Autoimmunity Research Unit. In 2009, she was recruited as Head of the Department of Immunology at Monash University.

In 2015, Professor Mackay became the inaugural Head of the School of Biomedical Sciences and Head of the Department of Pathology in the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne.

Her laboratory discovered the role of an important protein, known as BAFF, in health and autoimmune diseases. These findings provided the foundation for the development of a new therapy, belimumab (BenlystaTM), for the treatment of systemic lupus erythematosus (SLE) and the first new treatment for SLE in over 50 years.

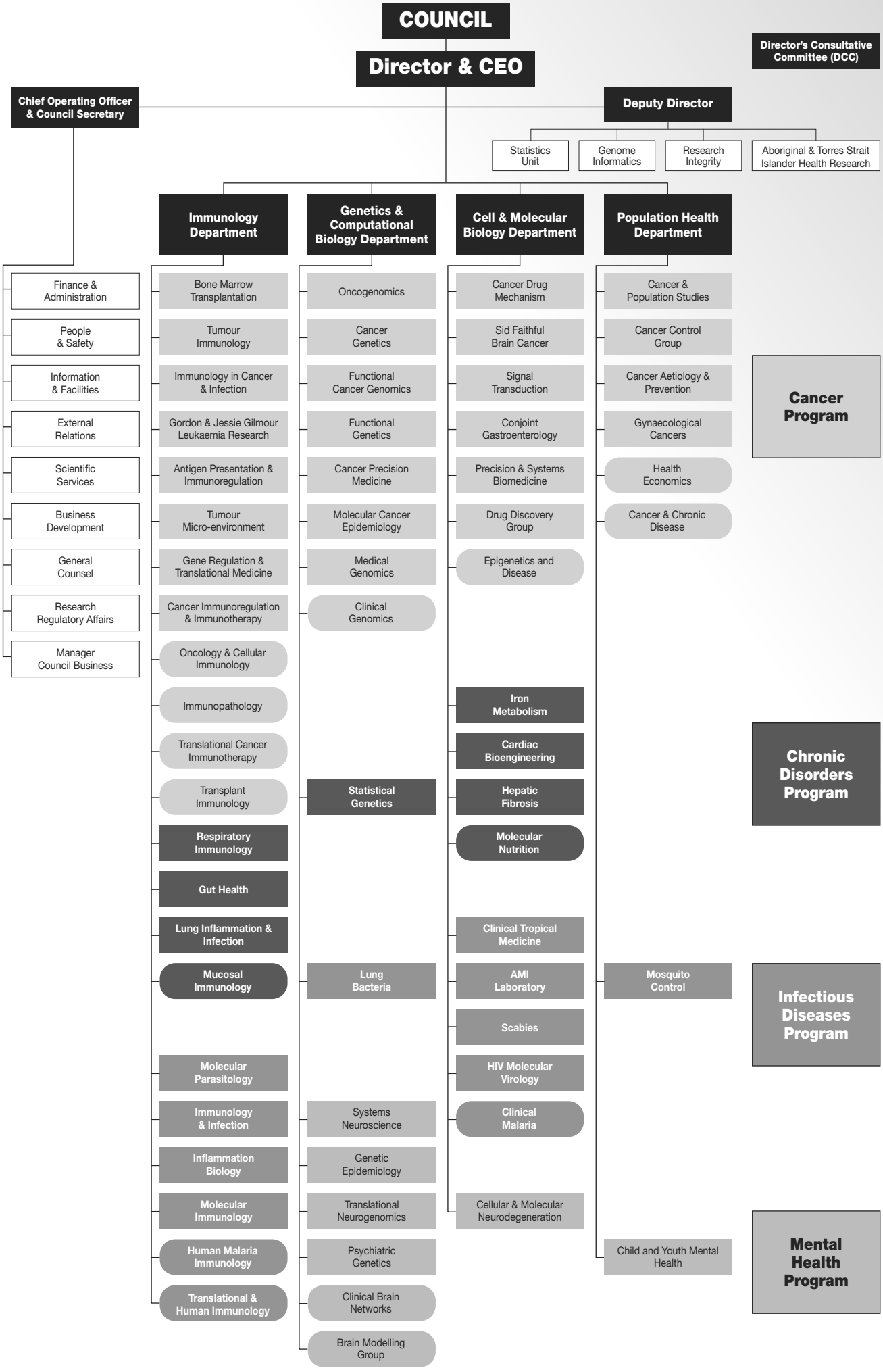
Professor Mackay has published more than 180 articles, which have been cited 18 000 times. She has published the world's most highly cited work on BAFF. Her landmark study on the role of BAFF in SLE has been cited more than 1000 times. Professor Mackay's h-index is 65.

She has received a number of prestigious national and international awards. Professor Mackay received the Thomson Reuters Australia Citation and Innovation award and a trophy from the French Ministry of Foreign Affairs for outstanding contribution in education and research as an expatriate. She also received the Martin Lackmann award for translational research and the William A. Paul Distinguished Innovator award from the Lupus Research Alliance in the United States. She is an elected council member of the International Cytokine and Interferon Society, a member on the medical board of the Gairdner Foundation in Canada and an elected fellow of the Australian Academy of Health and Medical Sciences.

Organisational structure

QIMR Berghofer has a matrix structure where each research group falls into one of four research programs and one of four departments. The departments are divided according to scientific approaches, while the programs are based on different types of diseases.

QIMR Berghofer's organisational structure as at 30 June 2020 is on page 23.


COUNCIL
Director & CEO
Director's Consultative Committee (DCC)
Chief Operating Officer & Council Secretary
Deputy Director
Statistics Unit
Genome Informatics
Research Integrity
Aboriginal & Torres Strait Islander Health Research
Immunology Department
Genetics & Computational Biology Department
Cell & Molecular Biology Department
Population Health Department
Finance & Administration
People & Safety
Information & Facilities
External Relations
Scientific Services
Business Development
General Counsel
Research Regulatory Affairs
Manager Council Business
Bone Marrow Transplantation
Tumour Immunology
Immunology in Cancer & Infection
Gordon & Jessie Gilmour Leukaemia Research
Antigen Presentation & Immunoregulation
Tumour Micro-environment
Gene Regulation & Translational Medicine
Cancer Immunoregulation & Immunotherapy
Oncology & Cellular Immunology
Immunopathology
Translational Cancer Immunotherapy
Transplant Immunology
Respiratory Immunology
Gut Health
Lung Inflammation & Infection
Mucosal Immunology
Molecular Parasitology
Immunology & Infection
Inflammation Biology
Molecular Immunology
Human Malaria Immunology
Translational & Human Immunology
Oncogenomics
Cancer Genetics
Functional Cancer Genomics
Functional Genetics
Cancer Precision Medicine
Molecular Cancer Epidemiology
Medical Genomics
Clinical Genomics
Statistical Genetics
Lung Bacteria
Systems Neuroscience
Genetic Epidemiology
Translational Neurogenomics
Psychiatric Genetics
Clinical Brain Networks
Brain Modelling Group
Cancer Drug Mechanism
Sid Faithful Brain Cancer
Signal Transduction
Conjoint Gastroenterology
Precision & Systems Biomedicine
Drug Discovery Group
Epigenetics and Disease
Iron Metabolism
Cardiac Bioengineering
Hepatic Fibrosis
Molecular Nutrition
Clinical Tropical Medicine
AMI Laboratory
Scabies
HIV Molecular Virology
Clinical Malaria
Cellular & Molecular Neurodegeneration
Cancer & Population Studies
Cancer Control Group
Cancer Aetiology & Prevention
Gynaecological Cancers
Health Economics
Cancer & Chronic Disease
Mosquito Control
Child and Youth Mental Health
Cancer Program
Chronic Disorders Program
Infectious Diseases Program
Mental Health Program

Operating environment

QIMR Berghofer aims to improve health by developing prevention strategies, new diagnostics and better health treatments. Its strategic objectives are to:

- foster scientific excellence
- build scientific, institutional and international connectivity
- undertake research with economic, clinical and community consequences
- strengthen enabling mechanisms.

The realisation of QIMR Berghofer's strategic objectives depends on the Institute's success in securing funding from government and non-government sources. In 2019–2020, QIMR Berghofer received $18.9 million from the Queensland Government, representing approximately 15.7 per cent of total revenue. This – together with competitive, peer-reviewed medical research grants – is QIMR Berghofer's most significant source of funding.

QIMR Berghofer leverages the Queensland Government grant, and the support operations it finances, to secure competitive, peer-reviewed medical research grants. However, competition for research grants has increased and national success rates have continued to fall in recent years, meaning that QIMR Berghofer is now funding a greater proportion of its research. For that reason, a high priority for the Institute is securing new and ongoing sources of income, particularly from research commercialisation and philanthropic sources.

Government objectives for the community

Keep Queenslanders healthy

QIMR Berghofer is highly attuned to the health needs of Queenslanders and directly contributes to the Government's objective of keeping Queenslanders healthy. The Institute does this by translating the discoveries and knowledge it produces into improved clinical practice, thereby strengthening the public health system. Specifically, QIMR Berghofer researches and creates new and improved prevention strategies, diagnostics and treatments for a range of diseases and disorders. Each of QIMR Berghofer's four research programs – Cancer, Infectious Diseases, Mental Health and Chronic Disorders – has been selected to align with the needs of Queensland. By focusing on diseases and conditions affecting Queenslanders, QIMR Berghofer will help address pressures facing the public health care sector by lessening rates of disease and improving quality of life and health care practices.

QIMR Berghofer's research program also responds to changes in demographics, lifestyles and the environment. Research into cancer is particularly important given Queensland's ageing population. The Institute has a strong focus on cancer prevention, and has examined in detail the number of cancer cases and deaths that could be prevented through lifestyle changes. The Institute is also conducting several programs of research relevant to the health impacts of climate change. For example, research into infectious diseases, especially tropical diseases, is vital given the increasing numbers of people living in the tropics and the migration of species due to climate change bringing tropical diseases closer to major population centres. QIMR Berghofer also has research capability in a number of other aspects of physical and mental health that will be affected by climate change. QIMR Berghofer's research into mental health disorders and neurodegeneration – including depression, dementia and Alzheimer's disease – addresses rises in the incidence of these diseases due to demographic and social changes. Work in the Chronic Disorders program – including into liver disease, asthma and inflammatory bowel disease – also addresses many of the health impacts associated with changes in our demographics and lifestyles.

QIMR Berghofer's research also directly contributes to the Government's specific objective of increasing the number of Queenslanders with a healthy bodyweight. The Institute publishes peer-reviewed research that is increasing the body of scientific evidence in favour of maintaining a healthy bodyweight. This includes research into the impact of obesity on cancer incidence and mortality, as well as investigating socio-demographic factors associated with childhood obesity. QIMR Berghofer promotes these research findings via the media to encourage Queenslanders to make healthy lifestyle choices. Researchers in the Institute's Population Health Department are also assessing the effects of a healthy diet on cancer incidence and survival. This research is helping to build an evidence base that will support initiatives to promote healthy diets.

The Institute's research also directly contributes to the Government's specific objective of reducing suicides. QIMR Berghofer has seven research groups in its Mental Health Program and depression, bipolar disorder and schizophrenia are major focuses of their research. In 2019–2020, the Institute welcomed a new Head of its Mental Health Program, Professor James Scott, who is conducting a wide-ranging program of research into child and adolescent mental health. This includes investigating the key risk factors for teenage suicide. QIMR Berghofer is leading the Australian arm of the world's largest genetic study of depression. This major, international effort will help to detect the genetic factors that contribute to clinical depression in order to develop better treatments. The Institute is also leading the Australian arm of another study into the genetic factors that contribute to bipolar disorder. QIMR Berghofer has continued to lead a randomised control trial investigating the most effective program for getting people with serious mental health disorders to do more physical activity. Regular exercise has been shown to significantly reduce mental distress in people with mental illnesses.

Give all our children a great start

QIMR Berghofer's research is helping to ensure all children receive the best start in life, with a number of key researchers focusing heavily on infant and child health. One research group is focused on nutrition and allergies, specifically on the interplay between the gut, the immune system and disease. Another research group is investigating the link between nutrition, gut bacteria, the immune system and the onset of allergies in small children. QIMR Berghofer also has a research group that is heavily focused on iron intake in early postnatal life, which has significant implications for infant nutrition and complementary feeding. The Institute's Population Health Department has also published a number of nutritional studies involving children. In 2019–2020, QIMR Berghofer received approval to commence a clinical trial using cellular immunotherapies to prevent infectious complications in children who have received stem cell transplants.

Create jobs in a strong economy

QIMR Berghofer contributes to the Queensland Government's objective of creating jobs in a strong economy by leveraging the Government's support five-fold annually. The Institute is actively recruiting researchers in areas of high importance to Queensland, including cellular immunotherapies, tropical diseases, cancer and genetics. In 2019–2020, QIMR Berghofer spun off the company EndpointIQ, which develops specialist IT systems for medical research institutes. QIMR Berghofer has also developed another key commercial opportunity with the precision analytics start-up genomiQa. These two companies, which were established with QIMR Berghofer intellectual property, are expected to grow and create new job opportunities in the coming years. It is anticipated that more start-up opportunities will come from the Institute's pipeline of research.

The Institute's advanced cell therapy manufacturing facility, Q-Gen Cell Therapeutics, has continued to develop capacity and a highly skilled workforce to meet the global demand for the cutting-edge cellular immunotherapies it produces.

QIMR Berghofer is also expanding its commercial and licensing agreements and promoting its scientific services to clients globally. In 2019–2020, the Institute entered into commercial agreements with companies Merck KGaA and Epimab Biotherapeutics. This work is creating jobs in the high-value bio-medical sector and is generating investment into Queensland. Finally, QIMR Berghofer is educating and training the scientists of tomorrow by hosting 170 post-graduate students and running a comprehensive high school education program.

Strategic framework

The Institute's strategic plan sets the priorities for its operational activities over the next five years. The strategic plan is available online at www.qimrberghofer.edu.au/about-us/strategic-plan and is updated on 1 July each year in accordance with Queensland Government requirements. Approved by The Council of the Queensland Institute of Medical Research, the revised Strategic Plan (2019–2023) was implemented from 1 July 2019.

Responding to emerging issues

COVID-19

QIMR Berghofer responded swiftly to the COVID-19 global pandemic, launching a program of research into SARS-CoV-2 (the virus that causes COVID-19), enacting a broad range of processes and measures to keep its workforce safe, and, importantly, keeping the Institute open to ensure critical operations and research were able to continue. A summary of the Institute's response is outlined below.

1. Launching a COVID-19 research program

When the scale and impact of the pandemic became apparent, the Institute moved quickly to secure $1.2 million in funding from Mr Clive Berghofer AM and the Brazil Family Foundation to commence a wide-ranging program of research into the virus. Further funding has since been secured through a COVID-19 fundraising appeal. Some of these research projects are mentioned earlier in the report. Others include:

- Evaluating potential new drugs and clinical interventions
- Investigating how patients with blood cancers respond to COVID-19
- Identifying the genetic risk factors for developing severe infection, which could fast-track targets for drug development.

In order to allow this research to commence, the following work was undertaken:

- The Institute's high biosecurity (PC3) containment facility was set up for SARS-CoV-2 research and two suites were dedicated to this work
- The live SARS-CoV-2 virus was acquired
- New equipment was purchased, including fumigation equipment, a UV deactivator and dedicated freezers
- Specialised personal protective equipment (PPE) was secured to allow scientists to work with the virus
- Safety testing was conducted and safety procedures for COVID-19 research were reviewed
- Additional training was provided to scientists in biocontainment and biosafety.

2. Keeping staff safe

The Institute rapidly put in place a broad range of measures to keep staff safe by minimising their chances of being exposed to the virus. A COVID-19 Response Committee was formed in early March, which included internal experts in public health, infection control, safety, ICT, and a range of other critical support areas. The committee coordinated all decisions about health and staff welfare policies.

3. Maintaining operations and research

The safety measures outlined above were critical in ensuring the Institute could remain open so vital research could continue, including the program of research into COVID-19. Additional measures were taken to maintain operations and research as far as possible. The Institute's crisis management team was activated, which planned for business continuity and the possibility of a depleted workforce. Specific plans were developed for critical facilities.

In addition to contributing to the international research effort on COVID-19, QIMR Berghofer also prepared a register of research laboratories with skills in PCR testing in case the Institute was called on to assist with the national COVID-19 testing effort.

Annual review of operations

Each year, QIMR Berghofer reviews its operations and measures its success against the objectives and performance indicators set out in the Strategic Plan (2019–2023) and against the service areas and service standards set out in the Service Delivery Statement in the State Budget documentation. A review of QIMR Berghofer's achievements in 2019–2020 follows.

Review of performance

Review: Foster scientific excellence

In 2020, QIMR Berghofer was the highest-ranked Australian institution included in the Nature index of the world's top 100 not-for-profit science institutions, coming in in the top 50 (based on a count of high-quality research outputs in 2019). Only three other Australian institutions were included in the list.

Two of the best indicators of scientific excellence are the number of papers an institute publishes and the number of times those papers are cited by other researchers worldwide. In 2019, QIMR Berghofer published 836 scientific papers, which far exceeds the number of papers published by comparable medical research institutes. These papers have already been cited more than 2599 times. All QIMR Berghofer papers published since 1980 were cited 48 767 times in 2019. This is an increase in citations of more than 50 per cent over the last five years, which far exceeds QIMR Berghofer's target of 15 per cent growth over that time.

In 2019–2020, eight researchers joined the '1000 club', meaning a total of 49 QIMR Berghofer scientists have now authored at least one paper that has been cited more than 1000 times. Twelve researchers who were already on the list increased the number of papers that have now been cited more than 1000 times.

Another 10 researchers joined the '500 club', bringing to 33 the number of QIMR Berghofer scientists who have now authored at least one paper that has been cited more than 500 times. Four researchers who were already on the list increased the number of papers that have now been cited more than 500 times.

Membership of QIMR Berghofer's '1000 club' and '500 club' is detailed in the tables on the following page.

1000 CLUB

Author	Number of publications cited more than 1000 times
Nick Martin	10
James Scott	9
Mark Smyth	8
John Pearson	6
Nick Hayward	6
Nic Waddell	5
Georgia Chenevix-Trench	4
Fabienne Mackay	4
Ann-Marie Patch	4
Lisa Simms	4
Christina Xu	3
Conrad Leonard	3
Felicity Newell	3
Graham Radford-Smith	3
Katia Nones	3
Michelle Lupton	3
Oliver Holmes	3
Sarah Medland	3
Scott Gordon	3
Scott Wood	3
Greg Anderson	2
Harsha Gowda	2
Kum Kum Khanna	2
Michael Breakspear	2
Stephen Kazakoff	2
Stuart MacGregor	2
Adele Green	1
Alan Robertson	1
Amanda Spurdle	1
Andreas Moller	1
Anthony White	1
Barbara Leggett	1
Carolina Soekmadji	1
David Whiteman	1
Don McManus	1
Jason Madore	1
John Whitfield	1
Jonathan Beesley	1
Juliet French	1
Ken Dutton-Regester	1
Keshava Datta	1
Leon Hugo	1
Michelle Wykes	1
Nigel Waterhouse	1
Penny Webb	1
Scott Bell	1
Siok-Keen Tey	1
Sudha Rao	1
Xiao Qing Chen	1

500 CLUB

Author	Number of publications with 500 to 999 citations in first or last author position
Mark Smyth	14
Nick Martin	12
Barbara Leggett	5
Fabienne Mackay	5
Don McManus	4
Adele Green	3
Geoff Hill	2
Kum Kum Khanna	2
Michael Breakspear	2
Rajiv Khanna	2
Sarah Medland	2
Stacey Edwards	1
Andreas Moller	1
Ann-Marie Patch	1
Anthony White	1
David Duffy	1
David Frazer	1
David Whiteman	1
Georgia Chenevix-Trench	1
Graham Radford-Smith	1
Grant Ramm	1
James Scott	1
John Whitfield	1
Jonathan Beesley	1
Kelli MacDonald	1
Lisa Simms	1
Michele Teng	1
Michelle Hill	1
Nirmala Pandeya	1
Penny Webb	1
Sharon Johnatty	1
Stuart Macgregor	1
Vicki Whitehall	1

The h-Index is an integrated measure of the quality and quantity of a scientist's output. The average h-Index of our Faculty (the scientists who have their own research groups) is more than 48, which is considered to be outstanding.

As well as success in publications and citations, QIMR Berghofer researchers were recognised with a number of prestigious accolades in 2019–2020. These include:

- Professor Mark Smyth was named in the annual Highly Cited Researchers 2019 list and recognised as one of the world's most influential researchers in the fields of immunology and clinical medicine.
- Professor Geoff Hill and Dr Paulo Martins were part of a team that won the prestigious Eureka Prize for Scientific Research for their ground-breaking immunology research.
- Dr Severine Navarro and Dr James Hudson received Young Tall Poppy Science Awards, which recognise the achievements of Australia's outstanding young scientific researchers and communicators.
- Dr James Hudson was awarded the prestigious Metcalf Prize for Stem Cell Research for his work to develop new heart regeneration drugs.
- Professor Sarah Medland was awarded a Medal of the Order of Australia (OAM) in the Queen's Birthday 2020 Honours List.
- Professor Penny Webb received a lifetime achievement award from the Australasian Epidemiological Association.
- Professor Adele Green AC was elected as a Fellow of the Australian Academy of Science in recognition of her international leadership in the epidemiology of melanoma and skin cancer.
- Associate Professor Tracy O'Mara was named Cure Cancer 2020 Researcher of the Year for her work trying to unravel the genetics of ovarian and endometrial cancers and for her potential as a future leader in the field.
- Dr James Hudson was awarded an inaugural Snow Fellowship.
- Dr Siok Tey was appointed to the Federal Government's Stem Cell Therapies Expert Advisory Panel that will help progress the long-term plan for stem cell research in Australia.
- Dr Severine Navarro was appointed to the steering committee of the Woolworths Centre for Childhood Nutrition Research.

QIMR Berghofer holds its annual Council Awards ceremony in December. The recipients of its key research awards were:

- Bancroft Medal – Lynn Lin and Angela Trieu.
- Ralph Doherty QIMR Berghofer Prize for Outstanding Achievement and Leadership in Medical Research – Associate Professor Steven Lane.
- Post-doctoral Prize – Associate Professor Tracy O'Mara
- Long Service Awards – Professor Grant Ramm and Dr David Duffy
- Australian Cancer Research Foundation Prize for Cancer Research Excellence – Dr Paulo Martins
- Researcher Recognition Awards – Michelle Neller and Catherine Gordon
- Support Staff Recognition Awards – Nancy Cloake, Paula Hall and Damon Johnstone.

Review: Build scientific, institutional and international connectivity

In 2019–2020, QIMR Berghofer:

- Collaborated with external researchers on 93 per cent of the Institute's publications. Sixty-six per cent of QIMR Berghofer publications involved international collaborators.
- Hosted 165 visiting scientists, affiliates and honourary/emeritus appointees, and 170 higher degree students who are placed at the Institute by collaborating universities.
- Contributed expertise and analysis to nine state and federal government consultation processes.
- Continued to contribute to planning for the redevelopment of the Herston health precinct as members of the Herston Precinct Integration Committee, and actively contributed to the Herston-Kelvin Grove Stakeholder Group as part of Brisbane Marketing's Global Precincts initiative.

QIMR Berghofer collaborations

QIMR Berghofer has a long track record of successful and enduring research collaborations with our partner institutions locally, nationally and internationally. Together with UQ, QIMR Berghofer co-founded and co-manages the Australian Skin and Skin Cancer Research Centre, the Australian Infectious Disease Research Centre, the Queensland Mental Health Alliance and the Queensland Emory Development Alliance. Together with the Princess Alexandra Hospital and the Translational Research Institute, QIMR Berghofer established the Queensland Head and Neck Cancer Centre of Excellence. The Institute is a partner in the Herston Imaging Research Facility. QIMR Berghofer is a key member of the Queensland Genomics Health Alliance (QGHA). The Institute is also an active member and founder of the Brisbane Diamantina Health Partners (an accredited Advanced Health Research and Translation Centre).

Review: Undertake research with economic, clinical and community consequences

In 2019–2020, QIMR Berghofer undertook the following research with economic consequences:

- Entered an agreement to license new cancer immunotherapies to leading science and technology company Merck KGaA.
- Signed a commercial agreement with Epimab Biotherapeutics to develop bi-specific antibodies against immune-oncology targets.
- Found that over a 30-year period, investing in the promotion of daily sunscreen use and other sun protection strategies in Australia would save millions more dollars, and over 50 000 more lives, than screening for skin cancers.
- Found that nearly 30 000 cases of cancer could be prevented in Australia over the next 25 years if everyone followed the Government's alcohol guidelines of no more than two standard drinks per day.

In 2019–2020, QIMR Berghofer undertook the following research with clinical and community consequences:

- Launched a major program of research into COVID-19.
- Co-led the development of a new global blueprint for the care of people with cystic fibrosis, which could turn the fatal genetic disorder into a manageable condition and allow patients to live decades longer.
- Developed a genetic test to detect those at risk of going blind from glaucoma, and identified 107 genes that increase a person's risk of the eye disease.
- Discovered why some melanoma patients do not respond well to immunotherapy, a discovery that could lead to better-tailored treatments for the cancer.
- Identified ways to make the most widely used advanced treatment for Parkinson's disease, deep brain stimulation, more effective and safer.
- Discovered how the medications given to people with Parkinson's disease cause some people to develop addictive behaviours.
- Added weight to the potential benefits of using ultrasound treatment to deliver disease-targeting drugs to Alzheimer's patients.
- Co-led the world's most comprehensive analysis of genetic breast cancer risk to date and concluded that 191 genes are likely to affect a woman's risk of developing the disease.
- Identified the first eight genes linked with anorexia.
- Found that women who breastfeed their babies may lower their risk of developing ovarian cancer by almost 25 per cent.
- Identified how an early genetic change in blood and bone marrow cells paves the way for the development of some blood cancers, providing a new target for treatment.
- Launched the world's largest ever genetic study of skin cancer.
- Helped to speed up the development of a new type of immunotherapy by discovering how it activates the immune system to fight cancer.
- Discovered that drinking coffee does not change a person's risk of being diagnosed with or dying from cancer.
- Found evidence that a high-fat diet over a long period of time may induce early Barrett's oesophagus, which is a precursor condition to oesophageal cancer.
- Released a set of guidelines to help genomic health researchers work with Aboriginal and Torres Strait Islander communities in a way that respects cultural protocols.
- Found that 22 different genes help to determine how much sun exposure a person needs to receive before developing melanoma.
- As part of an international collaboration, discovered a way to potentially allow the heart to regenerate itself.
- Identified a key driver of the aggressive gut disorder Crohn's disease, which could eventually lead to new treatments.
- Found that about five per cent of melanomas in the eye are caused by exposure to sunlight, while the majority are not.
- As part of a collaboration, pinpointed where in the brain the communication process breaks down for people with chronic attention deficit hyperactivity disorder (ADHD), which could change the way people with ADHD are treated in the future.

Clinical trials

In 2019–2020, the Institute led 17 clinical trials as a result of research undertaken at QIMR Berghofer.

Impact of COVID-19 on research outputs

Research outputs have, inevitably, been affected by the COVID-19 shutdown. The Institute took a prudent approach and halted clinical trials and studies involving human participants during this period. While these trials are recommencing, the disruption may mean that fewer patients are treated over the duration of the study. As a precaution, a number of large genetic studies stopped receiving saliva (DNA) samples from participants while protocols were reviewed. This will ultimately impact on the research that follows. Laboratory research had to be scaled back to allow for physical distancing and also due to limited supplies of PPE and ethanol.

Despite the massive disruptions, QIMR Berghofer estimates that most research laboratories were able to operate at approximately 75 per cent of their usual research capacity through the COVID-19 shutdown period. The fact that the Institute was able to maintain research operations at this level will be crucial to maintaining research outputs, publishing papers and securing grants over the coming years. QIMR Berghofer is working closely with the Association of Australian Medical Research Institutes to try to ensure researchers are not disadvantaged by the COVID-19 shutdown in future grant applications.

Review: Strengthen enabling mechanisms

In 2019–2020, QIMR Berghofer:

- Provided financial support for 23 women scientists as part of the Institute's policy to help women researchers with young children to stay in research.
- Secured $34.3 million in new funding from the National Health and Medical Research Council.
- Secured $5.5 million in new funding from the Medical Research Future Fund.
- Secured an inaugural Snow Fellowship worth $8 million over eight years.
- Purchased a Cytek Aroura, which is a new type of flow cytometer.
- Purchased a xCelligence RTCA, which is a system for real time cell growth measurement that allows high throughput screening of drug and other treatment options.
- Raised almost $1.9 million to support priority COVID-19 research.

Community engagement

As Queensland's own medical research institute, QIMR Berghofer is passionate about sharing its research with the community. The Institute's community engagement activities have been significantly disrupted by the COVID-19 pandemic, with many events and activities scheduled for 2020 cancelled due to social distancing requirements.

In 2019–2020, the Institute's researchers spent a combined total of more than 400 hours on community engagement and school education activities.

Sharing our research

In 2019–2020, QIMR Berghofer:

- Hosted 20 public tours of the Institute and attended 28 public speaking engagements involving about 1270 members of the public. Tours of the Institute and public speaking engagements were suspended between March and June 2020.
- Attended World Science Festival (WSF) Brisbane's regional event in Chinchilla (before the rest of the WSF program was cancelled due to COVID-19).
- Shared the Institute's research with the community via the media. Fifty-three media releases were published.

High school education program

COVID-19 has disrupted the Institute's high school education program, with school visits to the Institute cancelled between March and June 2020. In spite of the disruptions, in 2019–2020, QIMR Berghofer:

- Gave approximately 930 students and nearly 90 teachers from more than 75 different high schools the opportunity to attend the Institute to participate in the education program.
- Hosted 458 students and 47 teachers from 25 schools for the Day in the Life of a Scientist program, which involves hands-on experiments in the Institute's purpose-built education laboratory.
- In July 2019, the Institute hosted 417 students and 24 teachers from nine schools for the High School Lecture Series, where students come to the Institute to be inspired by world-leading scientists. Due to COVID-19, in June 2020 the High School Lecture Series was delivered online, with 12 scientists presenting their research into genetics, infectious diseases and psychology.
- In the second half of 2019, 25 students from 15 different schools attended an intensive three-day work experience program. A further 34 students from 18 schools participated in the expanded one-day holiday science experience. Due to coronavirus restrictions, these programs could not run in the first half of 2020.
- In 2019–2020, 18 teachers from 11 different schools attended a teacher professional development workshop.
- In the second half of 2019, the Institute's Regional High School Lecture Series travelled to 13 different schools across regional Queensland – including in Townsville, Cairns and Toowoomba – and presented to 1179 students.

Community feedback

In 2019–2020, QIMR Berghofer:

- Hosted two community reference groups, giving community representatives the opportunity to provide input into the Institute's research priorities. One of these sessions was held online due to COVID-19 restrictions.

Support from the community

QIMR Berghofer relies on philanthropic support from individual and corporate donors and third-party fundraisers. The Institute thanks its key supporters for 2019–2020:

- Barbara McKay
- Biniris Pty Ltd
- BioTools
- Brian Needham
- BT Managed Accounts
- Calcino Corporation Pty Ltd
- Catherine Baldwin
- Centenary Foundation – The Nancy May McKenzie Bequest
- Chimera Legacy Foundation
- Clive Berghofer AM
- David and Elisabeth Stanton
- Donald and Joan Wilson Foundation
- Donald McDonald
- Dowling Family Foundation
- Dr Chris Moore
- Dr Fiona Roberts
- Dr John and Mrs Paulette Goodell
- Essential Advice Pty Ltd
- Estate of Deidre Alison Brown OAM
- Faithfull Investment Group Trust
- Graeham P. Sargent
- Hare Family Philanthropy
- Henry Cyril & Stella May Robjohns Memorial Trust
- In Memory of Ken and Glenda Gold
- Jacqueline Pascual
- JJ Richards & Sons Pty Ltd
- John and Georgina Story
- Jonathan and Kathleen Perrins
- Keith Maher
- Let's Find A Cure Foundation
- Lorraine Duckwitz
- Maureen Stevenson
- MG Car Club Qld Inc
- Mrs Winifred Grace Henry
- National Stem Cell Foundation of Australia
- Neil & Glenda Herron
- Pamela G Webb
- Perpetual Foundation – E M Squires
- Play for a Cure
- QIMR Berghofer Workplace Giving
- Queensland Community Foundation
- Rae L Peacock
- Ray and Tina Barton
- Robert George Relf Trust Fund

- Robert W Marshall
- Roycorp Pty Ltd
- Selwyn Thomas Fassifern Ozanne & Doreen Elaine Ozanne Trust
- Skin Cancer Institute (HealthCert)
- Summit for Sarcoma
- The Brazil Family Foundation
- The Estate of Aileen Colley
- The Estate of Esther P Bermingham
- The Estate of Greta Y Threadwell
- The Estate of Isabel M Allpass
- The Estate of Janette A Innes
- The Estate of Jeanette E Stumer
- The Estate of John A Hale
- The Estate of Margaret A Ireland
- The Estate of Mary L Coles
- The Estate of Peter J Duffy
- The Estate of Ronald J Pollard
- The Estate of Roy A Street
- The Estate of Stewart Coggins
- The Estate of Sydney R Cottrell
- The Estate of Sylvia M Carter
- The Estate of William T Hickey
- The Foxwell Family
- The Garry Whyte Sea Angel Private Ancillary Fund
- The Ian Potter Foundation
- The Ira Peace Mary and Ashley Keidge Perpetual Charitable Trust
- The John Thomas Wilson Endowment
- The King Family Foundation
- The Laurence Edward Wilkins Foundation
- The Pamela Joan Dinning Perpetual Charitable Trust
- The Patricia Bosso Memorial Fellowship
- The Patricia Guest Foundation
- The Sneyd Family
- Tour de Cure Ltd
- William and Hilde Chenhall Research Trust

At the annual Council Awards ceremony, QIMR Berghofer awarded Clive Berghofer Humanitarian Awards to supporters Lorraine Duckwitz, Barbara McKay and Robyn Britton in recognition of their invaluable support of the Institute.

Statutory obligations and compliance

Risk management

The review and management of risk at QIMR Berghofer is undertaken by the QIMR Berghofer Council through the Finance and Audit Committee. The Institute's management maintains a register of potential risks applicable to functions of the Institute.

Ethics, code of conduct and public service values

Based on the principles set out in the *Public Sector Ethics Act 1994*, QIMR Berghofer has a Code of Conduct for expected workplace conduct, relationships and behaviour of staff, in order to foster a safe and productive work environment for all employees. The Code of Conduct was last reviewed by Council in October 2019.

The ethics principles enshrined in the Code of Conduct are:

1. Integrity and impartiality
2. Promoting the public good
3. Commitment to the system of government
4. Accountability and transparency

Ethical procedures and practices are embedded into QIMR Berghofer's finance, procurement, fundraising and human resources operations. As part of the staff induction program, employees complete mandatory education and training in public sector ethics and the Code of Conduct, including their rights and obligations in relation to contraventions. This education and training must be undertaken at regular intervals throughout a staff member's employment. In addition to making available online training modules, the Institute's Human Resources department also schedules workshops and team training sessions on request.

In addition to the Code of Conduct, the Institute also operates in consideration of the Queensland Public Service Values: customers first; ideas into action; unleash potential; be courageous; and, empower people.

Internal audit

Internal audit is a fundamental part of QIMR Berghofer's corporate governance, ensuring the Institute operates effectively, efficiently and economically. The role of internal audit is to provide independent, objective assurance and advice and to bring a systematic, disciplined approach to evaluating and improving the appropriateness and effectiveness of risk management and internal control.

The Finance and Audit Committee oversees the planning, performance and reporting of the internal auditor under the guidance of an annual internal audit plan. The internal audit contractor (Crowe) met with the Finance and Audit Committee at each quarterly committee meeting. The internal audit function has observed the terms of its charter and has due regard to Queensland Treasury's Audit Committee Guidelines.

Identifying areas of significant risk combines a focus on both cyclical reviews of core business processes, as well as reviews of key risk areas. Crowe's integrated governance, risk and controls framework builds on a traditional internal audit model to take a holistic view of QIMR Berghofer's key objectives, risks, controls and supporting structure across the organisation.

The internal audit plan is presented to the Finance and Audit Committee for approval prior to the commencement of the financial year, with consideration given to past internal audit findings, recent and forthcoming changes in systems and processes, key business risks and the period since the last internal audit of each core business process.

Workplace health and safety

QIMR Berghofer operates in compliance with Queensland's *Work Health and Safety Act 2011*. The Institute has a Safety Committee and a Safety Team.

Staffing

At 30 June 2020, QIMR Berghofer had:

- 525.9 full-time equivalent staff (including fixed-term, permanent, part-time and full-time staff, but not including visiting scientists/affiliates, casuals, students or external collaborators on site)
- 66 members of Faculty, including 12 Senior Scientists, 40 Group Leaders and 14 Team Heads
- 170 higher-degree students, who are placed at the Institute by collaborating universities
- 83 casual staff.

Workforce planning and performance

The majority of QIMR Berghofer staff are employed under the QIMR Berghofer Medical Research Institute Enterprise Agreement. Seventy-seven per cent of the Institute's employees are employed on fixed-term contracts, as research funding relies on short-term grants. Historically, QIMR Berghofer has maintained a low rate of staff turnover. In 2019–2020, the permanent separation rate was 2.7 per cent. Due to the nature of research funding and the fact that most scientists are employed on fixed-term arrangements, this figure does not include scientists. It also does not include other staff employed on fixed-term contracts. In 2019–2020, the voluntary separation rate across the Institute, from a FTE staff of 525.9 (as at 30 June 2020), was 15.4 per cent. The variation between the FTE staff figure of 525.9 and the budgeted figure of 504, reported in the Service Delivery Statement, is due to the variable nature of research funding, contract research and staff funded through commercial agreements.

QIMR Berghofer's workforce planning and performance is supported by a range of policies, procedures and initiatives designed to foster a high-performance culture. This includes a set induction program for new staff, annual online refresher training, annual performance reviews, an extensive annual program of scientific seminars for staff (including dedicated seminar series for PhD students, early-career researchers and support staff), conference attendance/participation, and opportunities for staff development and career progression.

Equal opportunities

Women are strongly represented at QIMR Berghofer, accounting for 59.7 per cent of the total workforce, 62.8 per cent of research staff and 62.9 per cent of students. Women hold senior management roles at the Institute, including as Director and CEO, as Coordinators of two of the four research Departments, as Deputy Coordinators of three of the four research Departments, and as the Institute's Chief Operating Officer and General Counsel. Nearly 44 per cent of lead research positions (Faculty) are held by women.

To encourage even more women into lead research positions, QIMR Berghofer has a financial assistance scheme. Women scientists employed at the level of senior research officer and higher, who have at least one child below high-school age, can apply for up to $10 000 in financial assistance in addition to their salaries. These funds can be used at the scientist's discretion. Under the policy, women scientists employed at the slightly lower level of research officer, who have at least one child below high-school age, can apply for financial assistance for particular expenses. This could include covering the cost of childcare while the scientist attends a conference. The Institute also has several other measures in place to make it easier for mothers to return to work, including reserved places for children under two at a local childcare centre, and having a designated room for nursing mothers. QIMR Berghofer also offers parking on premises for pregnant women in their final month before taking maternity leave.

QIMR Berghofer operates in consideration of the guidelines endorsed by the Council of the Australian Academy of Science to ensure both women and men have equal opportunities to pursue a successful career in science. The Institute has a Gender Equity Committee, flexible work hours, and job-share and part-time employment options to help staff balance their personal and professional lives. Women account for the majority of staff with part-time and job-share arrangements.

Human rights

QIMR Berghofer has complied with its obligations under the *Human Rights Act 2019*. Since the Act came into effect, the Institute has conducted a comprehensive review of all of its policies and procedures to ensure they are compliant with the Act. QIMR Berghofer did not receive any complaints under the *Human Rights Act 2019* in the reporting period.

Information systems and recordkeeping

QIMR Berghofer's recordkeeping complies with the *Public Records Act 2002* and *Financial and Performance Management Standard 2019*. The Institute keeps physical and electronic documents as full and accurate records of its activities, and uses the Total Records and Information Management (TRIM) document management system. This single, standardised system promotes file and information sharing across the organisation, secures access to the Institute's records, improves accessibility and reduces duplication.

Records are not disposed of, or archived, unless duly authorised under the *Public Records Act 2002* or by reference to the Retention and Disposal Schedule (RDS) approved by Queensland State Archives (QSA). All QIMR Berghofer records are registered into TRIM before being transferred to the off-site storage provider or QSA. All QIMR Berghofer hardcopy records stored off-site are managed under legislatively appropriate risk management standards and guidelines. Work continues on ensuring that all record types are identified, and are managed under the retention and disposal schedule, and that all other legislative and other requirements for records management are satisfied.

Records management is undertaken by trained staff and all new Institute employees receive a training session in records management as part of their formal induction process.

Open data

For information on consultancies and overseas travel for QIMR Berghofer, visit the Queensland Government Open Data website: https://data.qld.gov.au.

Research Achievements

CANCER PROGRAM

HEAD: ASSOCIATE PROFESSOR STEVEN LANE

Cancer is a disease caused by abnormal cell growth, which eventually spreads to other parts of the body. Some cancers are common, others rare. Some are clearly inherited as they occur in families, while others are caused by factors in the environment interacting with genetic susceptibilities. Many forms of cancer can be treated successfully if detected early; however, cancer is still one of the major causes of illness and death in Australia and the developed world.

Cancer is the largest research program at QIMR Berghofer, accounting for approximately half the Institute's research. Research in the cancer program includes:

- identifying the genetic, epigenetic and environmental factors affecting an individual's risk of cancer
- studying the molecular changes that are precursors to cancer or that occur during tumour formation and metastasis
- developing and testing novel therapies in the laboratory and in clinical trials
- developing tests to detect and improve the diagnosis of cancer.

The program has a strong focus on skin cancers, including melanoma; hormone-related cancers such as breast, ovarian, endometrial and prostate cancer; lung cancer; leukaemia and lymphoma; brain cancer; and tumours of the gastrointestinal tract.

The Institute is a world leader in immunotherapy, which is emerging as the fourth pillar of cancer treatment, alongside surgery, chemotherapy and radiotherapy.

Antigen Presentation and Immunoregulation

Group Leader: Kelli MacDonald

The Antigen Presentation and Immunoregulation Group researches the pathophysiology of graft-versus-host disease (GVHD), the major complication of allogeneic stem cell transplantation (SCT). Current research projects run by this group focus on delineating therapeutically targetable cytokine and cellular mediators of GVHD and dissecting their mechanism of action using preclinical models. The group's overarching goal is to identify points of intervention to improve outcomes in patients undergoing SCT as a treatment for cancer.

Highlights:

- Established, for the first time, that the brain is a target organ of chronic GVHD, which is associated with neuroinflammation and impaired learning and behaviour.
- Identified a molecular pathway in intestinal epithelial cells that is crucial for controlling T cell mediated gut damage early after transplantation.
- Identified AKNA as a centrosome-associated protein in T cells that is required for optimal cytolytic function of CD8 T cells and tumour clearance after transplant.

Bone Marrow Transplantation

Senior Scientist: Geoff Hill

Professor Geoff Hill left QIMR Berghofer to take up a senior role at the Fred Hutch Institute in Seattle, USA. Professor Hill retains the position of Honorary Senior Scientist with the Institute and a number of QIMR Berghofer's laboratories are continuing the work formerly undertaken by his group.

Cancer Aetiology and Prevention

Group Leader: Rachel Neale

Deputy Coordinator, Population Health Department

The Cancer Aetiology and Prevention Group has primarily focused on completing the intervention phase of the D-Health Trial. The last participants recruited completed the trial in February and the group has now obtained all final surveys and samples. Analysis has begun, with several manuscripts in advanced stages.

A PhD student has also joined the group to continue working on pancreatic cancer, leveraging a linked dataset to perform an analysis focused on diabetes and pancreatic cancer.

Highlights:

- Completed the intervention phase of the D-Health Trial.
- Completed and published the outcomes of the Prepares Trial.
- Led the health working group of the United Nations Environmental Effects Assessment Panel and published a comprehensive review.

Cancer and Chronic Disease

Team Head: Patricia Valery

The Cancer and Chronic Disease Research Group focuses on three main areas:

- management of chronic liver disease and liver cancer
- patterns of care of Aboriginal and Torres Strait Islander people with cancer
- descriptive epidemiology of cancer and chronic liver disease (such as incidence, trends, geographic distribution of disease).

A particular focus of the group's research is the optimal management of cirrhosis in Australia. Findings from a current study will provide a better understanding of the treatment trajectory and quality of care of cirrhosis patients residing in Queensland.

Another area of work is on improving cirrhosis and liver cancer care in Indigenous primary health care. The group is examining the coordination and continuity of care of Indigenous patients with cirrhosis and/or liver cancer. The findings will transfer knowledge about better coordination of care to policy and practice.

The group also collaborates with other Australian researchers on projects focusing on non-alcoholic fatty liver disease, childhood cancers, lung cancer and chronic respiratory disease.

Highlights:

- Showed that Indigenous patients with liver disease had more emergency presentations and readmissions, fewer one-day admissions (i.e. for diagnostic/therapeutic procedures) and lower survival.
- Developed the first supportive needs assessment tool for cirrhosis.
- Undertook a pharmacist-led education and medication reconciliation intervention in a cirrhosis clinic at the Princess Alexandra Hospital.
- Demonstrated that targeted interventions to improve patients' knowledge and self-management of cirrhosis can significantly reduce unplanned hospital admissions among adults with decompensated cirrhosis.

Cancer and Population Studies

Senior Scientist: Adele Green

The Cancer and Population Studies Group investigates the causes, prevention and management of skin cancer and melanoma. Its keratinocyte cancer studies are either based in the community or in solid-organ transplant recipients who are at very high risk compared to the background population. The group's studies in the latter are highly collaborative with treating clinicians and are guided by their clinical questions.

The group's primary melanoma project studies patients whose melanoma was confined to the skin when diagnosed, but whose disease is at high risk of spread, to better understand prognostic factors and their quality of life after diagnosis. They are also studying melanoma and cataracts in commercial airline pilots in Australia to examine possible risks related to occupational exposure to UV and cosmic radiation.

In addition, the group is studying the magnitude of weight gain in heart transplant recipients after transplantation.

Highlights:

- Showed the beneficial effects of a multidisciplinary high-throughput skin clinic on the healthcare costs of organ transplant recipients.
- Confirmed that regular sunscreen use does not have any effect on long-term risk of mortality.
- Showed that melanoma incidence is not increased in Australian commercial pilots.
- Documented for the first time the enormous skin cancer burden in Queensland lung transplant recipients.

Cancer Control Group

Senior Scientist: David Whiteman
QIMR Berghofer Deputy Director

The Cancer Control Group focuses on identifying the causes of cancer in the population and then using that knowledge to find ways to reduce the burden of cancer. Much of the group's research involves collection and analysis of data arising from the QSkin Study, a cohort of more than 40 000 Queenslanders being followed for the occurrence of skin cancer and other conditions. This resource continues to generate findings that are highly relevant to health consumers, practitioners and policy makers. The group is also conducting studies into cancers of the head and neck and examining the role of human papillomaviruses (HPV) in initiating these cancers. In collaboration with Cancer Council Australia, the group is leading studies to estimate the fractions of cancer in the Australian population that are attributable to modifiable factors.

Highlights:

- Identified globally consistent sex-specific patterns of melanoma incidence.
- Identified the characteristics of thin melanomas, which have a high risk of causing death of the patient.
- With colleagues, led a new analysis to identify the genetic variants that predispose to keratinocyte cancers.
- Estimated the numbers of people who died from cancer in Australia that could be attributed to alcohol consumption.

Cancer Drug Mechanism

Group Leader: Glen Boyle

The Cancer Drug Mechanism Group combines molecular and cellular biology with understanding of drug mechanisms to potentially treat cancers and other chronic diseases. The group's cell and molecular biology work focuses on understanding the mechanisms involved in the progression and metastasis of cancers of the skin (melanoma and cutaneous squamous cell carcinoma), and of the mouth and throat (head and neck cancer). These mechanisms also impact on the resistance of these cancers to treatment. The identification and understanding of aberrantly regulated pathways in these cancers is crucial to the identification of suitable therapeutic agents to treat these diseases.

The group has identified that different sub-populations of melanoma cells within the same tumour are important in the processes of growth and spreading. It is believed that these different cell types cooperate and communicate with each other. Importantly, one cell type potentially resists killing while in circulation and may shield other cell populations. These findings open the opportunity to find a treatment to stop melanoma cells growing and spreading.

The group's work with new drugs has focused on ways to treat chronic, non-healing skin wounds in patients.

Highlights:

- Characterised the molecular effects of a new agent for treatment of chronic skin wounds.
- Developed a model leading to identification of key molecules involved in neural invasion of skin cancer (squamous cell carcinoma).
- Established that different sub-populations of melanoma cells within the same tumour are crucial for tumour growth after metastasis.
- Identified a new factor involved in melanoma invasion that imparts survival of cancer cells in circulation.

Cancer Genetics

Senior Scientist: Georgia Chenevix-Trench

Coordinator, Genetics and Computational Biology Department

The main activity of the Cancer Genetics Group this year has been follow up of the large number of breast cancer risk loci the group has identified with their international collaborators. The group has successfully narrowed down the number of candidate causal variants by fine mapping of the genetic data. They identified 191 likely target genes (most of which were not previously known to play a role in breast cancer) and started to follow these up in more detail. For this functional follow up, the group is focusing on two approaches:

- Identification of a drug repositioning opportunity.
- The group has started experiments aiming at inhibiting or activating all 191 target genes at once to identify those that affect breast cell growth. Early results are very promising.

Highlights:

- Undertook chromatin interactome mapping at 139 independent breast cancer risk signals.
- Fine-mapped 150 breast cancer risk regions, identifying 191 likely target genes.
- Identified genomic domains in BRCA1 and BRCA2 associated with elevated prostate cancer risk.
- Identified 32 new breast cancer loci from overall and subtype-specific analyses of a genome-wide association study.

Cancer Immunoregulation and Immunotherapy

Group Leader: Michele Teng

The Cancer Immunoregulation and Immunotherapy Group investigates how tumour-induced immunosuppression impedes the effective treatment of established cancer. Specifically, in cancer initiation, growth and metastasis, the group is interested in the role of regulatory T cell subsets, the adenosinergic pathway, and the IL-23-associated cytokine family. The group has also developed a pre-clinical mouse model to assess how different combination therapies impact on tumour immunity and toxicities.

The group provided the game-changing, pre-clinical proof that neoadjuvant immunotherapy was superior to adjuvant immunotherapy in the context of surgery. The group is currently working on further understanding the immunological mechanism underpinning the efficacy of neoadjuvant immunotherapy.

Highlights:

- Identified MR1 as a potential new immunotherapy target.
- Demonstrated that antibodies that block immunosuppresive metabolites have anti-tumour activity.

Cancer Precision Medicine Group

Group Leader: Harsha Gowda

The Cancer Precision Medicine Group specialises in proteomics and uses this technology to investigate and characterise various mechanisms that regulate cancer cell survival. The ultimate goal is to understand mechanisms that are essential for cancer cell survival, thereby identifying potential vulnerabilities that can be targeted for therapy. The group is investigating mechanisms that can be targeted using small molecule inhibitors (particularly a class of proteins called kinases) and immunotherapeutic strategies. Most tumours become resistant to therapy after initially responding to the drug. This has hampered the ability to achieve durable response to most cancer therapies. The group is trying to understand drug resistance mechanisms to improve efficacy of cancer therapies. The group is also investigating the potential of several new proteins encoded by the human genome that have not yet been identified.

Highlights:

- Identified MAP2K1 as a potential target in erlotinib-resistant head and neck squamous cell carcinoma.
- Identified molecular alterations associated with chronic exposure to chewing tobacco in oesophageal cells.
- Identified lncRNA expression patterns associated with early-stage breast cancer.
- Identified CLK1 as a new therapeutic target in gastric cancer.

Clinical Genomics

Team Head: Ann-Marie Patch

The Clinical Genomics Group analyses cancer sequencing data from colorectal, endometrial and pleural mesothelioma using computational methods to investigate the biological mechanisms that enable cancer cells to establish, multiply and become resistant to treatment.

The group has identified the main genes that, when mutated, commonly cause cancers and has also highlighted the complex nature of each individual cancer. It is this complexity, termed heterogeneity, that contributes to why each person's cancer may respond differently to cancer treatments.

The group uses new techniques such as single-cell RNA sequencing to investigate intra-tumour heterogeneity in mesothelioma patients' samples, discovering three sub-populations of cancer cells. These cell populations have distinct genetic and transcriptomic characteristics that can affect the overall survival of patients. Additionally, the group has analysed whole genome and transcriptome data from primary and metastatic colorectal cancer samples and has identified the mutations and gene expression patterns that contribute to the variable responses of patients to their treatment.

Highlights:

- Led and completed the analysis to characterise the molecular landscape of the aggressive cancer, malignant pleural mesothelioma, revealing that structural variants are an important mutational mechanism.
- Led the analysis that uncovered evidence of three sub-populations of cancer cells that influence overall patient survival.
- Observed genomic differences between primary and metastatic colorectal cancer samples and identified multiple mechanisms through which tumour cells may evade the immune system.
- Generated and analysed long-read RNA sequencing to explore the intra-tumour heterogeneity in expressed gene transcripts in primary and metastatic colorectal cancer. This will help unravel a largely unexplored source of cancer cell plasticity.

Research Achievements

Conjoint Gastroenterology

Group Leader: Vicki Whitehall

This group's focus is the molecular and clinical aspects of colorectal polyp and cancer development with the aims of reducing cancer incidence and improving patient outcomes. The group is particularly interested in a subtype of colorectal polyps called sessile serrated adenomas. They recently discovered that in young patients these polyps are at lower risk of progressing to cancer than in older patients. The group is currently further testing this finding using its mouse model of serrated neoplasia. The group has developed a statistical model to estimate molecular ageing in the intestine and has found that this is greatly accelerated in this model. They are now developing ways to reverse this to prevent the risk of polyps progressing to cancer, including by using a novel form of curcumin. The group has also started a study to develop new strategies to treat the subgroup of bowel cancers that arise from these polyps.

Highlights:

- Discovered that BRAF mutation accelerates age-related DNA methylation changes, which dramatically increases the risk of colorectal neoplasia in elderly individuals.
- Identified up-regulation of the TGFb signalling pathway in BRAF mutant cancers and found that inhibition of this pathway can sensitise tumours to immunotherapy.
- Found in our colorectal cancer model that curcumin is an effective agent for preventing colorectal cancer, and that aspirin prevents colorectal cancer metastasis.

Drug Discovery Group

Group Leader: Peter Parsons

The mechanism of action of the anti-cancer drug EBC-46 (tigilanol tiglate) was further studied to more closely define its ability to ablate tumours by direct injection. This has led to studies of immunogenic factors released following treatment, and investigation of the potential for EBC-46 to effect tumour responses at sites remote from the treatment point (abscopal response), as well as possible synergism with checkpoint inhibitors. New leads were gained with the discovery of the induction and quantitation of cytokines that may help drive the hemorrhagic necrosis necessary for ablation of tumours.

In an ongoing collaboration with Cardiff University, the mechanism of action of a semi-synthetic analogue of EBC-46, WH-1, was studied in chronic wounds of an animal model. Accelerated closure was found to be associated with a number of factors including collagen synthesis and disruption of the biofilm resulting from infection with skin bacteria.

A subset of the compounds identified in the group's primary screens and by a UWS collaborator display the potential for treating neurodegenerative disease. The group has established a co-culture assay (neurons/astroglia/microglia) as a secondary screen for the testing of such compounds.

Highlights:

- Extended the structure activity relationships for chemical modifications of a new anti-cancer drug.
- Pursued leads relating to the mechanism of a new compound, showing efficacy in healing wounds in an animal model.
- Applied a co-culture assay (neurons/astroglia/microglia) as a robust secondary screen for neuroprotectants.

Epigenetics and Disease

Team Head: Jason Lee

Epigenetic modifications change the pattern of expression of genes. In some cases, this can give rise to cancers. The Epigenetics and Disease Group is using small molecule inhibitors to reverse some of these changes and block tumour progression. Having successfully identified combinations of epigenetic-modifying enzyme inhibitors that stop the growth of tumour cell lines – making them more sensitive to clinical treatments or reversing the resistance of some cancers to some therapies – the group is now testing these combinations in animal models. The epigenetic studies target breast, ovarian, head and neck, and lung cancers, as well as melanoma. The group's drug development program has reached a phase where a pharmaceutical company is undertaking further validation of the group's results.

Highlights:

- Received a patent for biomarkers for diagnosing conditions.
- Filed a patent on biomarkers for cancer therapy.

Functional Cancer Genomics

Group Leader: Stacey Edwards

Genome-wide association studies (GWAS) have identified 196 single nucleotide polymorphisms (SNPs) that are associated with an increased risk of breast cancer. However, the vast majority of risk SNPs fall in non-coding regions of the genome and therefore, the target genes are not known. Over the past year, The Functional Cancer Genomics Group has focused on identifying the target genes and underlying molecular mechanisms at GWAS-identified breast cancer risk loci. Identification of the key target genes and the pathways responsible for risk will increase the understanding of the biology underpinning cancer aetiology and provide key targets suitable for future drug repositioning or drug development.

Highlights:

- Reported several hundred breast cancer candidate target genes, including some known cancer driver genes, but also many molecular targets not previously implicated in breast cancer aetiology.
- Systematically annotated all long non-coding RNA (lncRNA) genes transcribed from 139 breast cancer GWAS signals and assessed their contribution to breast cancer risk.
- Identified more than 4000 lncRNA genes and showed their expression distinguishes normal breast tissue from tumours and different breast cancer subtypes.
- Identified loci at which gene expression could potentially explain breast cancer risk phenotypes and identified 13 genes as potential mediators of breast cancer risk.

Functional Genetics

Group Leader: Juliet French

Deputy Coordinator, Genetics and Computational Biology Department

The Functional Genetics Research Group's focus is understanding how genetic variants in non-coding regions of the genome influence cancer risk and progression. Until recently, the genetic basis of cancer had only been examined in coding regions, which account for less than two per cent of the human genome. However, non-coding regions of the DNA are littered with functional elements that are important in switching genes on and off. This laboratory focuses on how inherited variants identified through genome-wide association studies (GWAS), and cancer-specific mutations identified through whole-genome sequencing (WGS), can alter these non-coding elements to promote the development of cancer. The ultimate aim is to use genetics to pinpoint the key genes and pathways implicated in the development of cancer to identify new therapeutic opportunities.

Highlights:

- Identified hundreds of new breast cancer risk genes using genetic data collected from more than 200 000 breast cancer cases and controls.
- Determined new mechanisms by which inherited genetic variants can influence a woman's risk of developing breast cancer.
- Showed that reduced levels of a new breast cancer risk gene, NTN4, promote breast cancer growth and development.
- Developed high-throughput screening methods to identify new genes implicated in breast cancer development.

Gene Regulation and Translational Medicine

Group Leader: Sudha Rao

The Gene Regulation and Translational Medicine Group focuses on the interaction between epigenetics, the immune system and oncology, particularly in relation to metastatic cancers and potential implications for viral therapy and the immune response in the aged population. The group addresses the potential implications for epigenetic therapy in combination with immunotherapy and chemotherapy for a variety of metastatic cancers. The group is also in the process of developing sensitive liquid biopsies using newly identified biomarkers for patient responsiveness to immunotherapy in the context of the tumour microenvironment. Clinically based epigenetic platforms are being developed for drug screening and biomarker discovery in collaboration with global technology partners.

Highlights:

- Established an epigenetic-based biomarker and pre-clinical CTC drug screening platform for patient-derived liquid biopsy and tissue biopsies.
- Developed a new class of epigenetic-based drugs for the treatment of COVID-19.
- Profiled COVID-19 epigenetic-based dysfunctional immune signatures in patient liquid biopsies of cancer patients with COVID-19, in collaboration with RBWH and Gold Coast Hospital clinicians.

- Showed for the first time the identification of a novel 'epigenetic switch', which is a critical molecular footprint of dysfunctional T cells of metastatic cancer patients resistant to immunotherapy.
- Developed a novel companion liquid biopsy-based diagnostic and companion therapy based on the lab's discovery of a new class of chromatin-based checkpoint proteins. In collaboration with clinicians at RBWH, profiling and pre-clinical drug testing has been initiated.
- Developed a new class of epi-drugs targeting LSD1 enzyme that are dual-targeting inhibitors that can block CSCs (seeders of metastasis) and re-invigorate dysfunctional T cells, restoring killing ability.

Gordon and Jessie Gilmour Leukaemia Research Laboratory

Group Leader: Steven Lane
Head, Cancer Program

The Gordon and Jessie Gilmour Leukaemia Research Laboratory is researching myeloid blood cancers that include myeloid leukaemia (AML), myelodysplastic syndrome (MDS) and myeloproliferative neoplasms (MPN) as part its translational leukaemia research work. These are very aggressive and rapidly fatal blood cancers that are among the most common types of cancer affecting Australians.

The laboratory's efforts concentrate on understanding how leukaemia stem cells in AML and MPN are able to regenerate leukaemia (or cause relapse in patients), even after cytotoxic chemotherapy. Research has focused on generating robust models of leukaemia and dissecting the pathways of self-renewal in leukaemia stem cells and normal blood stem cells.

Highlights:

- Showed how interferon treats myeloproliferative neoplasm by targeting stem cell populations.
- Demonstrated how genes can transform normal blood-forming cells into leukaemia cells.
- Showed how changing the schedule of chemotherapy drugs can improve outcomes in leukaemia.

Gynaecological Cancers Group

Group Leader: Penny Webb
Coordinator, Population Health Department

The Gynaecological Cancers Group investigates all aspects of ovarian and endometrial cancer epidemiology from aetiology to diagnosis, patterns of care, quality of life and survival. Particular areas of focus include the role of environmental (non-genetic) factors and the interaction between genetic and environmental factors in the causation and prognosis of gynaecological cancer, and supporting women to live well after a diagnosis of gynaecological cancer. Much of this work is conducted within two national population-based case control studies, the Australian Ovarian Cancer Study (AOCS) and the Australian National Endometrial Cancer Study (ANECS), and three international consortia, the Ovarian Cancer Association Consortium (OCAC), Multidisciplinary Ovarian Cancer Outcomes Group (MOCOG) and Epidemiology of Endometrial Cancer Consortium (E2C2). The group has also completed five-year follow-up for the Ovarian Cancer Prognosis and Lifestyle (OPAL) study, which investigates whether modifiable aspects of lifestyle are associated with outcomes following a diagnosis of ovarian cancer.

In a complementary project, the group is using data-linkage to assess the relation between medication use and cancer risk and outcomes, and, in 2020, is setting up a new randomised control trial of the use of electronic patient-reported outcome measures in routine cancer care.

Highlights:

- Confirmed that women with ovarian cancer who smoke have worse survival than non-smokers and found that if current smokers stopped smoking when their cancer was diagnosed, their survival was comparable to that of women who did not smoke when their cancer was diagnosed.
- Collaborated in an international study conducted through the Ovarian Cancer Association Consortium, which found women who breastfed their children had a significantly lower risk of developing ovarian cancer than those who did not breastfeed their children.
- Found that although needs assessment for women with gynaecological cancers and their caregivers is part of current practice in Australia, the use of validated tools or a checklist to do this and generation of a formalised care plan are rare. Having sufficient time to discuss issues is both the most important enabling factor and the greatest barrier to successful supportive care provision.
- In collaboration with colleagues at The University of Queensland, found that hysterectomy without oophorectomy performed prior to 35 years, and hysterectomy with bilateral salpingo-oophorectomy performed prior to 45 years were associated with higher mortality, but these procedures were not associated with increased mortality when performed at older ages.

Health Economics

Team Head: Louisa Gordon

The Health Economics Group uses health services and economic data to evaluate new programs, technologies and medical services for their cost-effectiveness and value to society. The group has worked on several economic evaluations of important medical advances, including clinical genomics applications (for patients with myeloid blood cancers, epilepsy, and paediatric disorders). The group has also generated findings on the financial burden on people with neuroendocrine cancers and has completed cost-effectiveness analyses of primary prevention in skin cancers and regulation of sunbeds for Europe and the US with World Health Organization (WHO) collaborators.

Highlights:

- Published 20 papers on the health economic impacts of new health services in cancer populations.
- Generated important economic evidence from budget impact analyses for Queensland Health on implementing whole-genomic sequencing of pathogens to assist infection control teams to better manage bacterial outbreaks in hospitals.
- Disseminated an evaluation of the consequences of government regulation of commercial solaria to prevent skin cancers, which is being used to support European health policy decisions around reducing sunbed use.

Immunology in Cancer and Infection

Senior Scientist: Mark Smyth
Coordinator, Immunology Department

The Immunology in Cancer and Infection Group focuses on advancing understanding of the basic principles underlying an immune response to cancer (and metastases) and infection, as well as further understanding these processes at the molecular level, with particular emphasis on the role of the innate immune system.

The group continued to progress programs to drive two new immune checkpoint therapeutics for cancer treatment into the clinic. The first clinical trial of immunotherapy prior to cancer surgery has been initiated to translate the group's foundational pre-clinical studies. A molecule called CD155 has been investigated in melanoma where high levels of CD155 on the cancer at diagnosis predict resistance to the best available combination melanoma immunotherapy. The group has shown that a standard-of-care blood cancer therapy fails in some patients because of high levels of an immunosuppressive metabolite made in the tumours. The group has discovered an important new immune pathway in the development of bone cancer, and another immune pathway that improves immune cell infiltration into tumours, playing a part in helping discover and patent a new target for immunotherapy.

Highlights:

- Described the first mechanism of action of CD39 targeted antibodies in cancer.
- Discovered high tumour CD155 expression and high frequency of PD-1hi expressing CD8+ T cells in melanomas at diagnosis as predictors of failed response to combination immunotherapy.
- Described the role of extracellular adenosine in the resistance of lymphoma to CD20 targeted immunotherapy.
- Described a novel chemokine scavenger receptor that promotes tumour growth and metastasis.

Immunopathology

Team Head: Kate Gartlan

The Immunopathology Laboratory works on a range of studies aimed at improving outcomes for bone marrow transplant patients. The group's focus is primarily on graft-versus-host disease and graft rejection, which is researched and modelled pre-clinically. This year the group has also contributed to three Australian clinical trials looking at adjunct therapies for transplant recipients.

Highlight:

- Characterised the role of GM-CSF cytokine in driving graft-versus-host disease pathology early post-transplant.
- Described the development of a new small molecule inhibitor of perforin to prevent graft rejection during bone marrow transplantation.
- Completed two studies in collaboration with a commercial partner to investigate novel therapies in allotransplantation.
- Contributed to three Australian clinical trials investigating adjunct therapies for stem cell transplant recipients.

Research Achievements

Medical Genomics

Group Leader: Nic Waddell
Coordinator, Cancer Program

Genomics allows researchers to study a person's entire genome. The Medical Genomics Group analyses genomic data using computers to learn about disease and find better ways to treat or diagnose patients. The approaches taken include:

- classification of samples into significant subtypes
- identification of driver mutations
- identification of mutational processes that underlie tumour development.

Ultimately, the aim is to find alternative therapeutic targets. These are important steps towards 'personalised medicine', where the diagnosis, management and treatment of patients will be based on their individual genomic data.

Highlights:

- Played a key role in an international project that performed a pan-cancer analysis of cancer whole genomes.
- Contributed to the development of guidelines to assist researchers when undertaking genomic research in collaboration with Aboriginal and Torres Strait Islander Queenslanders
- Co-led a study into the whole-genome landscape of mucosal melanoma, which revealed diverse drivers and therapeutic targets.
- Co-led a study, which revealed clinically relevant insights into the aetiology of familial breast cancers.

Molecular Cancer Epidemiology

Group Leader: Amanda Spurdle

The Molecular Cancer Epidemiology Laboratory studies breast and ovarian cancer, endometrial cancer, colon cancer and prostate cancer, with a focus on identifying molecular signatures of normal and tumour tissues that can point to the genetic and environmental causes of these cancers. The laboratory covers a range of projects with the themes of cancer epidemiology and molecular pathology.

The group remains active in developing and applying methods to determine the clinical significance of multiple different cancer predisposition genes. The group has also initiated studies to look at whether different variant types might be associated with differences in disease presentation, such as earlier age at cancer onset.

The group has conducted experiments to help understand how common variation can be driving increased risk of endometrial cancer. This has the potential to identify new drug targets for endometrial cancer treatment.

Highlights:

- Developed a quantitative model to predict disease causality of missense variants in the TP53 gene.
- Showed that major hotspot missense variants in TP53 are associated with poorer prognostic features in hereditary cancer patients.
- Analysed splicing patterns of the PALB2 gene to provide recommendations for interpretation of PALB2 genetic variants for clinical reporting.
- Conducted experimental analysis of promoter-associated chromatin interactions to identify biologically relevant candidate target genes for endometrial cancer risk.

Oncogenomics

Senior Scientist: Nick Hayward

The Oncogenomics Laboratory identifies and characterises novel cancer genes and studies the way in which defects in these genes are associated with cancer predisposition or development, particularly with a focus on melanoma and lung cancer.

The group has conducted whole-genome sequencing studies of rare melanoma subtypes as well as melanocytic naevi and carried out functional assessment of some genes that drive melanocytic neoplasia. The group's studies have also included contributions towards genetics of melanoma predisposition, both at the level of the general population, as well as multi-case families.

Highlights:

- Conducted the largest whole-genome sequencing study of mucosal melanoma to date.
- Conducted the largest whole-genome sequencing study of uveal melanoma to date.
- Completed a whole-genome sequencing study of melanocytic naevi.
- Contributed to a meta-analysis of cutaneous melanoma genome-wide association studies.

Oncology and Cellular Immunology

Team Head: Tobias Bald

The Oncology and Cellular Immunology Laboratory is interested in how innate immune cells contribute to resistance to immunotherapies. It aims to understand the cellular and molecular mechanism to identify new targets. Genetically engineered and transplantable mouse models of cancer, state-of-the art flow cytometry, imaging and next-generation sequencing techniques are used. The group has contributed to the Institute's research in response to the COVID-19 global pandemic, in particular collaborating with Professor James Hudson and his Cardiac Bioengineering Group.

Highlights:

- Contributed to priority COVID-19 research.

Personalised Medicine

Team Head: Fares Al-Ejeh

During the year, Dr Fares Al-Ejeh left the Institute to take up the position of Senior Scientist and Group Leader of the Translational Cancer Research Group at Qatar Biomedical Research Institute.

Precision and Systems Biomedicine

Group Leader: Michelle Hill

The Precision and Systems Biomedicine Laboratory aims to improve modifiable health outcomes by developing better diagnostics and conducting integrative study of cell membrane disturbances that lead to diseases. The group focuses on early disease detection and non-drug prevention approaches to provide Australians with tools for actively maintaining their health.

The group has continued R&D towards early cancer detection tests and to unveil the mechanisms of obesity in cancer as a preventable risk factor. In addition, the group collaborates with other QIMR Berghofer researchers to enable discovery of disease-associated metabolites and lipid mediators in chronic, immunological and neurological diseases.

Highlights:

- Published a study demonstrating that a chronic high-fat diet is sufficient to induce early cancer of the oesophagus.
- Discovered promising blood biomarkers for early ovarian and pancreatic cancer.
- Published collaborative studies on biomarkers for screening of cholangiocarcinoma.
- Developed workflow and software for clinical lipidomics.

Sid Faithfull Brain Cancer Laboratory

Group Leader: Bryan Day

The Sid Faithfull Brain Cancer Laboratory studies the most common and aggressive forms of both adult brain cancer, glioblastoma (GBM), and the paediatric brain cancers, medulloblastoma and diffuse intrinsic pontine glioma (DIPG). The focus of their research is on understanding the molecular mechanisms that are responsible for the initiation and recurrence of brain cancers and to develop and test new and effective therapies to treat these aggressive diseases.

The group's current research projects include:

- defining Eph receptors as therapeutic targets in brain cancer
- defining new therapies for the treatment of brain cancer
- understanding intra-tumoural heterogeneity and inter-clonal cooperativity in brain cancer
- exploring the use of antibody drug conjugates (ADCs) and organoid cultures in the treatment of brain cancer
- brain cancer tissue and culture bank development
- developing effective strategies to target multiple GBM cell-states
- neo-adjuvant immuno-oncology clinical trial preparation.

Highlights:

- Defined the critical role of the dystroglycan receptor to glioma stem cell (GSC) function.
- Defined new dual roles of the drug salinomycin in glioblastoma and developed drug derivatives with 10-fold greater efficacy, which may lead to clinical testing of these new compounds.
- Revealed that unique glioblastoma cell-states are maintained in GBM 3D cultures. Total proteomics data for the Q-Cell resource was made publicly available to the scientific community.
- Revealed key mutations in the EphA2 gene, which led to hearing loss in patients with Pendred Syndrome.

Research Achievements

Signal Transduction

Group Leader: Kum Kum Khanna

Deputy Coordinator, Cell and Molecular Biology Department

The Signal Transduction Laboratory researches DNA damage response (DDR) pathways that are essential for the survival of all organisms. Defects in DDR are the cause of many diseases, including cancer. The group works to understand how its dysregulation leads to development and progression of cancer and to provide the basis for translation to the clinic.

In particular, the group focuses on triple negative breast cancers (TNBCs) and high-grade serous ovarian cancers (HGSOCs), which are both very difficult to treat. More than 90 per cent of TNBC and HGSOCs carry a mutation in the tumour suppressor gene p53. The group has identified new compounds to target p53-mut cancers, which are currently being tested in pre-clinical models. In addition to cancer, DDR is of great relevance to other diseases, and the group applies its expertise to understand DDR's role in maintenance of normal tissue homeostasis.

Highlights:

- Generated and characterised a Cep55 knockout mouse model that mimics human MARCH and MKS syndromes associated with Cep55 deficiency.
- Found that the drug Marizomib targets triple-negative breast cancer cells via dual inhibition of proteasome and oxphos pathways.
- Found that the FDA-approved drug Thioredoxin reductase inhibitor, combined with anti-PDL1 blockade, effectively killed TNBC tumours in mice and could be a promising avenue for clinical study.
- Provided a causal link for over-expressed Cep55 in cancer through generation of a Cep55 over-expression model that leads to a wide spectrum of cancers associated with metastasis.

Translational Cancer Immunotherapy

Team Head: Siok Tey

The Translational Cancer Immunotherapy Laboratory studies the interaction between the immune response and tumour control, with a particular emphasis on translating basic science into clinical therapies. The lab has particular expertise in bone marrow transplantation and cell and gene therapy. It is one of only a few centres in Australia that are conducting investigator-driven clinical trials using gene-modified T cells.

In the past 12 months, the group has developed new types of CAR T cells that may be more effective and can be tracked using standard medical imaging techniques, which will be especially useful in the treatment of solid cancers. The group has partnered with the Royal Brisbane and Women's Hospital to establish an in-house CAR T cell manufacturing platform, which will improve access, reduce costs, and enable translation of the group's CAR T cell research into first-in-human clinical trials.

Other research activities include the development of a new type of cell therapy for the treatment of graft-versus-host disease (GVHD), which is a life-threatening complication of bone marrow transplantation, and basic immunological research to better understand the factors that determine the success of immune cell therapy.

Highlights:

- Established an in-house CAR T cell manufacturing capacity in partnership with the Royal Brisbane and Women's Hospital.
- Developed a cost-effective method for gene analysis in patients who receive gene therapy product.
- Completed a small-scale manufacturing protocol for a new type of cell therapy (Regulatory T cell) for graft-versus-host disease.
- Developed a CAR T cell therapy targeting CD22 antigen on B cells.

Transplant Immunology

Team Head: Antiopi Varelias

The Transplant Immunology Group's research aims to improve the fundamental understanding of the pathophysiology of graft-versus-host disease (GVHD), one of the major complications that occurs after stem cell transplantation. A better understanding of the underlying factors that drive GVHD will lead to this high-risk procedure, which is used as a treatment for haematological malignancies, becoming safer.

Using unique and complex pre-clinical models, together with innovative technologies, the group's main projects have focused on defining the interactions between intestinal microbiota and host immune responses at mucosal sites after transplantation. Additionally, using clinical samples, the group identified a new regulatory T cell population was preferentially expanded in the peripheral blood of healthy donors after stem cell mobilisation. Overall, this research has identified new pathways for therapeutic intervention and provided important insights for new avenues of investigation.

Highlights:

- Demonstrated that continuous exposure to a disease-associated gut microbiome is critical to drive hyper-acute graft-versus-host disease.
- Contributed to the study that identified MHC Class II antigen presentation by intestinal epithelium initiated graft-versus-host disease and is influenced by the microbiota.
- Contributed to the study that used single-cell transcriptomic approaches to demonstrate that allo-reactive CD4+ T cells over time display divergent fates during gut graft-versus-host disease.
- Identified IL-17A-secreting CD8+ Mucosa-Associated Invariant T Cells were expanded in peripheral blood of healthy human donors after stem cell mobilisation.
- Contributed to a pilot clinical study characterising the effect of enteral and parenteral nutrition on the gastrointestinal microbiome post-allogeneic transplantation.

Tumour Immunology

Senior Scientist: Rajiv Khanna
Deputy Coordinator, Immunology Department

The Tumour Immunology Group's primary focus is to develop cell-based immunotherapies for infectious complications and human cancers. The group has developed breakthrough technologies to manufacture killer T cell therapies, which have been successfully used for the treatment of patients in Australia and overseas.

Highlights:

- Successfully completed a world-first clinical trial of adoptive immunotherapy for the treatment of cytomegalovirus infection in organ transplant patients.
- Successfully completed a clinical trial of killer T cell therapy as an adjuvant treatment for brain cancer patients.
- Successfully completed comprehensive profiling of human papilloma virus-specific killer T cell immunity in head and neck cancer patients in collaboration with the Princess Alexandra Hospital and the Royal Brisbane and Women's Hospital.
- Developed a novel off-the-shelf cellular immunotherapy, which can be used for the treatment of multiple Epstein-Barr virus-associated cancers.

Tumour Microenvironment

Group Leader: Andreas Moller

The Tumour Microenvironment Laboratory investigates and identifies specific mechanisms in which cancer cells and their derived vesicles, termed exosomes, communicate with the environment in order to promote disease progression. The group aims to understand the complexities behind the processes employed by cancer-derived exosomes, used to promote the spread of cancer cells to other organs. Based on this innovative information, the laboratory develops innovative cancer-specific blood-based biomarkers, which provides great promise for clinical translation, with an aim of early cancer detection in people.

Highlight:

- Identified novel mechanisms of cancer spread to distant organs, facilitated by exosomes.
- Designed a blood-based biomarker to implement as a screening tool for the detection of cancer.

INFECTIOUS DISEASES PROGRAM

ACTING HEAD: PROFESSOR CHRISTIAN ENGWERDA

The COVID-19 global pandemic has shown the devastating impact of infectious diseases. The human and economic cost of this single infectious disease is incalculable. Yet it is just one disease. Each year, infectious diseases claim millions of lives across the globe. They are caused by pathogenic organisms, including viruses like SARS-CoV-2, the virus that causes COVID-19, as well as many other viruses, bacteria and parasites. The research groups in QIMR Berghofer's Infectious Diseases Program are studying how these organisms cause illness, searching for better ways to diagnose and treat the diseases they cause, and developing vaccines and education strategies to prevent infections. These research groups have a strong focus on diseases that disproportionately affect developing countries and tropical regions.

Apart from COVID-19, QIMR Berghofer's Infectious Diseases Program is researching other viruses (including human immunodeficiency virus (HIV), cytomegalovirus, Epstein-Barr virus and mosquito-borne viruses), bacteria (including streptococci) and parasites (including those that cause malaria, schistosomiasis, leishmaniasis and scabies). The program has a strong focus on collaborations with clinicians and pharmaceutical companies.

QIMR Berghofer is a founding member of the Australian Infectious Diseases (AID) Research Centre, along with The University of Queensland. AID includes QIMR Berghofer infectious diseases experts and supports research into viral, bacterial and parasitic diseases, including several projects recently funded into COVID-19.

Researchers from QIMR Berghofer's Infectious Diseases Program have close links with scientists from across the globe, including with our near neighbours in Papua New Guinea, Indonesia and Malaysia, as well as in the United States, Europe, South America, Africa, China and India. Our researchers not only work on diseases endemic to these countries, but also train their next generation of scientists.

AMI Laboratory

Group Leader: Qin Cheng

The Army Malaria Institute (AMI) Laboratory was established to facilitate and enhance research collaborations between QIMR Berghofer and the Australian Defence Force Malaria and Infectious Disease Institute (ADF MIDI). The laboratory's research focuses on the investigation of the biological and molecular changes within the malaria parasite that make them difficult to detect and resistant to anti-malarial drugs, and the epidemiological surveillance of these parasites. Major activities include:

- surveillance of mutant malaria parasites that are undetectable by common malaria rapid diagnostic tests (RDTs) to inform diagnosis and case management policy
- surveillance of malaria prevalence and drug resistance to inform prevention and treatment policy
- characterisation of artemisinin-induced dormant parasites in humans to optimise malaria treatment regimen and efficacy.

Highlights:

- Investigated proportions of mutant parasites undetectable by malaria RDTs in imported malaria cases from travellers and refugees (from Sudan, South Sudan, Nigeria and Sierra Leone) entering Australia. Findings revealed high proportions of mutant parasites originating from these countries that can cause false negative RDT results.
- Investigated the prevalence of mutant parasites undetectable by malaria RDTs in *P. falciparum* isolates collected from cross-sectional surveys of malaria patients in 48 districts of eastern and western Uganda. Findings revealed significant prevalence of mutant parasites in Uganda, especially in the eastern region of the country.
- Conducted a baseline molecular investigation on artemisinin resistance in parasites collected from three Pacific countries (PNG, the Solomon Islands and Vanuatu) prior to the introduction of artemisinin drugs and reported limited sequence polymorphisms, but not artemisinin-resistant mutations in the parasite populations tested.
- Characterised artemisinin-induced dormant parasites in clinical trial participants and demonstrated for the first time the presence of artemisinin-induced dormant parasites and evidence for these dormant parasites causing recrudescence.

INFECTIOUS DISEASES PROGRAM

Cellular Immunology

Group Leader: Scott Burrows

The Cellular Immunology Group's focus was to investigate the killer T cells of the immune system, which control viral infection.

During the year the work of this group was incorporated into the Tumour Immunology Laboratory, headed by Professor Rajiv Khanna.

Clinical Tropical Medicine

Senior Scientist: James McCarthy

The Clinical Tropical Medicine Laboratory's focus was to improve human health by contributing to the control of human parasitic diseases, particularly malaria. The main research themes of the group were to:

- evaluate the safety and activity of candidate antimalarial drugs and vaccines using the Induced Blood Stage Malaria (IBSM) model
- investigate the biology of malaria parasites
- investigate other parasitic tropical diseases, specifically scabies and helminth infections.

During the year Professor James McCarthy left the Institute to take up an appointment with the Doherty Institute. The work of his group has been incorporated into the Clinical Malaria Laboratory, headed by Associate Professor Bridget Barber.

Clinical Malaria

Team Head: Bridget Barber

The Clinical Malaria Group (formerly the Clinical Tropical Medicine Group) utilises the induced blood stage malaria (IBSM) model to evaluate the safety and efficacy of novel antimalarial drugs and vaccines in healthy volunteers. In addition, the group utilises these studies to evaluate pathophysiological mechanisms of disease from *P. falciparum* and *P. vivax*.

With the emergence of the SARS-CoV-2 virus and COVID-19, the group is also preparing to conduct a randomised controlled trial of an existing anti-inflammatory drug, Tocilizumab, in patients with severe COVID-19.

Highlights:

- Testing a novel fast-acting antimalarial (ZRC-3278) within the IBSM model.
- Developing a new *P. falciparum* malaria cell bank (3D7-MBE-008) for use in malaria volunteer infection studies.
- Completion of a study evaluating microvascular pathophysiology in volunteers infected with *P. falciparum* and *P. vivax.*

HIV Molecular Virology

Group Leader: David Harrich

The HIV and Molecular Virology Group has investigated different viruses that infect humans, including human immunodeficiency virus (HIV), dengue virus, and SARS-CoV-2, which causes COVID-19. All viruses are parasites that cannot replicate without infecting a host. An aspect of the group's research involves investigating how viruses use the host for their replication. For example, the group discovered that HIV uses a host protein call eukaryotic translation elongation factor 1A (eEF1A) in order to successfully infect a cell. Interestingly, the viral enzyme that copies the viral genome during virus growth requires eEF1A. The group has used several different methods to block this event, which blocks HIV growth in cells. Dengue virus infects hundreds of millions of people each year; however, no effective vaccine or drugs are available. The group investigated a means to block dengue virus growth using what are called defective interfering particles, or DIPs. The group's research showed that DIPs are highly effective at blocking dengue virus in cells. The group is currently testing DIP therapy further to see if it is useful clinically. Strategies that the group developed to study Dengue and DIPs are now being applied to the coronavirus that causes COVID-19.

Highlights:

- Discovered a new class of HIV-1 inhibitor that works against drug-resistant HIV.
- Found that DIPs can inhibit replication of all dengue virus serotypes.
- Identified that Nullbasic, an anti-HIV-1 protein, potently inhibits HIV in vivo.
- Investigated new adjuvant approaches for an HIV functional cure.

Research Achievements

Human Malaria Immunology

Team Head: Michelle Boyle

The Human Malaria Immunology Group has focused on understanding the development of protective immunity to malaria. The group uses human clinical samples from volunteer infection studies and cohorts in malaria-exposed areas. Cutting-edge technologies are used to investigate how humans become immune to malaria. The group aims to develop new control strategies to prevent malaria disease.

Highlights:

- Identified plasma cells as disrupters of malaria immune development.
- Developed capacity to run single cell RNA sequencing experiments on human malaria clinical samples.

Immunology and Infection

Group Leader: Christian Engwerda

Acting Head, Infectious Diseases Program

The goal of the Immunology and Infection Laboratory is to understand the immunoregulatory mechanisms employed by CD4+ T cells during parasitic diseases so that they can be manipulated for clinical advantage. The group uses pre-clinical models of malaria and visceral leishmaniasis (VL), as well as clinical samples from patients with these diseases, to generate unique data sets to identify novel immune molecules that can be targeted to improve human health. The group has identified new molecules that can be targeted for therapeutic advantage during infection, cancer and autoimmunity. It has also investigated whether existing drugs can be repurposed to manipulate the activity of molecules the group has discovered, as well as generating and testing new therapeutics. The group will identify drugs to improve disease outcomes in a broad range of inflammatory diseases, as well as continue to test whether these drugs can be employed to improve vaccines and/or drug treatments in malaria or leishmaniasis. The group continues to collaborate with colleagues in disease-endemic countries – most notably with researchers based at Banaras Hindu University in Varanasi, India – and to train students and post-doctoral fellows from these groups.

Highlights:

- Identified the mechanism of action for a novel inflammatory molecule called NKG7 that can be modulated for clinical advantage in colitis, cancer, malaria and leishmaniasis.
- Repurposed a licensed drug called ruxolitinib that can be used to block type I interferon signalling in malaria and visceral leishmaniasis and improve anti-parasitic CD4+ T cell responses.
- Discovered how the DNA-sensing molecule STING regulates T cell functions in malaria.
- Developed strategies to manipulate the metabolism of T cells to prevent the development of tissue pathology without compromising anti-parasitic immunity in visceral leishmaniasis.

Inflammation Biology

Group Leader: Andreas Suhrbier

The Inflammation Biology Laboratory has continued efforts to understand how mosquito-borne viruses – primarily chikungunya, Ross River and Zika viruses – cause disease. The group has also helped to develop new interventions against these and related pathogens in collaboration with academic and commercial collaborators. This includes new vaccines based on a recombinant poxvirus vector system and insect-specific flavivirus technology.

The arrival of COVID-19 has been catastrophic and all-consuming for many. With the help of philanthropic funding, the group has repurposed a state-of-the-art BSL3/PC3 facility for SARS-CoV-2 work.

Highlights:

- Showed that a high-fibre diet is detrimental in a viral arthritis setting.
- Illustrated the utility of a new recombinant platform for flavivirus vaccines and diagnostics using chimeras of a new insect-specific flavivirus.
- Illustrated the utility of deep mutational scanning for probing the role of specific amino acids in determining viral tropism.
- Clearly illustrated the physiological role of macrophage SerpinB2.
- Obtained a SARS-CoV-2 virus isolate and started development of a mouse model to allow first-in-animal testing of new interventions.

Lung Bacteria

Group Leader: Scott Bell

The Lung Bacteria Group has continued to focus on understanding acquisition and transmission pathways for common infections in people with cystic fibrosis (CF). The work has demonstrated the influence of climate on the rising incidence of nontuberculous mycobacteria infection in Queensland. The group has also examined population genetic adaptation, including chronic Burkholdirira pseudomallei infection, and the genetic differences between environmental and patient-derived CF infections. A randomised controlled trial examining the impact of non-invasive ventilation on people with CF was completed. The group also studied models of care, comparing metropolitan and regional patient outcome and infection control practices in Australian and New Zealand CF centres.

During the year, Professor Scott Bell left the Institute to take up an appointment with the Translational Research Institute so the work of this group within the Institute has ceased.

Highlights:

- Co-led a Lancet commission on the future of cystic fibrosis care.
- Conducted a randomised controlled trial demonstrating improved survival in patients with cystic fibrosis receiving non-invasive ventilation compared with oxygen therapy.
- Demonstrated that patients with cystic fibrosis living in regional and rural Queensland have poorer access to transplantation and lower survival compared to those living in metropolitan regions.

Malaria Immunology

Group Leader: Ashraful Haque

During the year, Associate Professor Ashraful Haque left the Institute to take up an appointment with the University of Melbourne so the work of this group within the Institute has ceased.

Molecular Immunology

Group Leader: Michelle Wykes

The Molecular Immunology Group has focused on developing two new immunotherapies for cancer and one for autoimmunity. The group completed studies on the first immunotherapy, which was licensed in April 2020. Development of soluble PD-L2 therapy (sPD-L2) therapy for cancer was progressed. The group initiated testing of 'blocking' therapy for autoimmunity.

Highlights:

- Licensed a novel immunotherapy to a multinational pharmaceutical company.

Molecular Parasitology

Senior Scientist: Don McManus

The Molecular Parasitology Group continued to research parasitic worms that cause much global ill health and economic loss. The group is a world leader in molecular parasitology, vaccine and diagnostics development and in global health research. Its research is transformational and continues to shape policy and practice, leading to improved worm treatment and control regimens with wide-scale application. To achieve public health goals, the group continues to build and sustain a multidisciplinary team of national and international scientists with a global reputation for leading expertise and highly productive work in Asia. The group spearheads worm genomics and its extensive immuno-epidemiological research sheds new light on environmental and genetic factors that are pivotal in human predisposition to schistosome infection, providing a conceptual basis for future human schistosomiasis vaccine development. Having demonstrated the importance of buffalo reservoirs in the transmission and persistence of schistosomiasis in China, the group continued its efforts to develop a bovine-targeted vaccine. Further trialling of the 'Magic Glasses' intestinal worm intervention was successful, and, as a result, it will be rolled out in 3500 schools in the Calabarzon province of the Philippines, then nationally. This program has the potential to globally eliminate a spectrum of infectious diseases.

Research Achievements

Highlights:

- Achieved a Web of Science 'Highly cited paper designation' (top 1 per cent papers in clinical medicine) and a 'Hot paper' designation (top 0.1 per cent of papers in its field) for a Schistosomiasis publication in *Nature Reviews Disease Primers*.
- Invited to write 'Defeating schistosomiasis,' a *New England Journal of Medicine* editorial on schistosomiasis control.
- Professor McManus was awarded honorary membership of the British Society of Parasitology in recognition of his impact in the field of parasitology.

Mosquito Control

Group Leader: Greg Devine

The Mosquito Control Group has made significant progress in describing Ross River virus epidemiology and in developing new tools for its characterisation. The group continues to lead explorations of new insecticidal vector control paradigms of 'spatial repellents' for the control of Aedes-borne diseases (dengue, Zika, chikungunya) in the Americas. The group has made significant inroads into the exploitation of mosquito genomics for identifying vector control targets and population dynamics (dispersal parameters, invasion pathways, and population genetics).

The group continues to chair and host the Mosquito and Arbovirus Research Committee, which advises Queensland Health and local government on vector surveillance and control and guides their research.

The Mosquito Control Group works with local government to characterise the efficacy of their mosquito control efforts and has introduced new and rigorous surveillance methods to that end. The group also works with State and Federal Governments on the costs and public health risks of exotic mosquito invasions and on the ecology and epidemiology of the Ross River virus.

Another focus of the group is to understand the evolution and transmission of defective interfering particles (DIPs) in mosquitoes. DIPs are a potential new focus for dengue therapeutants. The group also undertakes collaborative and commercial research to test the safety (transmissibility) of new arbovirus vaccines.

Highlights:

- Led urban trials improving insecticide delivery in dengue-endemic areas, thereby securing a further $1 million in funding from the UK Department for International Development.
- Successfully led the Mosquito and Arbovirus Research Committee, working with local government and Queensland Health.
- Provided crucial evidence presented to the World Health Organization in Geneva that supported the Australian Government's request to overhaul biosecurity measures on aircraft.
- Contributed to understanding the epidemiology of Ross River virus.

Scabies

Group Leader: Katja Fischer

Scabies is a highly contagious skin disease causing sickness and death around the world, particularly in the tropics. Infection with parasitic scabies mites promotes opportunistic bacterial infections, which can lead to severe kidney and heart disease. Very little is known about the links between mites and associated pathogens, but the resultant illnesses cause a significant public health burden worldwide. Scabies is a neglected condition, and consequently there is no vaccine or diagnostic tools and limited treatment options. The biological science of scabies mites in relation to the complex diseases they cause is poorly understood, due to an absence of molecular information on mite infestation, bacterial co-infection and the interactions thereof.

The Scabies Research Laboratory aims to:

- identify key therapeutic and diagnostic targets and molecular mechanisms underlying scabies pathogenesis from its comprehensive and integrated scabies multi-'omics' databases
- lead the international scabies microbiome program to define the impact of scabies on the microbiome of healthy skin and examine the synergy between mites and bacteria
- develop multiple candidate scabicides which, with support from industry partners, will enter pre-clinical and clinical studies.

Highlights:

- Researched the scabies mite genome, proteome and transcriptome.
- Examined scabies-mite-associated microbiota.
- Undertook in-vitro and in-vivo testing of a novel drug candidate.

Translational and Human Immunology

Team Head: Corey Smith

The Translational and Human Immunology Group focuses on understanding how T cells control infection and cancer, particularly following T cell therapy. The group has demonstrated that attributes on T cells generated for cell therapy have an impact on the control of viral diseases in transplant patients, and has shown how changes in the T cell compartment are associated with control of disease following T cell therapy. The group has also recently shown that assessment of the T cell responses before patients have an organ transplant can predict the patient's risk of viral complications post-transplant. A study in patients who have been infected with SARs-Cov-2 has been initiated to understand their T cell responses.

Highlights:

- Demonstrated that T cell repertoire remodelling following post-transplant T cell therapy coincides with clinical response.
- Found a novel marker on T cells, which is linked to improved survival and potency in T cell therapy.
- Demonstrated that pre-transplant immunity can predict risk of viral infection post-transplant in lung transplant recipients.
- Initiated a study on T cell immunity in COVID-19.

Research Achievements

CHRONIC DISORDERS PROGRAM

HEAD: PROFESSOR GREG ANDERSON

QIMR Berghofer is researching a range of chronic disorders – complex conditions affecting the quality of life and health prospects of people around the world.

Demographic and lifestyle changes have led to a rise in the number of chronic disorders, and the Institute's research in this field is in response to the community's changing needs.

Chronic disorders researched at the Institute include asthma and other lung diseases, cardiovascular disease, cystic fibrosis, eye disease, haemochromatosis, chronic liver disease and inflammatory bowel disease. Other work is focused on nutrition and maternal and infant health. This wide-ranging research program includes identifying the genetic variation associated with the risk of some of these disorders, as well as understanding disease progression and the basic molecular events that underlie the conditions.

Cardiac Bioengineering

Group Leader: James Hudson

The Cardiac Bioengineering Laboratory (formerly known as the Organoid Research Laboratory) is focused on developing state-of-the art bioengineering approaches and using these for the discovery of new therapeutics for human disease.

The group is generating core knowledge and understanding of the development of the heart and processes driving disease. One of the models the group uses is 3D human cardiac organoids, which are beating human heart tissues in a dish. Through this approach, the group has discovered new therapeutic targets for heart failure.

In response to the COVID-19 pandemic, the group has begun research on the effect of the virus on the human heart.

Recently, Associate Professor James Hudson was named an inaugural Snow Fellow. This prestigious fellowship from the Snow Medical Research Foundation is valued at approximately $8 million over eight years and is designed to target emerging global research leaders who show the potential to drive, manage and influence the next generation of health and medical innovation.

Highlights:

- Developed human cardiac organoid technologies to more closely recapitulate the human heart.
- Discovered new therapeutic targets for heart failure.
- Discovered cytokines and factors that could drive cardiac pathology in COVID-19, and identified possible therapeutic targets.
- Collaborated with multiple national and international research groups to provide more insight into biological mechanisms that could be modulated as new therapeutics.

Gut Health

Group Leader: Graham Radford-Smith

The Gut Health Group's major research focus is the link between objective and quantitative clinical data and molecular data in subjects with gut disorders, including inflammatory bowel disease (Crohn's disease and ulcerative colitis) and colorectal cancer. The group focuses on understanding the underlying biology of gut health disorders and developing objective diagnostic support systems to aid in the timely diagnosis of disease. The group has developed novel systems to extract and analyse longitudinal laboratory data on the group's research subjects and seeks to determine the relationships between specific subgroups within these datasets and both host genome and transcriptome. To this end, the group has generated extensive genotype data on both its Crohn's disease and ulcerative colitis populations, together with a detailed transcriptomic profile of both the small and large bowel. This will improve the group's understanding of intestinal biology in the healthy and inflamed gut, and support the development of novel therapeutic approaches and diagnostic tools.

Hepatic Fibrosis

Group Leader: Grant Ramm

Coordinator, Cell and Molecular Biology Department

The Hepatic Fibrosis Group has investigated the mechanisms that cause inflammation and liver scarring (fibrosis) in chronic liver disease associated with the iron overload disorder, haemochromatosis, and the severe paediatric disease, cystic fibrosis. The group has identified how a specific process that induces scar tissue in liver cells is regulated via tiny fragments of regulatory genetic material called microRNAs. The group plans to develop potential therapies to target these microRNAs to treat liver scarring. Using this knowledge, the group has also

developed a blood test that can detect these microRNAs and identify people with severe liver scarring or liver cancer. Finally, the group has been working on validating a new non-invasive technology that uses an ultrasound-based detection system to measure liver stiffness (fibrosis) so that patients with liver disease and children with cystic fibrosis will not be subjected to invasive procedures, such as liver biopsy.

Highlights:

- Demonstrated that regression of fibrosis with venesection therapy in patients with HFE-haemochromatosis and severe hepatic fibrosis at diagnosis significantly reduces the risk of long-term liver cancer development.
- Using serum micro-RNA sequencing, identified a panel of microRNAs detectable in the circulation that can identify those subjects with hepatocellular carcinoma in patients with cirrhosis due to chronic hepatitis C infection.
- Published a clinical trial asessing the utility of a modified ultrasound-based technology called transient elastography to non-invasively assess liver stiffness due to hepatic fibrosis and thus stage the severity of liver disease in children with cystic-fibrosis-associated liver disease.
- Characterised the anti-fibrotic mechanism of microRNA-25-regulated fibrillar collagen synthesis in hepatic stellate cells associated with liver fibrosis in chronic liver disease, which acts by supressing notch receptor-signalling cross-talk with the profibrogenic TGF-beta receptor pathway.

Iron Metabolism

Group Leader: Greg Anderson
Head, Chronic Disorders Program

The Iron Metabolism Laboratory focuses on understanding the homeostasis of the essential trace element iron (and related metals), the natural history of iron-related disorders, potential therapies and mechanisms of liver disease. Current research activities include:

- elucidating the basic mechanisms of intestinal iron absorption and its regulation. Increased absorption characterises most iron-loading disorders, such as haemochromatosis and thalassaemia. Emphasis is being placed on the ferroportin/hephaestin iron transport complex and its modulation by the iron regulatory peptide, hepcidin.
- exploring novel mechanisms of regulating iron intake in pregnancy and early postnatal life. These are times of high iron demand and this work has significant implications for maternal health, as well as infant nutrition and complementary feeding.
- using novel nanoparticle technology to develop better methods for delivering iron-removing agents. Target tissues for iron removal include the liver, brain and heart, as well as tumours.
- studying the natural history of the iron-loading disorder, hereditary haemochromatosis, and exploring markers for monitoring the effectiveness of treatment.
- examining the mechanisms underlying hepatic encephalopathy, the neurophsychiatric syndrome that often accompanies severe liver disease. The group's work takes a broad approach, from basic molecular mechanisms to clinical applications.

Highlights:

- Showed that iron reduction therapy reduces the long-term risk of liver cancer in patients with haemochromatosis.
- Demonstrated that high dietary iron induces beta amyloid and tau in both wild-type mice and a mouse model of Alzheimer's disease.
- Demonstrated that lipid-modified gold nanoclusters regulate microglial polarisation and have the potential to alter neurogenesis.
- Showed that targeting indoleamine 2, 3-dioxygenase using a nanoparticulate pro-drug augments anti-tumour immunity of PD-L1 checkpoint blockade.

Lung Inflammation and Infection

Group Leader: David Reid

A major focus of the Lung Inflammation and Infection Laboratory is to investigate the interaction between bacterial pathogens and the host innate immune response within the lung. Chronic respiratory diseases characterised by infection are very prevalent in Australia and globally. The group studies the role of iron and other biologically active metal ions in promoting bacterial infection in the lungs of patients with the genetic disease cystic fibrosis (CF) and other suppurative lung diseases. To do this the group is studying bacterial and host immune system interactions in-vivo using a number of biochemical, molecular and cell imaging methods and also modelling these interactions using mouse models. The group is also developing molecules to interfere with bacterial iron acquisition with the goal of developing these as antibiotic adjuncts.

Research Achievements

Molecular Nutrition

Team Head: David Frazer

The Molecular Nutrition Laboratory studies the role of iron in health and disease. Over the past year, the group has focussed on the regulation of iron homeostasis during pregnancy and infancy and the effect of iron supplements at this time. This is a critical period of development and iron deficiency at this time can have life-long consequences. The group has been able to show that suckling infants use a unique molecular mechanism to absorb iron from their diet. This pathway involves the iron transporter ZIP8 and this discovery could have implications for how young children are supplemented. The group has also examined the mechanism by which iron is transferred across the placenta and delivered to the developing foetus, showing that the essential ferroxidase in the placenta is hephaestin, and not zyklopen as widely thought. In addition, the group has preliminary data indicating that oral iron supplements can have detrimental effects on placental iron transfer, which, if verified, could have important implications for iron supplementation during pregnancy.

Highlights:

- Discovered a role for the protein ZIP8 in the absorption of dietary iron during pregnancy.
- Demonstrated that hephaestin is the important ferroxidase mediating the transfer of iron across the placenta.
- Investigated the effect of the novel iron supplements IHAT and sucrosomial iron on the intestinal microbiome.
- Investigated the effect of oral iron supplements on iron transporters in the placenta and generated preliminary data indicating that high doses of iron may block iron transfer to the foetus.

Mucosal Immunology

Team Head: Severine Navarro

The Mucosal Immunology Groups seeks to develop innovative treatments for inflammation and chronic illnesses, like allergies, asthma and inflammatory bowel diseases, with a particular focus on children. The group works in collaboration with other academics, clinicians, paediatricians, dietitians, chemists, and computational biologists to translate its efforts to the clinic and bring its findings to the public. The group is interested in the mechanisms of immune dysregulation, the role of the microbiome and its interaction with the different immune compartments to understand disease onset.

The group has established collaborative partnerships with the Royal Brisbane and Women's Hospital, the Queensland Children's Hospital, QUT, The University of Queensland, Griffith University, as well as commercial partners.

Highlights:

- Developed a collaborative project to assess the impact of the Western diet during pregnancy on behaviour and anxiety in children.
- Initiated a collaborative project to understand how socioeconomic differences in diet quality, hygiene, sanitation and stress levels can negatively affect the microbiome.
- Associate Professor Severine Navarro was nominated Queensland Councillor of the Australia and New Zealand Society for Immunology and received a 2019 Young Tall Poppy Award.

Respiratory Immunology

Group Leader: Simon Phipps
Coordinator, Chronic Disorders Program

The Respiratory Immunology Group is focused on understanding the development origins of health and disease, with a focus on respiratory diseases such as asthma and chronic obstructive pulmonary disease. The group has developed various novel mouse models of viral bronchiolitis and later asthma, and through the use of genetic or pharmacological inhibition, together with adoptive cell transfer studies, has elucidated several important pathogenic processes and identified new targets for therapeutic intervention. Often these targets are validated using clinical samples and supported by cellular assays using healthy and diseased primary cells obtained from the lung or circulation.

Highlights:

- Identified that necroptosis, a newly identified pathway of cellular death, contributes to viral bronchiolitis in infancy.
- Unravelled the cellular and molecular mechanism by which poor maternal diet and microbial dysbiosis predisposes the offspring to infection, allergy, and asthma in early life.
- Identified a novel biomarker of allergy risk, leading to a provisional patent.

Statistical Genetics

Group Leader: Stuart MacGregor

Research in the Statistical Genetics Laboratory focuses on applying a range of statistical genetic methods to complex diseases. As well as identifying new inherited variants contributing to disease risk, the group has used genetic data to identify overlaps between various diseases and traits. In the specific case of a disease and a modifiable risk factor, the group has used genetic data in causal inference (work aiming to determine if a risk factor really causes that disease). For example, the group showed that being short-sighted in early life causes retinal detachment in later life. The group also showed that coffee consumption is unlikely to alter cancer risk.

The group's work has continued to have two major disease foci – eye disease (glaucoma, myopia and macular degeneration) and cancer (various skin cancers and oesophageal cancer). Specifically, the group has mapped a large number of genes influencing the risk of eye disease. This work in eye disease has now been extended to allow gene-based risk predictions for glaucoma. In the future this should allow more efficient screening for the disease, reducing the number of Australians who go blind as result of the disease.

Highlights:

- Published a study showing that is possible to use genetic data to predict glaucoma risk years before the disease occurs, enabling timely and effective treatments which will prevent blindness.
- Mapped over 60 genes for non-melanoma skin cancer and demonstrated a genetic link with autoimmune diseases.
- Mapped the first ever genes for gastroesophageal reflux disease, uncovering new drug targets for this very common condition.
- Showed that short sightedness (myopia) is not just a benign condition easily corrected with glasses – rather, it is very likely to cause retinal detachment in later life.

Statistics Unit

Group Leader: Gunter Hartel

The mission of the Statistics Unit is to support QIMR Berghofer researchers and clinicians with statistical advice, consulting, training, and collaboration. This service has been extended under contracts to support clinicians and researchers from Metro North Hospital and Health Service (MNHHS) and Mater Research (MR). The statistics unit comprises 10 full- and part-time statisticians, ranging from junior statisticians in training to PhD-qualified statisticians with decades of research and consulting experience. The unit provides one-on-one consultation with researchers to assist them with development of research proposals, funding applications and analysis plans, through to statistical analyses, report writing, co-authoring of publication and collaboration on research grants as CIs and AIs. Additionally, the unit offers an annual introductory statistics workshop to all staff, as well as more targeted training sessions for specific groups or audiences. The Statistics Unit also works with IT to provide statistical analysis software to Institute staff, as well as training and advice to help researchers to understand their data. The unit also serves as an incubator for new statisticians to develop their talents and gain experience in applying statistics to medical research.

Highlights:

- Authorship on 106 peer-reviewed publications.
- Worked on 115 projects with 94 scientists from 49 research groups within QIMR Berghofer.
- Continued to service contracts to MNHHS and MR.
- Introduced workshops on R statistics software, and advanced statistical modelling seminars, to complement the introductory statistics workshops.

MENTAL HEALTH PROGRAM

HEAD: Professor James Scott

QIMR Berghofer's Mental Health Program focuses on a range of conditions that arise from an interaction of genetic and complex environmental influences, such as Alzheimer's disease, dementia, depression, anxiety, bipolar disorder, schizophrenia, epilepsy and anorexia nervosa.

The Mental Health Program combines QIMR Berghofer's existing expertise in genetics and population health with new techniques in neurosciences. The teams have strengths in the clinical aspects of mood disorders, which are complemented by their ability to use genetic, imaging and computational approaches to understand these debilitating disorders. This approach promises earlier and more accurate diagnosis of mental disorders and personalised therapies based on improved knowledge of pathophysiology and empirically validated clinical and/or biological phenotypes.

The Institute's mental health researchers have comprehensively mapped the connections in the healthy elderly brain, laying the groundwork for new research into Alzheimer's disease and dementia, and are using cutting-edge imaging and information technology to develop a diagnostic test for major depressive disorders.

With the appointment of the new Head of the Mental Health Program, Professor James Scott, the Institute has expanded its research program into child and adolescent mental health.

Brain Modelling

Team Head: James Roberts

The Brain Modelling Group works on modelling and analysing brain structure and dynamics in health and disease. The group is following two major themes: developing new diagnostic methods for infant brain health and modelling large-scale brain activity across the lifespan.

This past year the group has been collating a large NHMRC-funded database of high-quality brain activity recordings from babies born prematurely. Using this valuable resource, the group has developed a new 'growth chart' for brain function, showing how the brain is developing, similar to how one tracks a baby's weight. On the modelling side, in another NHMRC-funded project the group is harnessing the rapid developments in neuroimaging technology and connectomics to develop new mathematical models of brain activity, in particular at the spatial scales most relevant to human health. The group has provided the first explanation for large-scale brain waves that change dynamically over time. The group has also developed the first model of infant sleep brain dynamics, and the first explanation for brain activity during recovery from hypoxia. The group's modelling expertise has been applied to uncover new neurobiological insights into attention deficit hyperactivity disorder (ADHD).

Highlights:

- Produced a landmark paper showing how brain waves emerge from the human connectome, published in *Nature Communications*.
- Collated the largest database of high-quality preterm brain activity recordings, a highly valuable research resource.
- Developed an accurate method for tracking 'brain age' in preterm infants – essentially a growth chart for brain function.
- Modelled infant sleep brain dynamics, finding a mechanism for whole-brain activity patterns that relates to neurodevelopmental outcomes in preterms.

Cellular and Molecular Neurodegeneration

Group Leader: Anthony White

The Cellular and Molecular Neurodegeneration Group researches the underlying basis of disease in Alzheimer's disease (dementia), motor neuron disease and other forms of neurodegeneration, with the aim of developing new therapeutic interventions or biomarkers. This research involves the development and application of a wide range of new human-cell-based models, including olfactory cells (nasal cells), induced pluripotent stem cell-derived neurons, brain endothelial cells, microglia (brain immune cells), and the growth of brain organoids (mini-brains). The group is investigating the role of inflammatory processes in these diseases and identifying how gene and environment interplay affects disease processes. The group is also developing new drug screening approaches involving analysis of drug-gene pathway interactions and testing these on clinically scalable platforms that will provide advances for personalised medicine approaches to brain disorders.

Highlights:

- Found that focused ultrasound has different effects on the Alzheimer's blood-brain barrier, with implications for therapeutic treatment.
- Discovered the Alzheimer's disease risk gene PILRB is up-regulated in Alzheimer's patient microglia with effects on microglia function.

- Established a unique 3D model of human microglia growth that is revealing disease-specific changes not apparent in 2D culture.
- Became the first to demonstrate the neurotoxic effects of bushfire smoke on human brain cells.

Child and Youth Mental Health

Senior Scientist: James Scott
Head: Mental Health Program

The Child and Youth Mental Health Research Group aims to improve the mental health and wellbeing of young Australians. The group has undertaken research to prevent bullying victimisation in schools and online. Bullying victimisation is one of the strongest risk factors for mental illness in adolescents, and bullying prevention could reduce the burden of mental illness in the community.

The group has also received funding from the National Health and Medical Research Council to study immunological causes of psychosis. The group has previously shown that approximately three per cent of people admitted to hospital with psychosis have an autoimmune illness, which responds to immunotherapy rather than antipsychotic medication. Accurately identifying those with immune-mediated psychosis will transform treatments for some people with serious mental illness.

Suicide is the leading cause of death in adolescents. The group has examined risk factors for suicide, identifying that adolescents who are experiencing symptoms of psychosis are at significantly increased risk of attempting suicide. Screening questionnaires are now being developed to better predict those young people most at risk.

Highlights:

- Completed a large clinical trial examining the efficacy and safety of sodium benzoate in people with early psychosis.
- Began a study validating testing criteria for immune-mediated psychosis.
- Commenced two large studies examining the prevalence, predictors and health outcomes of child maltreatment in Australia.
- Completed a large clinical trial examining the efficacy of social cognition and interaction training in people with psychosis.

Clinical Brain Networks

Team Head: Luca Cocchi

The Clinical Brain Networks Group has engaged in active collaborations with national and international leaders in network science, neuroimaging, computational modelling, psychology, and psychiatry. These multi-disciplinary collaborations have delivered broad and significant outcomes, hastened knowledge transfer and facilitated clinical translation.

The group has generated fundamental knowledge of brain networks and translated this information to advance the understanding of neural mechanisms supporting symptoms of complex brain disorders.

The group has recently established a new theoretical and methodological framework to combine neuroimaging, mathematical modelling and brain stimulation to study the neural mechanisms supporting communication between remote brain regions. This approach, and knowledge gathered from it, have been recognised as critical to bridging the gap between mathematical simulations and targeted clinical interventions for mental disorders.

Knowledge and methods gained from the group's research have optimised a FDA/TGA-approved brain stimulation treatment for depression and resulted in innovative clinical brain stimulation protocols. These protocols have been implemented in blinded, randomised clinical trials assessing the efficacy of neuroimaging-guided brain stimulation to normalise brain network activity and reduce symptoms of obsessive-compulsive disorder.

Highlights:

- Developed an understanding of the low-dimensional neural signature supporting human cognition.
- Identified a neural cause of the breakdown in the link between brain network anatomy and function in ADHD.
- Completed the first study to reveal functional brain networks supporting newborn sleep stages, discovering a neural mechanism for the different activity patterns predicting future behaviour.
- Conducted ongoing clinical trials assessing the value of targeted non-invasive brain stimulation to reduce symptoms of OCD.

Research Achievements

Genetic Epidemiology

Senior Scientist: Nick Martin

The Genetic Epidemiology Group seeks to identify the particular genes involved in causing complex diseases. The group performs longitudinal studies with twins on a wide range of complex traits of medical and behavioural interest. Research over recent years has moved to genome-wide association studies (GWAS) to locate genes influencing complex traits, including anxiety, alcoholism, dizygotic (non-identical) twinning, anorexia, depression and other psychiatric disorders.

From combined QIMR Berghofer studies, the group has identified and genotyped 3250 mothers of spontaneous non-identical twins. Combining these with about 10 000 controls from the Institute's QSkin study, the group has carried out GWAS and identified three new genes for dizygotic twinning. Combining these in a meta analysis with other groups internationally, at least 14 dizygotic twinning genes have now been identified. These are leading to profound new insights into the control of female fertility, which may suggest new strategies for treatment of infertility.

Using a public relations campaign, plus access to Pharmaceutical Benefit Scheme (PBS) records, the group recruited more than 20 000 people with depression and genotyped more than 16 000 of them to better understand genetic risk factors for depression and for antidepressant response. The first phase analysis of demographics etc. has been completed and second phase of GWAS has begun.

The group has now brought to a close the Brisbane Longitudinal Twin Study of melanoma risk factors, which, over 25 years (1992–2016), collected data on nearly 2500 pairs of adolescent twins and their families from southeast Queensland. GWAS of moliness and pigmentation traits has produced new insights into the causation of melanoma. Much analysis remains to be done.

Highlights:

- Completed data collection for the Australian Genetics of Depression Study with more than 20 000 cases phenotyped and more than 16 000 genotyped.
- Identified three new genes for dizygotic twinning. Combining these findings in a meta analysis with other groups internationally, at least 14 dizygotic twinning genes have now been identified.

Neurogenomics

Team Head: Guy Barry

The Neurogenomics Group investigated genome-wide transcriptomic data to provide insights into how the human brain functions.

During the year Dr Guy Barry left the Institute so the work of this group has ceased.

Psychiatric Genetics

Group Leader: Sarah Medland
Coordinator, Mental Health Program

The Psychiatric Genetics Group uses statistical genetics and genetic epidemiological techniques to investigate the aetiology of mental health conditions and traits that impact upon mental health. The group's current projects focus on examining the genetic architecture of human brain structure, ADHD, bipolar, depression, schizophrenia, anorexia, borderline personality disorder and pregnancy-related conditions that impact on mental health. The group also works on developing models and strategies to translate genetic findings in the mental health domain, as translation within this field is expected to be different to other fields of medicine.

Highlights:

- Recruited, phenotyped and genotyped 5000 Australians with bipolar disorder to a large genetics study.
- Designed and tested a screening tool to identify women experiencing symptoms of post-traumatic stress disorder relating to pregnancy and childbirth.
- Collected information on the impact of COVID-19 on the mental health and wellbeing of over 4000 Australians.

Systems Neuroscience

Senior Scientist: Michael Breakspear

The Systems Neuroscience Group uses brain imaging and computer modelling to understand a range of important diseases of the human brain. In 2019, the head of the group, Professor Michael Breakspear, transferred to the University of Newcastle but remains an honorary Senior Scientist at QIMR Berghofer. The work of the group has been transferred to other laboratories within the Institute's Mental Health Program.

Translational Neurogenomics

Group Leader: Eske Derks

The Translational Neurogenomics Group investigates the role of genetic risk factors in neuropsychiatric conditions to better understand the functional molecular consequences underlying statistical associations and to achieve translation of genetic findings to the clinic. The group has identified interactions across genes and identified new gene mechanisms linked to major depressive disorder, implicating the role of the complement C4A gene. The group has investigated genetic overlap between different symptoms of depression and showed that the nine different symptoms of depression are influenced by partly unique genetic risk factors. In addition, the group has identified new genetic risk factors for six substance use traits and has improved the functional interpretation of genetic risk loci. Pharmaceutical compounds that target genetic risk factors of Alzheimer's Disease and that are potentially effective for the prevention or treatment of this neuropsychiatric disorder have been identified.

Highlights:

- Identified pharmaceutical compounds that target genetic risk factors for Alzheimer's disease.
- Identified the complement C4A gene as a causal genetic risk factor for major depressive disorder.
- Identified genetic overlap between nine different symptoms of depression and improved the understanding of the genetic and clinical heterogeneity of depressive symptoms.
- Identified new genetic risk factors for substance use disorders.

Financial Review

Total comprehensive income in 2019–2020 was a deficit of $9.6 million. The result was impacted by the COVID-19 pandemic most significantly through negative investment returns. Income from the Federal Government's JobKeeper program provided some offset to this. While donation income has increased this financial year, competitive grant funding and commercial activities have decreased.

The Council's financial structure is mainly based on the management of operating, commercial and grant funds. Funding from competitive grants and commercial contracts spent on research in the 2019–2020 financial year was $45.6 million (2018–2019: $45.4 million), representing 42 per cent (2018–2019: 38 per cent) of total income from continuing operations (excluding the sale of the subsidiary in 2018–2019). A portion of the Council's operating funding is provided by a grant from Queensland Health of $18.9 million (2018–2019: $18.9 million).

The Council's total funding resources, including amounts under management at 30 June 2020, totalled $180.7 million (2018–2019: $175.1 million). The increase in funds held during the year was mainly due to a higher balance of unspent grant funds following a slowing of research activities during the pandemic.

The Council of the Queensland Institute of Medical Research Financial Statements 2019–2020

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Statement of comprehensive income
For the year ended 30 June 2020

OPERATING RESULT	Notes	2020 $'000	2019 $'000
Income from continuing operations			
Grants and other contributions	3	76,296	75,228
User charges and fees	4	28,916	30,165
Other revenue	5	14,866	12,537
Interest		482	649
Total Revenue		120,560	118,579
(Loss)/gains on disposal/revaluation of assets	6	(12,361)	13,899
Total income from continuing operations		**108,199**	**132,478**
Expenses from continuing operations			
Employee expenses	7	66,373	63,999
Supplies and services	8	31,161	33,362
Depreciation and amortisation	17,18	12,185	12,012
Other expenses	9	7,222	8,529
Finance costs		825	755
Total expenses from continuing operations		**117,766**	**118,657**
Operating result from continuing operations		**(9,567)**	**13,821**
Other comprehensive income			
Items that will not be reclassified subsequently to operating result			
Increase in asset revaluation surplus	22	-	-
Total other comprehensive income		**-**	**-**
Total comprehensive (loss)/income		**(9,567)**	**13,821**

The accompanying notes form part of these financial statements

Statement of financial position
As at 30 June 2020

	Notes	2020 $'000	2019 $'000
Current assets			
Cash and cash equivalents	10	19,256	15,748
Receivables	11	7,916	8,339
Other financial assets	13	17,714	18,445
Inventories	12	693	258
Other current assets	14	7,181	1,220
		52,760	**44,010**
Assets classified as held for sale	16	-	525
Total current assets		**52,760**	**44,535**
Non-current assets			
Other financial assets	13	143,771	140,885
Property, plant and equipment	18	268,533	277,266
Intangible assets	17	209	280
Controlled and jointly controlled entities	33	500	275
Other non-current assets	14	1,841	5,949
Total non-current assets		**414,854**	**424,655**
Total assets		**467,614**	**469,190**
Current liabilities			
Payables	19	6,215	9,180
Accrued employee benefits	20	6,359	5,847
Contract liabilities	21	44,096	32,921
Total current liabilities		**56,670**	**47,948**
Total liabilities		**56,670**	**47,948**
Net assets		**410,944**	**421,242**
Equity			
Accumulated surplus		338,445	348,743
Asset revaluation surplus	22	72,499	72,499
Total equity		**410,944**	**421,242**

The accompanying notes form part of these financial statements.

The Council of The Queensland Institute of Medical Research

Statement of changes in equity
For the year ended 30 June 2020

	Accumulated surplus	Asset revaluation surplus (note 22)	Total
	$'000	$'000	$'000
Balance as at 1 July 2019	**348,743**	72,499	**421,242**
Net effect of changes in accounting policies (Note 35)	(731)	-	(731)
Operating result from continuing operations	(9,567)	-	(9,567)
Balance as at 30 June 2020	**338,445**	**72,499**	**410,944**
Balance as at 1 July 2018	334,922	72,499	407,421
Operating result from continuing operations	13,821	-	13,821
Balance as at 30 June 2019	**348,743**	**72,499**	**421,242**

The accompanying notes form part of these financial statements.

The Council of The Queensland Institute of Medical Research

Statement of cash flows
For the year ended 30 June 2020

	Notes	2020 $'000	2019 $'000
Cash flows from operating activities			
Inflows:			
Grants and other contributions		82,596	73,667
User charges and fees		31,001	32,370
Other income		4,599	1,747
Interest income		511	649
GST input tax credits from ATO		3,135	3,516
GST collected from customers		2,044	1,934
Outflows:			
Employee expenses		(66,850)	(63,847)
Supplies and services		(36,355)	(39,380)
Finance costs		(825)	(755)
GST paid to suppliers		(3,069)	(3,267)
GST remitted to ATO		(2,021)	(1,987)
Other		(1,536)	(1,740)
Net cash generated by operating activities	CF1	**13,230**	**2,907**
Cash flows from investing activities			
Inflows:			
Redemptions of other financial assets		44	3,100
Net proceeds from sale of subsidiary		-	7,445
Sales of property, plant and equipment		549	26
Outflows:			
Investments in other financial assets		(5,865)	(10,278)
Acquisition of property, plant and equipment		(3,975)	(4,806)
Investment in related entity		(225)	(275)
Net cash used in investing activities		**(9,472)**	**(4,788)**
Cash flows from financing activities			
Inflows:			
Loans and advances redeemed from related entity		-	1,810
Outflows:			
Loans and advances made to related entity		(250)	(1,810)
Net cash used in financing activities		**(250)**	**-**
Net increase/(decrease) in cash and cash equivalents		3,508	(1,881)
Cash and cash equivalents at beginning of financial year		15,748	17,629
Cash and cash equivalents at end of financial year	10	**19,256**	**15,748**

The accompanying notes form part of these financial statements.

Notes to the statement of cash flows
For the year ended 30 June 2020

	2020 $'000	2019 $'000
CF1 Reconciliation of operating result to net cash from operating activities		
Operating (deficit)/surplus	(9,567)	13,821
Depreciation and amortisation expense	12,185	12,012
Investment distributions in other financial assets	(9,654)	(11,228)
Gain/(loss) on sale of property, plant and equipment	(41)	91
Net gain on sale of subsidiary	(79)	(12,441)
Net (loss)/gain on market value of other financial assets	12,481	(1,549)
Donation of asset held for sale	-	(525)
Change in assets and liabilities:		
(Increase)/decrease in operating receivables	(178)	387
(Increase)/decrease in inventories	(435)	(2)
(Increase)/decrease in prepayments	(122)	(575)
Increase/(decrease) in operating payables	(2,317)	(1,518)
Increase/(decrease) in accrued employee benefits	512	388
Increase/(decrease) in contract liabilities	10,445	4,046
Net cash generated by operating activities	**13,230**	**2,907**

The accompanying notes form part of these financial statements.

The Council of The Queensland Institute of Medical Research

Notes to the financial statements
For the year ended 30 June 2020

The Council of The Queensland Institute of Medical Research

Notes to the financial statements
For the year ended 30 June 2020

Notes to the financial statements
For the year ended 30 June 2020

ABOUT COUNCIL AND THIS FINANCIAL REPORT

1. Basis of financial statement preparation

General information

The Council of the Queensland Institute of Medical Research is a Queensland statutory body established under the *Queensland Institute of Medical Research Act 1945* and is controlled by the State of Queensland which is the ultimate parent. The Council trades as QIMR Berghofer Medical Research Institute.

The head office and principal place of business of the statutory body is:
300 Herston Road
Herston QLD 4006

For information in relation to the Council's financial statements please call +61 7 3362 0222, email enquiries@qimrberghofer.edu.au or visit the internet site www.qimrberghofer.edu.au.

Compliance with prescribed requirements

The Council has prepared these financial statements in compliance with the requirements of the *Financial and Performance Management Standard 2019 section 38*, *Financial Accountability Act 2009*, and the *Australian Charities and Not-for-profits Commission Act 2012*.

These financial statements are general purpose financial statements and have been prepared on an accrual basis, except for the statement of cash flows which is prepared on a cash basis in accordance with Australian Accounting Standards and Interpretations. In addition, the financial statements comply with Queensland Treasury's Minimum Reporting Requirements and other authoritative pronouncements including the Australian Charities and Not-for-profits Commission (ACNC).

With respect to compliance with Australian Accounting Standards and Interpretations, the Council has applied those requirements applicable to not-for-profit entities as the Council is a not-for-profit statutory body.

New accounting standards applied for the first time in these financial statements are outlined in note 35.

The reporting entity

The financial statements include the value of all revenues, expenses, assets, liabilities and equity of the Council and the entities it controls where these entities are material. Any controlled entities that are not considered as material are not consolidated with the Council's financial statements and the amount of the investment is recorded at cost.

Presentation details

Currency and rounding

Amounts included in the financial statements are in Australian dollars and have been rounded to the nearest $1,000 or, where that amount is $500 or less, to zero, unless disclosure of the full amount is specifically required.

Notes to the financial statements
For the year ended 30 June 2020

1. Basis of financial statement preparation (cont'd)

Comparatives

Comparative information reflects the audited 2018-19 financial statements and has been restated where necessary to be consistent with disclosures in the current reporting period.

Current/non-current classification

Assets and liabilities are classified as either 'current' or 'non-current' in the statement of financial position and associated notes.

Assets are classified as 'current' where their carrying amount is expected to be realised within 12 months after the reporting date. Liabilities are classified as 'current' when they are due to be settled within 12 months after the reporting date, or the Council does not have an unconditional right to defer settlement to beyond 12 months after the reporting date.

All other assets and liabilities are classified as non-current.

Basis of measurement

Historical cost is used as the measurement basis in this financial report except for the following:
- Buildings, which are measured at fair value; and
- Inventories, which are measured at the lower of cost and net realisable value.

Historical cost

Under historical cost, assets are recorded at the amount of cash or cash equivalents paid or the fair value of the consideration given to acquire assets at the time of their acquisition**.** Liabilities are recorded at the amount of proceeds received in exchange for the obligation or at the amounts of cash or cash equivalents expected to be paid to satisfy the liability in the normal course of business.

Fair value

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly derived from observable inputs or estimated using another valuation technique. Fair value is determined using the following approaches:

- The market approach uses prices and other relevant information generated by market transactions involving identical or comparable (i.e. similar) assets, liabilities or a group of assets and liabilities, such as a business.
- The cost approach reflects the amount that would be required currently to replace the service capacity of an asset. This method includes the current replacement cost methodology.

Where fair value is used, the fair value approach is disclosed.

Notes to the financial statements
For the year ended 30 June 2020

1. Basis of financial statement preparation (cont'd)

Net realisable value

Net realisable value represents the amount of cash or cash equivalents that could currently be obtained by selling an asset in an orderly disposal.

Accounting estimates and judgements

The preparation of financial statements necessarily requires the determination and use of certain critical accounting estimates, assumptions, and management judgements that have the potential to cause a material adjustment to the carrying amounts of assets and liabilities within the next financial year. Such estimates, judgements and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised and in future periods as relevant.

Judgement has been exercised in considering the impacts that the COVID-19 pandemic has had, or may have, on the Council based on known information. This consideration extends to the recognition of receivables and payables, valuation of assets and impacts on investments. Other than as addressed in specific notes, there does not currently appear to be either any significant impact upon the financial statements or any significant uncertainties with respect to events or conditions which may impact the Council unfavourably as at reporting date or subsequently as a result of the COVID-19 pandemic.

Estimates and assumptions that have a potential significant effect are outlined in the following financial statement notes:

- Useful lives of property, plant and equipment – note 18
- Valuation of property, plant and equipment – note 18

Authorisation of financial statements for issue

The financial statements are authorised for issue by the Chair of Council, Director & Chief Executive Officer and Secretary at the date of signing the Management Certificate.

2. Objective and principal activities of the Council

The objective of the Council is to control and manage the operations of the Queensland Institute of Medical Research in accordance with the *Queensland Institute of Medical Research Act 1945*. The Council has been established to conduct research into all branches of medical science. It operates predominantly in one geographical area, being Queensland, Australia, although it has research collaborations across Australia and overseas.

The majority of the Council's funding is generated from competitive, peer-reviewed research grants, commercial and other earned revenue. The Council also receives an annual operational grant from the Department of Health, Queensland (Queensland Health). Further funding is generated from donations, fundraising and investment activities performed under the guidance of the Council. Refer note 28.

Notes to the financial statements
For the year ended 30 June 2020

NOTES ABOUT OUR FINANCIAL PERFORMANCE

	2020 $'000	2019 $'000
3. Grants and other contributions		
Revenue from contracts with customers		
Grants - National Health & Medical Research Council (NHMRC)	27,645	28,063
Grants - Cancer Council Queensland	664	471
Grants - Brisbane Diamantina Health Partners	602	-
Grants - Queensland Genomics Health Alliance	578	545
Grants - Melanoma Research Alliance	573	287
Grants - Children's Hospital Foundation	483	30
Grants - National Breast Cancer Foundation	474	440
Grants - US Department of Defence	468	723
Grants - Australian Research Council	362	410
Grants - Bill and Melinda Gates Foundation	335	-
Grants - Medical Research Future Fund	72	-
Grants - Other	4,448	4,729
Other grants and contributions		
Grants - Queensland Health	18,926	18,864
Grants - NHMRC infrastructure support funding (IRIISS)	4,776	5,231
Grants - Queensland Government^	716	828
Grants - Therapeutic Innovation Australia Limited	425	-
Grants - Perpetual Trustees Australia Limited	-	368
Grants - Other	475	1,173
Capital Grants - Australian Cancer Research Foundation (ACRF)	-	1,750
Capital Grants - Queensland Government	140	1,120
Donations and bequests	14,134	10,196
Total	**76,296**	**75,228**

^ Department of Innovation and Tourism Industry Development (DITID), Department of Science, Information Technology and Innovation (DSITI) and Department of Environment and Science (DES).

Accounting policy - Grants and other contributions

Grants, contributions and donations are non-reciprocal transactions where Council does not directly give approximately equal value to the grantor.

Where the grant agreement is enforceable and contains sufficiently specific performance obligations for the Council to transfer goods or services to a third party on the grantor's behalf, the transaction is accounted for under AASB 15 *Revenue from Contracts with Customers.* In this case, revenue is initially deferred (as a contract liability) and recognised as or when the performance obligations are satisfied. Otherwise, the grant is accounted for under AASB 1058 *Income of Not-for-Profit Entities*, whereby revenue is recognised upon receipt of the grant funding.

3. Grants and other contributions (cont'd)

Accounting policy - Services received free of charge or for nominal value
Contributions of services are recognised only if the services would have been purchased if they had not been donated and their fair value can be measured reliably. Where this is the case, an equal amount is recognised as revenue and an expense.

Disclosure – Revenue from contracts with customers
Grants - research grants, including NHMRC
The Council's obligation under competitive research grant funding agreements is to perform research activities in accordance with the grant proposal. Funding is received over the life of the grant, and revenue is recognised over time as the research activities are performed as measured by expenditure of the grant funds. The contract liability recognised at reporting date equates to the unspent balance.

Disclosure – Other grants and contributions
Grants - Queensland Health operating grant
The Council receives funding from the State Government via Queensland Health to contribute to overhead costs for the Institute and to support the Institute in achieving its strategic objectives. Funding is received in two instalments each year, the first in July and the second on passing of the Budget Appropriation Bill. Revenue is recognised as and when Council has a contractual right to receive the funds as there are no sufficiently specific performance obligations.

Grants - IRIISS infrastructure support grant
NHMRC provides annual funding to contribute to the infrastructure and overhead costs of funded research. Funding is received as a one-off payment annually. The revenue is recognised on receipt as there are no specific performance obligations.

Capital grants
The funding for capital grants was received as a reimbursement of costs previously expended. As such, the revenue is recognised on receipt.

Donations and bequests
Council receives donations and bequests that are either given for a specific purpose (where the researcher and disease is specified) or un-tied. In both cases, the revenue is recognised immediately on receipt as there is no enforceable contract. Refer to note 35 for the impact of adoption of AASB 1058 on special-purpose donations.

	2020 $'000	2019 $'000
4. User charges and fees		
Revenue from contracts with customers		
Commercial and contract research	23,938	26,258
Rent and licence fees	4,604	3,538
User charges and fees		
Sundry tenants recoveries	374	369
Total	**28,916**	**30,165**

Accounting policy - Revenue from contracts with customers
Revenue from contracts with customers is recognised when the Council transfers control over a good or service provided to the customer.

4. User charges and fees (cont'd)

Contract research
Research services are provided for specific time periods under each contract, and revenue is matched to those periods. Progress payments are generally invoiced in advance. Refer to note 35 for the impact of adoption of AASB 15 on contract research revenue.

Commercialisation
Where a contract provides for a commercialisation payment on achievement of certain milestones, such as first dose in a clinical trial resulting from Council Intellectual Property (IP), revenue is recognised when Council has a contractual right to receive funds.

Contract manufacturing
Council undertakes commercial manufacturing services at the Q-Gen Cell Therapeutics facility. Contracts are structured with a fixed charge, invoiced in advance, and a variable component invoiced according to contract terms. Revenue for the fixed charge is recognised in the period to which it relates.

Licence of premises fees
Council licences part of their buildings to tenants. Licence of premises fees are recognised on a periodic straight line basis over the full term of each agreement.

A tenant paid an upfront fee as part of their licence agreement; this fee is recognised over the 10 year life of the agreement. Refer to note 35 for the impact of adoption of AASB 15 on this upfront payment.

Refer to notes 14 and 21 for disclosures about contract assets and liabilities outstanding at year end.

	2020 $'000	2019 $'000
5. Other revenue		
Investment distributions	9,654	11,228
JobKeeper subsidy	4,845	-
Reimbursements	207	486
Other	160	823
Total	**14,866**	**12,537**

Accounting policy - Reimbursements
Reimbursement from third parties for commercial and/or collaboration arrangements are recognised as revenue when the revenue has been earned and can be measured reliably with a sufficient degree of certainty. This involves either invoicing for related goods/services and/or the recognition of accrued revenue.

Accounting policy - JobKeeper subsidy
The JobKeeper payment scheme is a temporary subsidy received by Council as a result of the impact of coronavirus (COVID-19). Revenue is recognised on an accrual basis with payment being made in arrears from payroll fortnights commencing after 30 March 2020.

Notes to the financial statements
For the year ended 30 June 2020

5. Other revenue (cont'd)

Accounting policy - Interest, dividends and distributions
Revenue for interest on cash and cash equivalents is recognised on an accrual basis. Revenue for dividends and distributions from managed funds classified as financial instruments held at fair value through profit or loss are recognised when the Council's right to receive payment is established.

Accounting policy - Imputation credits
As an endorsed income tax exempt charity, imputation credits attached to franked dividends received by the Council are refundable and may be claimed retrospectively after the end of the financial year (refer note 36). Imputation credits are brought to account when the right to receive the credits is established.

	2020 $'000	2019 $'000
6. Gains/(losses) on sale/revaluation of assets		
Net gain on sale of subsidiary (refer note 33(a))	79	12,441
Net gain/(loss) on disposal of property, plant and equipment	41	(91)
Net (loss)/gain on market value of other financial assets	(12,481)	1,549
Total	**(12,361)**	**13,899**

The Council holds financial assets in managed funds. Refer notes 13 and 24.

Accounting Policy – Gains/(losses) on revaluation of other financial assets
Gains/(losses) arising from changes in the fair value of managed funds are included in the operating result for the period in which they arise.

7. Employee expenses		
Employee benefits		
Wages and salaries	51,380	49,178
Employer superannuation contributions	8,010	7,862
Annual leave expense	5,098	5,163
Long service leave levy	1,388	1,172
Other employee benefits	321	426
	66,197	63,801
Employee-related expenses		
Workers' compensation premium	69	93
Fringe benefits tax expense	12	16
Other employee related expenses	95	89
	176	198
Total	**66,373**	**63,999**
The number of employees including full-time, part-time and casual employees measured on a full-time equivalent basis is:	562	571

7. Employee expenses (cont'd)

Employee benefits
Wages and salaries, employer superannuation contributions, annual leave expense and long service leave levies are regarded as employee benefits.

Accounting policy – Wages & salaries
Accruals for wages, salaries and annual leave expense due but unpaid at reporting dates are recognised at current salary rates. Annual leave entitlements are recognised at their undiscounted values and are classified as current liabilities as Council does not have the unconditional right to defer settlement for the next 12 months.

Accounting policy – Sick leave
As sick leave is non-vesting, an expense is recognised for this leave as it is taken. Prior history indicates that on average, sick leave taken each reporting period is less than the existing accumulated entitlements and thus no liability for unused sick leave entitlements is recognised. This is expected to continue in future periods.

Accounting policy - Long service leave
Under the Queensland Government's long service leave scheme, a levy is made on the statutory body to cover the cost of employees' long service leave. The levies are expensed in the period in which they are payable. Amounts paid to employees for long service leave are claimed from the scheme quarterly in arrears.

Accounting policy – Superannuation
Employer superannuation contributions are paid to QSuper, the superannuation scheme for Queensland Government employees, at rates specified under the Enterprise Agreement and Council's Superannuation Policy. Contributions are expensed in the period in which they are payable. The Council's obligation is limited to its contribution to QSuper. The QSuper scheme has defined benefit and defined contribution categories. The liability for defined benefits is held on a whole-of-government basis and reported in those financial statements pursuant to AASB 1049 *Whole of Government and General Government Sector Financial Reporting.*

Accounting policy – Workers' compensation premiums
The Council pays premiums to WorkCover Queensland and inter-state QBE in respect of its obligations for employee compensation. Workers' compensation insurance is a consequence of employing employees, but is not counted in an employee's total remuneration package. It is not an employee benefit and is recognised separately as employee- related expenses.

	2020	2019
	$'000	$'000
8. Supplies and services		
Supplies and consumables	13,537	14,815
Scientific collaborations	7,288	6,765
Consultants and contractors	3,866	4,673
Service contracts	2,452	2,402
Utilities	1,989	2,354
Minor equipment and software purchases	1,013	913
Travel	942	1,379
Operating lease rentals	61	61
Other	13	-
Total	**31,161**	**33,362**

Notes to the financial statements
For the year ended 30 June 2020

8. Supplies and services (cont'd)

Accounting policy – Lease expense
Lease expenses include lease rentals for short-term leases, leases of low value assets and variable lease payments. Refer to note 15 for a breakdown of lease expenses and other lease disclosures.

Accounting policy - Scientific collaboration distributions
Council has a number of research collaboration agreements in place with various granting bodies and universities. Distributions are made in terms of these collaboration agreements and are recognised as an expense in the period in which they are incurred.

	2020 $'000	2019 $'000
9. Other expenses		
Commercial and contract research distributions	6,313	7,545
Insurance	662	582
Legal expenses	93	244
Audit & other fees - internal	79	84
Audit fees - external *	72	77
Net (gain) on foreign exchange transactions	-	(1)
Other	3	(2)
Total	**7,222**	**8,529**

* Total external audit fees to be paid to the Queensland Audit Office relating to the 2019-20 financial year are $72,000 (2019: $76,500). There are no non-audit services included in this amount.

Accounting policy - Insurance
The Council's non-current physical assets and other risks are insured through the Queensland Government Insurance Fund (QGIF), premiums being paid on a risk assessment basis. In addition, the Council has policies with private insurance companies to cover risks not included by QGIF.

Accounting policy - Commercial and contract research distributions
The Council has a number of commercial and licence arrangements in place. Under the Council's contract research policy, distributions to researchers may be made to Employee Research Services accounts (refer note 31) from the proceeds of industry-sponsored contracts. These distributions are recognised as an expense at the time of invoicing under the contract. Additionally, under the Council's intellectual property policy, distributions to inventors or contributors are recognised as an expense at the time of milestone invoicing under these contractual arrangements. Payments to inventors or contributors may be made in the subsequent financial year following their recognition.

Notes to the financial statements
For the year ended 30 June 2020

NOTES ABOUT OUR FINANCIAL POSITION

	2020 $'000	2019 $'000
10. Cash and cash equivalents		
Term deposits	19,564	15,654
Cash at bank and on call	9,218	8,463
Employee Research Services (ERS)	(9,527)	(8,370)
Imprest accounts	1	1
Total	**19,256**	**15,748**

The Council's term deposits consist entirely of unspent research grant funds (contract liabilities), refer note 21. For Employee Research Services (ERS) funds held in cash and cash equivalents, refer to note 31.

Accounting policy - Cash and cash equivalents
For the purposes of the statement of financial position and the statement of cash flows, cash assets include all cash and cheques receipted but not banked at 30 June as well as deposits at call with financial institutions.

11. Receivables		
Trade receivables	5,259	6,328
Less: Loss allowance	-	-
	5,259	6,328
Long service leave reimbursements	102	270
Accrued interest	90	135
GST receivable	65	45
Other receivables	2,400	1,561
Total	**7,916**	**8,339**

Accounting policy - Receivables
Receivables are measured at amortised cost, which approximates their fair value at the reporting date. Trade debtors are recognised at the amounts due at the time of sale or service delivery, i.e. the agreed purchase/contract price. Settlement of these amounts is required within 30 days of the invoice date.

Other debtors generally arise from transactions outside the usual operating activities of the Council and are recognised at their assessed values. Terms are a maximum of 30 days, no interest is charged and no security is obtained.

Disclosure – Receivables
The closing balance of receivables arising from contracts with customers at 30 June 2020 is $4.2m (30 June 2019: $5.2m).

Disclosure - Credit risk exposure of receivables
The maximum exposure to credit risk at balance date for receivables is the gross carrying amount of those assets. No collateral is held as security and no credit enhancements relate to receivables held by the Council.

11. Receivables (cont'd)

Impairment of receivables
The Council uses a provision matrix to calculate a loss allowance for receivables. The provision matrix is initially based on the Council's historical observed default rates. Any loss allowance incorporates reasonable and supportive
forward-looking information. Economic changes impacting on the Council's debtors, and relevant industry data form part of Council's impairment assessment. At every reporting date, the historical observed default rates are updated and changes in the forward-looking estimates are analysed. The assessment of the correlation between historical observed default rates, forecast economic conditions and the loss allowance is a significant estimate. The amount of the loss allowance is sensitive to changes in circumstances and of forecast economic conditions. The Council's historical credit loss experience and forecast economic conditions may also not be representative of customers' actual default in the future.

Following a review of Council trade and other debtors over the past 10 years, no loss allowance has been made in 2019-20 given the historical immaterial quantum of bad debts involved over this review period.

Accounting policy – Impairment of receivables
Where Council has no reasonable expectation of recovering an amount owed by a debtor, the debt would be written off by directly reducing the receivable against the loss allowance. This occurs when the debt is over 120 days past due and Council has ceased enforcement activity. If the amount of debt written off exceeds the loss allowance, the excess would be recognised as an impairment loss.

Disclosure - Ageing of past due but not impaired receivables
Ageing of past due but not impaired financial assets is disclosed in the following tables. No financial assets were assessed as being impaired as at 30 June 2020.

2020 Financial assets past due but not impaired

	Not Due	Overdue				Not due and overdue
	<30 days $'000	30-60 days $'000	61-90 days $'000	>90 days $'000	Total $'000	Total $'000
Financial assets						
Receivables	6,086	1,051	313	466	1,830	7,916
Total	**6,086**	**1,051**	**313**	**466**	**1,830**	**7,916**

2019 Financial assets past due but not impaired

	Not Due	Overdue				Not due and overdue
	<30 days $'000	30-60 days $'000	61-90 days $'000	>90 days $'000	Total $'000	Total $'000
Financial assets						
Receivables	5,442	1,065	411	1,421	2,897	8,339
Total	**5,442**	**1,065**	**411**	**1,421**	**2,897**	**8,339**

Notes to the financial statements
For the year ended 30 June 2020

	2020 $'000	2019 $'000
12. Inventories		
Supplies and consumables – at cost	693	258
Total	**693**	**258**

Accounting policy - Inventories
Inventories are represented by consumable laboratory supplies valued at the lower of cost and net realisable value.

Cost is assigned on a weighted average basis and includes expenditure incurred in acquiring the inventories and bringing them to their existing condition.

Net realisable value is determined by estimating the selling price in the ordinary course of business, less the estimated costs of completion and selling expenses. No inventory assets have been classified as inventories held for distribution.

All inventories on hand at 30 June are expected to be utilised within 12 months.

13. Other financial assets

Current		
Managed fund investments		
Budgeted drawdowns	12,500	12,000
Grant funds	5,214	6,445
Total	**17,714**	**18,445**
Non current		
Managed fund investments	143,771	140,885
Total	**143,771**	**140,885**

Accounting policy - Other financial assets
Other financial assets held at fair value through profit or loss represent investments in managed funds. The investments are stated at current market value at the reporting date. Changes in the market value of these instruments, whether realised or unrealised, are recognised in the statement of comprehensive income. These investments were originally classified at fair value through profit or loss upon initial recognition and the Council manages these investments and makes purchases and sales decisions based on their fair value in accordance with the Council's documented investment strategy.

All managed fund investments are categorised as level 1 investments in accordance with the fair value hierarchy, which reflects the unadjusted quoted market price. Refer to note 24 for liquidity risk management. The current portion of managed funds is made up of unspent grant funds invested (refer to note 21) plus drawdowns approved by Council in the 2020-21 budget which can be used for operational cash requirements if needed.

14. Other assets

Current assets		
NPV of final instalment from sale of subsidiary	5,492	-
Advances to subsidiaries	924	578
Other	765	642
Total	**7,181**	**1,220**

Notes to the financial statements
For the year ended 30 June 2020

14. Other assets (cont'd)

	2020	2019
	$'000	$'000
Non-current assets		
NPV of final instalment from sale of subsidiary	-	5,413
Loans to subsidiaries	703	-
Lease receivable	1,138	536
Total	**1,841**	**5,949**

Accounting Policy – Other assets
Other assets generally arise from transactions outside the usual operating activities of the Council and are recognised at their contract values.

Disclosures – deferred consideration and lease receivable
Following on from the sale of Q-Pharm Pty Ltd (refer note 33 (a)):
- deferred consideration receivable totalling $5.5m due 31 January 2021 has been discounted at the two-year government bond rate; and
- lease receivable resulting from a one-year rental holiday under a 10-year licence agreement is being amortised over the period of this agreement.

Disclosures – loans to subsidiaries
Council has entered a loan agreement with subsidiary Endpoint IQ Pty Ltd to advance funds of up to $1.0m, at an interest rate of 8% p.a. Council has agreed to capitalise the interest. The initial loan term is 3 years, with an option to extend for a further 3 years at Council's discretion. Refer note 33(e).

Disclosures – advance to subsidiaries
Council has paid some expenses on behalf of genomiQa Pty Ltd that form an advance which it intends to recover via a loan agreement with genomiQa.

15. Leases

A new accounting standard AASB 16 *Leases* came into effect in 2019-20, resulting in changes to the Council's accounting for leases for which it is lessee. The effect of the new standard and the Council's newly adopted lease accounting policies in 2019-20 are disclosed in note 35.There are no transitional impacts relating to this lease standard.

Leases as Lessee

Accounting policy – leases as lessee
The Council measures right-of-use assets from concessionary leases at cost on initial recognition, and measures all right-of-use assets at cost subsequent to initial recognition.

The Council has elected not to recognise right-of-use assets and lease liabilities arising from short-term leases and leases of low value assets. The lease payments are recognised as expenses on a straight-line basis over the lease term. An asset is considered low value where it is expected to cost less than $10,000 when new.

Notes to the financial statements
For the year ended 30 June 2020

15. Leases (cont'd)

Disclosures – leases as lessee

(i) Details of leasing arrangements as lessee

Concessionary land lease
The Council's buildings are built on land owned by Metro North Hospital & Health Services (MNHHS). It is anticipated that Council will enter into a peppercorn lease for land occupied by the three buildings, for a 40-year term, with MNHHS in the reporting period ending 30 June 2021. Leases currently in place for the land occupied by Bancroft and CBCRC buildings (refer to note 18) are to be terminated at this time.

As the lease to be entered with MNHHS is a peppercorn lease there will be no recognition of the lease liability on the statement of financial position as Council has applied the temporary option for not-for-profit entities to elect to measure right-of-use assets arising under concessionary leases as disclosed in note 35.

	2020 $'000	2019 $'000
(ii) Amounts recognised in profit or loss		
Operating lease rentals included in note 8:		
- expenses relating to short-term leases and low-value assets	9	9
- expenses relating to low-value assets	52	52
(iii) Total cash outflow for leases	61	61

Operating lease commitments at the reporting date (2018-19 disclosure under AASB 117) are inclusive of anticipated GST and are payable as follows:

Not later than one year	28	39
Later than one year and not later than five years	54	91
Total	**82**	**130**

Lease expenses have renewal options; however, no leases have escalation clauses other than in the event of payment default. No lease arrangements create restrictions on other financing transactions.

Leases as lessor

Accounting policy – Leases as lessor
Council recognises lease payments from operating leases as income on a straight-line basis over the lease term.

Disclosure - Leases as lessor
(i) Details of leasing arrangements as lessor

Sublease of research facility
Lease receivables comprises two separate licences of premises each with a lease term of 10 years from commencement date (1 January 2016 and 1 February 2019). These amounts do not include lease fees which may become receivable under the lease on the basis of registered associates on the premises in excess of stipulated minimums and do not include any recovery of expenses such as scientific services, electricity and water costs.

15. Leases (cont'd)

The sublease agreements include make-good clauses that requires the lessees to restore the facilities to a satisfactory condition at the end of the lease term. No amounts were recognised in respect of variable lease payments other than CPI-based or market rent reviews. Council does not have any finance leases.

(ii) Maturity analysis
The following table sets out a maturity analysis of future undiscounted lease receivable for licences of the premises under the Council's operating leases:

	2020	2019
	$'000	$'000
Receivable:		
Not later than one year	4,397	4,171
Later than one year and not later than five years	15,773	15,890
Later than five years	6,906	9,636
Total	**27,076**	**29,697**

16. Assets classified as held for sale

Residential property	-	525
Total	-	**525**

Accounting Policy – Assets held for sale
Assets held for sale consist of those assets that management has determined are available for immediate sale in their present condition and their sale is highly probable within the next 12 months. Under AASB 5 *Non-current Assets Held for Sale and Discontinued Operations*, when an asset is classified as held for sale, its value is measured at the lower of the asset's carrying amount and fair value less cost to sell. Any restatement of the asset's value to fair value less costs to sell is a non-recurring valuation. Such assets are no longer amortised or depreciated upon being classified as held for sale.

Disclosures - Current assets held for sale
Council sold a donated residential property in 2019-20. The fair value for the residential property at 2018-19 reflects a valuation dated 4 December 2018 by a registered property valuer.

17. Intangible assets

Software purchased: At cost		
Gross	679	679
Less: Accumulated amortisation	(679)	(653)
	-	**26**
Software internally generated: At cost		
Gross	474	474
Less: Accumulated amortisation	(265)	(220)
	209	**254**
Total	**209**	**280**

17. Intangible assets (cont'd)

Accounting policy - Recognition and measurement of intangibles
Intangible assets with a cost or other acquisition value equal to or greater than $100,000 are recognised in the statement of financial position; items with a lesser value are expensed.

It has been determined that there is not an active market for any of the Council's intangible assets. As such, the assets are recognised and carried at cost less accumulated amortisation and accumulated impairment losses.

No intangible assets have been classified as held for sale or form part of a disposal group held for sale.

Key Judgement: Council also controls a number of software assets that are not recognised as assets because they fail to meet the AASB 138 recognition criteria.

Accounting policy - Amortisation expense
All intangibles assets of the Council have finite useful lives and are amortised on a straight line basis over their estimated useful life to the Council. Straight line amortisation is used reflecting the expected consumption of economic benefits on a progressive basis over the intangible's useful life. The residual value of all Council's intangible assets is zero.

Useful life
Key estimate: For each class of intangible asset the following amortisation rates are used:

Intangible Asset	Useful life
Purchased software	10 years
Internally generated software	10 years

Accounting policy – Impairment
All intangible assets are assessed for indicators of impairment on an annual basis. If an indicator of possible impairment exists, the Council determines the asset's recoverable amount. Any amount by which the asset's carrying amount exceeds the recoverable amount is recorded as an impairment loss.

Intangible assets are principally assessed for impairment by reference to the actual and expected continuing use of the asset by the Council, including discontinuing the use of software. The recoverable amount is determined as the higher of the asset's fair value less costs to sell and its value-in-use.

Intangible assets– balances and reconciliations of carrying amount

Intangibles reconciliation of carrying amount	Software internally generated	Software purchased	Software work in progress	Total
	2020 $'000	2020 $'000	2020 $'000	2020 $'000
Carrying amount at 1 July 2019	**254**	**26**	**-**	**280**
Acquisitions	-	-	-	-
Disposals	-	-	-	-
Transfers between classes	-	-	-	-
Amortisation	(45)	(26)	-	(71)
Carrying amount at 30 June 2020	**209**	**-**	**-**	**209**

Notes to the financial statements
For the year ended 30 June 2020

	Software internally generated	Software purchased	Software work in progress	Total
	2019 $'000	2019 $'000	2019 $'000	2019 $'000
Carrying amount at 1 July 2018	**303**	**93**	**-**	**396**
Acquisitions	-	-	-	-
Disposals	-	-	-	-
Transfers between classes	-	-	-	-
Amortisation	(49)	(67)	-	(116)
Carrying amount at 30 June 2019	**254**	**26**	**-**	**280**

	2020 $'000	2019 $'000
18. Property, plant and equipment		
Buildings: At fair value		
Gross	345,202	343,434
Less: Accumulated depreciation	(92,189)	(85,801)
	253,013	**257,633**
Plant & equipment: At cost		
Gross	63,689	61,357
Less: Accumulated depreciation	(48,169)	(43,346)
	15,520	**18,011**
Work in progress: At cost *	-	1,622
	-	**1,622**
Total	**268,533**	**277,266**

* Work in progress includes various building improvement and renewal projects, which were ongoing as at 30 June.

Notes to the financial statements
For the year ended 30 June 2020

18. Property, plant and equipment (cont'd)

Property plant and equipment – balances and reconciliations of carrying amount (including fair value level).

	Buildings (Research Facilities) Level 3	Plant & equipment	Work in progress	Total
	2020 $'000	2020 $'000	2020 $'000	2020 $'000
Carrying amount at 1 July 2019	**257,633**	**18,011**	**1,622**	**277,266**
Acquisitions	-	3,303	167	3,470
Disposals	-	(89)	-	(89)
Transfers between classes	1,768	21	(1,789)	-
Revaluation increments	-	-	-	-
Depreciation	(6,388)	(5,726)	-	(12,114)
Carrying amount at 30 June 2020	**253,013**	**15,520**	-	**268,533**

	Buildings (Research Facilities) Level 3	Plant & equipment	Work in progress	Total
	2019 $'000	2019 $'000	2019 $'000	2019 $'000
Carrying amount at 1 July 2018	**261,455**	**21,262**	**978**	**283,695**
Acquisitions	-	2,429	3,155	5,584
Disposals	-	(117)	-	(117)
Transfers between classes	2,511	-	(2,511)	-
Revaluation increments	-	-	-	-
Depreciation	(6,333)	(5,563)	-	(11,896)
Carrying amount at 30 June 2019	**257,633**	**18,011**	**1,622**	**277,266**

Accounting policy – Recognition
Items of property, plant and equipment with a cost or other value equal to or in excess of the following thresholds are recognised for financial reporting purposes in the year of acquisition:

Class	Threshold
Buildings	$10,000
Plant and equipment	$5,000
Other (including heritage & cultural)	$5,000

Items with a lesser value are expensed in the year of acquisition.

18. Property, plant and equipment (cont'd)

Expenditure on property, plant and equipment is only capitalised if it increases the service potential or useful life of the existing asset. Maintenance expenditure that merely restores original service potential (arising from ordinary wear and tear) is expensed.

The Council occupies three buildings situated on Crown land reserved and set apart for hospital purposes. The land is under the control of Metro North Hospital & Health Service (MNHHS) on behalf of The State of Queensland.

As the buildings are controlled by the Council, these assets are recognised in its financial statements, not in the financial statements of Queensland Health. Any revaluation surpluses or decrements associated with these assets are recognised by the Council.

Leases for the land and buildings known as the Bancroft Centre and the Clive Berghofer Cancer Research Centre exist between the Council and The State of Queensland (represented by Queensland Health) at a nominal rental, terminating on 27 June 2066. A new lease for the land occupied by all three buildings is expected to be entered into between Council and MNHHS at nominal rental. Upon commencement of the new lease, the existing leases will be surrendered. Refer to note 34.

Accounting policy – Cost of acquisition
Historical cost is used for the initial recording of all non-current physical asset acquisitions. Cost is determined as the value given as consideration plus costs incidental to the acquisition and those incurred in getting the assets ready for use.

Where assets are received free of charge from another Queensland Government entity, the acquisition cost is recognised as the gross carrying amount in the books of the transferor immediately prior to the transfer together with any accumulated depreciation.

Assets acquired at no cost or for nominal consideration, other than from another Queensland Government entity, are recognised at their fair value at the date of acquisition.

Accounting policy – Measurement using historical cost
Plant and equipment is measured at cost in accordance with Queensland Treasury *Non-Current Asset Policies*. The carrying amounts for plant and equipment at cost does not materially differ from their fair value.

Accounting policy – Measurement using fair value
Buildings are measured at fair value in accordance with AASB 116 *Property, Plant and Equipment*, AASB 13 *Fair Value Measurement* and Queensland Treasury *Non-Current Asset Policies* for the Queensland Public Sector. These assets are reported at their revalued amounts, being the fair value at the date of valuation, less accumulated depreciation and impairment losses where applicable. In respect of these asset classes, the cost of items acquired during the financial year has been judged by Council to materially represent their fair value at the end of the reporting period.

Buildings measured at fair value are revalued on an annual basis either by appraisals undertaken by an independent professional valuer, or by the use of appropriate and relevant indices, where the movement in fair value is material.

18. Property, plant and equipment (cont'd)

Use of independent valuation
Revaluations using an independent professional valuer are undertaken at least once every five years, the most recent being as at 30 June 2017 by the firm AECOM.

The fair values reported by the Council are based on appropriate valuation techniques that maximise the use of available and relevant observable inputs and minimise the use of unobservable inputs. As there is no active market for research facilities as the majority of building floor space is specialist research laboratories, the basis of the valuation is on a cost approach, which involves estimating the amount that would currently be required to replace the service capacity of an asset (referred to as Current Replacement Cost). This is a level 3 categorisation, as referenced in note 23.

The Replacement Cost is the total construction cost (including design fees and typical levels of contingency) if the asset was replaced on the valuation date with a modern day equivalent applying the 'highest and best use' principles.

For the valuation as at 30 June 2017, the Council elected to retain management's accumulated depreciation, which is based on the estimated standard life of a mixed laboratory/office building of 50 years.

Use of Indices
Where buildings have not been independently valued in the reporting period, their previous valuations are materially kept up to date via the application of relevant indices, ensuring the resulting value is a valid estimation of the buildings' fair values at reporting the date. In the absence of another appropriate published index, the Council uses the CPI (*Consumer Price Index (a): All groups, Brisbane and weighted average of eight capital cities*) published by the Australian Bureau of Statistics.

As at 30 June 2020, the change in the index since the last valuation is not considered material (less than 5% change) and consequently the carrying values of the three buildings have not been adjusted in the reporting period.

Accounting for changes in Fair Value
Any increment arising on the revaluation of buildings is credited to the asset revaluation reserve, except to the extent it reverses a revaluation decrement previously recognised as an expense. A decrease in the carrying amount on revaluation is charged as an expense to the extent it exceeds the balance, if any, in the revaluation surplus.

Accounting policy – Depreciation of property, plant and equipment
Property, plant and equipment is depreciated on a straight-line basis so as to allocate the net cost or revalued amount of each asset, less its estimated residual value, progressively over its estimated useful life to the Council, consistent with the even consumption of service potential.

Assets under construction (work-in-progress) are not depreciated until they reach service delivery capacity. Service delivery capacity relates to when construction is complete and the asset is first put to use or is installed ready for use in accordance with its intended application. These assets are then reclassified to the relevant classes within property, plant and equipment.

Buildings including structure and components are treated for accounting depreciation purposes as a single asset and depreciated over 50 years.

Any expenditure that increases the originally assessed capacity or service potential of an asset is capitalised and the new depreciable amount is depreciated over the remaining useful life of the asset to the Council.

18. Property, plant and equipment (cont'd)

For the Council's depreciable assets, the estimated amount to be received on disposal at the end of their useful life (residual value) is determined to be zero.

Useful life
Key estimate: For each class of depreciable assets the following useful lives are used:

Property, Plant and Equipment Asset	Useful life
Buildings	50 years
Plant and Equipment	3-20 years

Accounting policy – Impairment of non-current assets
All non-current physical assets are assessed for indicators of impairment on an annual basis, or, where the asset is measured at fair value, for indicators of a change in fair value/service potential since the last valuation was completed.

Where indicators of a material change in fair value or service potential since the last valuation arise, the asset is revalued at the reporting date under AASB 13 *Fair Value Measurement*. If an indicator of possible impairment exists, the Council determines the asset's recoverable amount under AASB 136 *Impairment of Assets.* Any amount by which the asset's carrying amount exceeds the recoverable amount is recorded as an impairment loss.

The recoverable amount is equal to the higher of the fair value less costs of disposal and the asset's value in use subject to the following:

- As a not-for-profit entity, certain property, plant and equipment of the Council is held for the continuing use of its service capacity and not for the generation of cash flows. Such assets are typically specialised in nature. In accordance with AASB 136, where such assets are measured at fair value under AASB 13, that fair value (with no adjustment for disposal costs) is effectively deemed to be the recoverable amount. As a consequence, AASB 136 does not apply to such assets unless they are measured at cost.
- For other non-specialised property, plant and equipment measured at fair value, where indicators of impairment exist, the only difference between the asset's fair value and its fair value less costs of disposal is the incremental costs attributable to the disposal of the asset. Consequently, the fair value of the asset determined under AASB 13 will materially approximate its recoverable amount where the disposal costs attributable to the asset are negligible. After the revaluation requirements of AASB 13 are first applied to these assets, applicable disposal costs are assessed, and, in the circumstances where such costs are not negligible, further adjustments to the recoverable amount are made in accordance with AASB 136.

For all other remaining assets measured at cost, and assets within the economic entity held for the generation of cash flows, recoverable amount is equal to the higher of the fair value less costs of disposal and the asset's value in use.

Value in use is equal to the present value of the future cash flows expected to be derived from the asset, or where Council no longer uses an asset and has made a formal decision not to reuse or replace the asset, the value in use is the present value of net disposal proceeds.

Recognising Impairment Losses
For assets measured at fair value, an impairment loss is treated as a revaluation decrease and offset against the asset revaluation surplus of the relevant class to the extent available. Where no asset revaluation surplus is available in respect of the class of asset, the loss is expensed in the statement of comprehensive income as a revaluation decrement. For assets measured at cost, an impairment loss is recognised immediately in the statement of comprehensive income.

Notes to the financial statements
For the year ended 30 June 2020

	2020	2019
	$'000	$'000
19. Payables		
Accrued expenses	2,085	3,332
Trade creditors	1,849	2,201
Accrued wages	1,820	1,247
Other	461	2,400
Total	**6,215**	**9,180**

Accounting Policy – Payables
Trade creditors are recognised upon receipt of the goods or services ordered and are measured at the nominal amount i.e. agreed purchase/contract price, gross of applicable trade and other discounts. Standard payment terms are end of month following month of invoice. Amounts owing are unsecured.

20. Accrued employee benefits

Current		
Annual leave entitlements payable	5,799	5,287
Long service leave levy payable	308	282
Other	252	278
Total	**6,359**	**5,847**

Accounting policy – Accrued employee benefits
No provision for long service leave is recognised in the Council's financial statements, the liability being held on a whole-of-government basis and reported in those financial statements pursuant to AASB 1049 *Whole of Government and General Government Sector Financial Reporting.*

Accruals for wages, salaries and annual leave expense due but unpaid at reporting dates are recognised in the statement of financial position at the current salary rates.

Annual leave entitlements are recognised at their undiscounted values and are classified as current liabilities as Council does not have the unconditional right to defer settlement for the next 12 months.

Notes to the financial statements
For the year ended 30 June 2020

21. Contract liabilities

	Restated Balance b/f 1 July 2019 $'000	Funds received $'000	Funds recognised as revenue $'000	Balance c/f 30 June 2020 $'000
National Health & Medical Research Council	14,931	30,316	(27,645)	17,602
Australian Research Council	127	281	(362)	46
Bill and Melinda Gates Foundation	-	2,201	(335)	1,866
Brisbane Diamantina Health Partners	-	904	(602)	302
Cancer Council Qld	351	827	(664)	514
Children's Hospital Foundation	396	518	(483)	431
Queensland Genomics Health Alliance	(87)	603	(578)	(62)
Queensland Government^	199	441	(716)	(76)
Medical Research Future Fund	-	1,033	(72)	961
Medicines for Malaria Venture (MMV)	309	2,018	(2,455)	(128)
Melanoma Research Alliance	65	740	(573)	232
National Breast Cancer Foundation	40	584	(474)	150
US Department of Defence	(91)	516	(468)	(43)
Other granting bodies*	2,841	4,792	(4,650)	2,983
Granting bodies – sub total	**19,081**	**45,774**	**(40,077)**	**24,778**
Commercial partners*	11,321	10,577	(5,525)	16,373
Other licence/rental fees	-	4,799	(4,604)	195
Queensland University of Technology*	3,250	-	(500)	2,750
Total	**33,652**	**61,150**	**(50,706)**	**44,096**

* Refer Note 35 for the impact of adopting AASB 15 and AASB 1058 on Contract Liabilities. The modified retrospective approach has been used.

^ Department of Innovation and Tourism Industry Development, Department of Science, Information Technology and Innovation and Department of Environment and Science

Notes to the financial statements
For the year ended 30 June 2020

21. Contract liabilities (cont'd)

	Balance b/f 1July 2018 $'000	Funds received $'000	Funds recognised as revenue $'000	Balance c/f 30 June 2019 $'000
National Health & Medical Research Council	14,238	28,756	(28,063)	14,931
Australian Research Council	(69)	606	(410)	127
Cancer Council Qld	272	550	(471)	351
Children's Hospital Foundation	-	426	(30)	396
Queensland Genomics Health Alliance	(25)	483	(545)	(87)
Queensland Government^	381	646	(828)	199
Medicines for Malaria Venture (MMV)	46	2,841	(2,612)	275
Melanoma Research Alliance	313	39	(287)	65
National Breast Cancer Foundation	63	417	(440)	40
Perpetual Trustees Australia Limited	368	-	(368)	-
US Department of Defence	(176)	808	(723)	(91)
Other granting bodies	5,679	6,124	(5,910)	5,893
Granting bodies – sub total	**21,090**	**41,696**	**(40,687)**	**22,099**
Commercial partners	7,885	7,631	(4,694)	10,822
Other licence/rental fees	-	3,538	(3,538)	-
Total	**28,975**	**52,865**	**(48,919)**	**32,921**

^ Department of Innovation and Tourism Industry Development, Department of Science, Information Technology and Innovation and Department of Environment and Science

Unspent grant funds of $19.56m (2019:$15.65m) are held in, term deposits (refer to note 10) and $5.21m (2019: $6.45m) in other financial assets (refer note 13). Where the grantors funding rules require unspent funds to be held in a bank account, those funds are in term deposits.

Accounting policy – Contract liabilities

Where grants and commercial contract proceeds are received with sufficiently specific performance obligations, a contract liability is recognised and revenue is recognised as those performance obligations are met.

Disclosure – Contract liabilities

All contract liabilities arise from contracts with customers.

Notes to the financial statements
For the year ended 30 June 2020

22. Asset revaluation surplus by class

	Buildings	Total
	$'000	$'000
Balance as at 1 July 2019	72,499	72,499
Revaluation increments/(decrements)	-	-
Balance as at 30 June 2020	**72,499**	**72,499**

	Buildings	Total
	$'000	$'000
Balance as at 1 July 2018	72,499	72,499
Revaluation increments/(decrements)	-	-
Balance as at 30 June 2019	**72,499**	**72,499**

Accounting policy - Asset revaluation surplus

The asset revaluation surplus represents the net effect of upwards and downwards revaluations of assets to fair value.

NOTES ABOUT RISKS AND OTHER ACCOUNTING UNCERTAINTIES

23. Fair value measurement

Accounting policy – Inputs for fair values
Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date under current market conditions (i.e. an exit price) regardless of whether that price is directly derived from observable inputs or estimated using another valuation technique.

Observable inputs are publicly available data that are relevant to the characteristics of the assets/liabilities being valued.

Unobservable inputs are data, assumptions and judgements that are not available publicly, but are relevant to the characteristics of the assets/liabilities being valued. Significant unobservable inputs used by the Council include, but are not limited to, subjective adjustments made to observable data to take account of the characteristics of the Council's assets/liabilities, internal records of recent construction costs (and/or estimates of such costs) for assets' characteristics/functionality, and assessments of physical condition and remaining useful life. Unobservable inputs are used to the extent that sufficient relevant and reliable observable inputs are not available for similar assets/liabilities.

A fair value measurement of a non-financial asset takes into account a market participant's ability to generate economic benefits by using the asset in its highest and best use or by selling it to another market participant that would use the asset in its highest and best use.

Fair value measurement hierarchy
All assets of the Council for which fair value is measured or disclosed in the financial statements are categorised within the following fair value hierarchy, based on the data and assumptions used in the most recent specific appraisals:

Level 1	represents fair value measurements that reflect unadjusted quoted market prices in active markets for identical assets;
Level 2	represents fair value measurements that are substantially derived from inputs (other than quoted prices included within level 1) that are observable, either directly or indirectly; and
Level 3	represents fair value measurements that are substantially derived from unobservable inputs.

There were no transfers of assets between fair value hierarchy levels during the current or prior years.

Basis for fair values of assets
Refer to note 18 for details of the basis for fair value measurement of buildings held by QIMR Berghofer.

Notes to the financial statements
For the year ended 30 June 2020

24. Financial risk disclosures

(a) Financial instrument categories

Accounting policy – Financial instruments
Recognition
Financial assets and financial liabilities are recognised in the statement of financial position when Council becomes party to the contractual provisions of the financial instrument.

The Council has the following categories of financial assets and financial liabilities:

	Notes	2020 $'000	2019 $'000
Financial assets			
Financial assets held at fair value through profit or loss:			
Cash and cash equivalents	10	19,256	15,748
Other financial assets	13	161,485	159,330
Other assets - current	14	7,181	1,220
Financial assets held at amortised cost:			
Receivables	11	7,916	8,339
Other assets - non-current (discounted)	14	1,841	5,949
		197,679	**190,586**
Financial liabilities (payable within one year)			
Financial liabilities measured at amortised cost:			
Payables	19	6,215	9,180
		6,215	**9,180**

No financial assets and financial liabilities have been offset and presented net in the statement of financial position.

The Council does not enter into transactions for speculative purposes, or for hedging.

(b) Financial risk management

Risk exposure

Financial risk management is implemented pursuant to Queensland Government and Council policy. These policies focus on the unpredictability of financial markets and seek to minimise potential adverse effects on the financial performance of the Council.

All financial risk is managed by the Institute under policies approved by the Council. The Council provides written principles for overall risk management, as well as policies covering specific areas.

Council's activities expose it to a variety of financial risks as set out in the following table:

Notes to the financial statements
For the year ended 30 June 2020

24. Financial risk disclosures (cont'd)

Risk Exposure	Definition	Exposure
Credit risk	The risk that the Council may incur financial loss as a result of another party to a financial instrument failing to discharge their obligation.	The Council is exposed to credit risk in respect of its receivables (note 11) and other non-current assets (note 14).
Liquidity risk	The risk that the Council may encounter difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial asset.	The Council is exposed to liquidity risk in respect of its payables (note 19).
Market risk	The risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: currency risk, interest rate risk and other price risk. Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates.	The Council is exposed to market risk on its managed funds (note 13). The Council is exposed to currency risk in respect of its commercial contracts entered into denominated in US dollars. It maintained a bank account in Hong Kong with an immaterial cash balance denominated in HK dollars used to fund the operations of a local study. The account was closed during the financial year. The Council is exposed to interest-rate risk through its cash deposited in interest bearing accounts (note 10).

Risk measurement and management strategies
Council measures risk exposure using a variety of methods as follows:

Risk Exposure	Measurement Method	Risk Management Strategies
Credit risk	Ageing analysis, earnings at risk	The Council manages credit risk through the use of a credit management strategy. This strategy aims to reduce the exposure to credit default by ensuring that the Council invests in secure assets and monitors all funds owed on a timely basis. Exposure to credit risk is monitored on an ongoing basis. Other non–current assets are part of a share sale agreement with a specific contract due and receivable date.

Notes to the financial statements
For the year ended 30 June 2020

24. Financial risk disclosures (cont'd)

Risk Exposure	Measurement Method	Risk Management Strategies
Liquidity risk	Sensitivity analysis	The Council manages liquidity risk through the use of a liquidity management strategy. This strategy aims to reduce the exposure to liquidity risk by ensuring the Council has sufficient funds available to meet employee and supplier obligations as they fall due. This is achieved by ensuring that minimum levels of cash are held within the various bank accounts so as to match the expected duration of the various employee and supplier liabilities. Managed funds held under 'Other Financial Assets' represent investments that are the Institutes' long term endowment type funds, as well as funds invested in excess of short-term operational requirements. These funds can, if required, be redeemed by Council within a relatively short period of time to meet operational cash requirements (note 13).
Market risk	Interest rate sensitivity analysis	The Council does not undertake any hedging in relation to interest risk and manages its risk as per the Council's liquidity risk management strategy articulated in the Council's policies. The Council is exposed to movements in interest rate risk through its investment in externally managed funds and its holdings in cash and cash equivalents. The Council does not undertake any hedging in relation to foreign currency risk and manages this through conservative exchange rate estimates when pricing commercial contracts. The Council places managed funds with three separate fund managers. The Investment Committee (a committee of Council) oversees the performance of these funds.

Credit risk disclosures

Credit risk management practice

The Council considers financial assets that are over 30 days past due to have significantly increased credit risk, and measures the loss allowance of such assets at lifetime expected credit losses instead of 12-month expected credit losses. The exception is trade receivables (refer to note 11), for which the loss allowance is always measured at lifetime expected credit losses.

The Council typically considers a financial asset to be in default when it becomes 90 days past due. However, a financial asset can be in default before this point if information indicates that the Council is unlikely to receive the outstanding amounts in full. The Council assessment of default does not take into account any collateral or other credit enhancements.

The Council write-off policy is disclosed in note 11.

Notes to the financial statements
For the year ended 30 June 2020

25. Contingencies

(a) Contingent assets

Contributions to Queensland Community Foundation
The QIMR Trust established a fund with the Queensland Community Foundation (QCF) for the purpose of generating future income and donations. This fund was transferred to Council upon abolition of the QIMR Trust on 1 February 2011. All contributions made to this named fund within QCF are held in a charitable trust (with The Public Trustee of Queensland as Trustee) and invested in perpetuity with net income distributed to the Council at the discretion of the Trustee in accordance with the Queensland Community Fund Declaration of Trust. Council may, from time to time, become eligible to receive a distribution from the Foundation, but does not have a proprietary or legal interest in the Foundation nor does the Foundation hold property for Council's benefit. Based on previous distributions, Council expects any future income from the Fund to be immaterial.

(b) Contingent liabilities

Following an assessment as to eligibility, Council applied for the JobKeeper Scheme from the Federal Government in response to the COVID-19 pandemic, was accepted and has recognised to 30 June 2020 a total of $4.8m. As the eligibility criteria involved a self-assessment, there is a risk that the Australian Taxation Office (ATO) will determine the Council is not eligible and may require repayment of the funds. A contingent liability is recognised on that basis.

Apart from the Letters of Comfort issued to each of genomiQa Pty Ltd (refer to note 33 (c)) and Endpoint IQ Pty (refer to note 33 (e)), the Council does not have any other contingent liabilities at 30 June 2020.

	2020 $'000	2019 $'000
26. Commitments		
(a) Capital expenditure commitments		
Building works	17	104
Other capital commitments	179	389
	196	**493**

Building works represents 9% of capital expenditure commitments (2019: 21%). The values shown are based on the committed contract value inclusive of anticipated GST.

Payable:		
Not later than one year	196	493
Total	**196**	**493**

27. Events occurring after balance date

Apart from the uncertainty associated with the COVID-19 pandemic, there are no events occurring after balance date that will have a material impact on the figures reported in these financial statements.

Notes to the financial statements
For the year ended 30 June 2020

28. Economic dependency

The Council's activities are predominantly funded by grants received from a range of funding agencies, the majority of which are Commonwealth and State Government bodies. The ability of the Council to source sufficient grant funding is dependent upon those entities continuing to have the ability to fund research activities and for the Institute to be successful in its funding applications. At balance date, Council had no indication that operational and research funding would not be provided as per the funding agreements, however Council acknowledges that there are uncertainties around the funding commitments from the Commonwealth and State Governments, and key donors, due to the COVID-19 pandemic. Should unforeseen fluctuations in the amount of available grant funding occur, the Council would use its cash assets (refer to note 10) and managed fund investments (refer to note 13) to cover short-term operational cash requirements.

29. Future impact of accounting standards not yet effective

At the date of authorisation of the financial report, all Australian accounting standards and interpretations with future effective dates are either not applicable to the Council’s activities or have no material impact on its activities.

Notes to the financial statements
For the year ended 30 June 2020

NOTES ON OUR PERFORMANCE COMPARED TO BUDGET

30. Budgetary reporting disclosures and significant financial impacts from COVID-19

Significant financial impacts – COVID-19 pandemic

The Council financial results for 2019-20 have been impacted by the COVID-19 pandemic most significantly through investment returns that were negative (2.4%) for the year, against a budgeted return of 8%.

Income from the Federal Government's JobKeeper program provided $4.8m in unbudgeted income.

Council expects to experience ongoing impacts on research as a result of the pandemic as some research projects have been delayed. As a result of this delay on projects, some expenditure has been deferred resulting in an increase in the balance of unspent grant funds in contract liabilities.

Research projects may subsequently extend beyond their original grant timeline creating a possible future grant funding shortfall. Any shortfall will be partially mitigated by research staff receiving JobKeeper payments.

Council does not consider there to be a material impact on the valuation of buildings as a result of the pandemic, due to the specialised nature of these building assets.

Notes to the financial statements
For the year ended 30 June 2020

30. Budgetary reporting disclosures and significant financial impacts from COVID-19 (cont'd)

Budget to actual comparison - Statement of comprehensive income

	Notes	Actual 2020 $'000	Original Budget 2020 $'000	Budget Variance 2020 $'000
Income from continuing operations				
Grants and other contributions		76,296	77,170	(874)
User charges and fees	a	28,916	33,997	(5,081)
Other revenue	b	14,866	6,625	8,241
Interest		482	706	(224)
Total Revenue		120,560	118,498	2,062
(Loss)/gains on disposal/revaluation of assets	c	(12,361)	5,781	(18,142)
Total income from continuing operations		**108,199**	**124,279**	**(16,080)**
Expenses from continuing operations				
Employee expenses		(66,373)	(65,899)	(474)
Supplies and services	d	(31,161)	(35,437)	4,276
Depreciation and amortisation		(12,185)	(12,551)	366
Other expenses	e	(7,222)	(9,746)	2,524
Finance costs		(825)	(646)	(179)
Total expenses from continuing operations		**(117,766)**	**(124,279)**	**6,513**
Operating result from continuing operations		**(9,567)**	**-**	**(9,567)**
Other comprehensive income				
Items that will not be reclassified subsequently to operating result				
Increase in asset revaluation surplus		-	-	-
Total other comprehensive income		**-**	**-**	**-**
Total comprehensive (loss)/income		**(9,567)**	**-**	**(9,567)**

Notes to the financial statements
For the year ended 30 June 2020

30. Budgetary reporting disclosures and significant financial impacts from COVID-19 (cont'd)

Budget to actual comparison - Statement of financial position

	Notes	Actual 2020 $'000	Original Budget 2020 $'000	Budget Variance 2020 $'000
Current assets				
Cash and cash equivalents	f	19,256	11,737	7,519
Receivables	g	7,916	2,122	5,794
Other financial assets		17,714	17,000	714
Inventories		693	276	417
Other current assets		7,181	6,245	936
Total current assets		**52,760**	**37,380**	**15,380**
Non-current assets				
Other financial assets		143,771	146,788	(3,017)
Property, plant and equipment		268,533	270,154	(1,621)
Intangible assets		209	209	-
Other non-current assets	h	1,841	777	1,064
Controlled and jointly controlled entities		500	500	-
Total non-current assets		**414,854**	**418,428**	**(3,574)**
Total assets		**467,614**	**455,808**	**11,806**
Current liabilities				
Payables	i	6,215	7,597	(1,382)
Accrued employee benefits		6,359	5,307	1,052
Contract liabilities	j	44,096	35,483	8,613
Total current liabilities		**56,670**	**48,387**	**8,283**
Total liabilities		**56,670**	**48,387**	**8,283**
Net assets		**410,944**	**407,421**	**3,523**
Equity		410,944	407,421	3,523
Total equity		**410,944**	**407,421**	**3,523**

30. Budgetary reporting disclosures and significant financial impacts from COVID-19 (cont'd)

Budget to actual comparison - Statement of cash flows

	Notes	Actual 2020 $'000	Original Budget 2020 $'000	Budget Variance 2020 $'000
Cash flows from operating activities				
Inflows:				
Grants and other contributions		82,596	77,051	5,545
User charges and fees	k	31,001	37,125	(6,124)
Other income	l	4,599	594	4,005
Interest income		511	650	(139)
GST input tax credits from ATO		3,135	-	3,135
GST collected from customers		2,044	-	2,044
Outflows:				
Employee expenses		(66,850)	(65,778)	(1,072)
Supplies and services	m	(36,355)	(41,783)	5,428
Finance costs		(825)	(646)	(179)
GST paid to suppliers		(3,069)	-	(3,069)
GST remitted to ATO		(2,021)	-	(2,021)
Other		(1,536)	(2,934)	1,398
Net cash generated by (used in) operating activities		**13,230**	**4,279**	**8,951**
Cash flows from investing activities				
Inflows:				
Redemptions of other financial assets	n	44	12,600	(12,556)
Sale of property, plant and equipment		549	-	549
Outflows:				
Investments in other financial assets	o	(5,865)	(12,250)	6,385
Acquisition of property, plant and equipment		(3,975)	(4,316)	341
Investment in related entity		(225)	(275)	50
Net cash used in investing activities		**(9,472)**	**(4,241)**	**(5,231)**
Cash flows from financing activities				
Outflows:				
Loans and advances made to related entity		(250)	-	(250)
Net cash used in financing activities		**(250)**	-	**(250)**
Net increase/(decrease) in cash and cash equivalents		3,508	38	3,470
Cash and cash equivalents at beginning of financial year		15,748	11,699	4,049
Cash and cash equivalents at end of financial year		**19,256**	**11,737**	**7,519**

Notes to the financial statements
For the year ended 30 June 2020

30. Budgetary reporting disclosures and significant financial impacts from COVID-19 (cont'd)

Explanation of major variances

Statement of comprehensive income

a. Income from the commercialisation of research outcomes was below budget due to scientific outcomes influencing milestone payment timing.
b. JobKeeper funding was received from the Federal Government in response to COVID-19. Investment distributions were 6.7% against a budget return of 4%, coupled with a higher opening fund balance.
c. Investment gains from market movements were below budget by $18.5m, with negative actual returns of (8.7%) against a budget return of 4%. Combined Investment returns (earnings, distribution and market valuation losses) delivered a return of negative (2.4%) relative to the budget of 8%.
d. Supplies and services in 2019/20 were lower than budget due to reduced activity during the COVID-19 restriction period.
e Other expenses are below budget in 2019/20 due to lower payments of commercialisation proceeds to project collaborators ($2.1m).

Statement of financial position

f. Cash and cash equivalents balance reflects the higher than budget balance of unspent grant funds, which in turn requires a higher balance of funds in term deposits under NHMRC grant funding rules. Other funds have been retained as cash rather than invested in managed funds during the period of market volatility resulting from COVID-19. In addition, the unbudgeted receipt of $3.2m, being two months of JobKeeper payments, has contributed to the higher cash balance.
g. The actual receivables balance includes $1.6m JobKeeper receivable for June 2020, received in July, and invoicing for commercial contracts issued in June in accordance with contract terms.
h. Non-current receivables are higher than budgeted due to the accounting standard for rental related income over the term of their lease ($1.1m).
i. The payables balance is lower than budget as at 30 June 2020 due to lower activity levels in the final quarter due to the COVID-19 lockdown.
j. The value of contract liabilities balance is higher across both grants and contract research services due to timing differences between the receipt of income and expenditure being incurred.

Statement of cash flows

k. Cash inflows from commercialisation of research outcomes was below budget by $6.0m due to timing of milestone payments.
l. JobKeeper income of $3.2m was received as a result of the Federal Government's COVID-19 response.
m Cash outflows on supplies and services are below budget due to timing on expenditure for research, consistent with the increased contract liabilities balance.
n Redemptions from other financial assets were $12.6m lower than budget due to the receipt of JobKeeper funds and lower than budget expenditure on supplies and services.
o. Some income was retained as cash, as opposed to the budgeted placement of these funds with Investment Funds. From March 2020, Investment Fund deposits were deferred and held in cash to reduce risk of capital loss due to investment market volatility during the COVID-19 period.

Notes to the financial statements
For the year ended 30 June 2020

WHAT WE LOOK AFTER ON BEHALF OF WHOLE-OF-GOVERNMENT AND THIRD PARTIES

31. Trust transactions and balances

Employee Research Services

The Council undertakes a custodial role in respect of transactions and balances relating to Employee Research Services (ERS). Transactions for ERS are not recognised in the financial statements but are disclosed in this note for the information of users. The balance of cash and cash equivalents excludes the balance of the ERS funds held in trust (refer to note 10).

This is a summary of the financial transactions and balances for Employee Research Services:

	2020 $'000	2019 $'000
Income	4,262	4,821
Expenses	(3,105)	(3,138)
Increase in net balance	**1,157**	**1,683**
Cash held in short term deposits	9,527	8,370
Total trust assets	**9,527**	**8,370**

The Council undertakes certain trustee transactions on behalf of employees' research activities, for which no fees are received by Council.

Notes to the financial statements
For the year ended 30 June 2020

OTHER INFORMATION

32. Key management personnel (KMP) disclosures

(a) Key management personnel

The following details for key management personnel include those positions that had authority and responsibility for planning, directing and controlling the activities of the Institute during 2018-19 and 2019-20. Appointment is made by the Governor in Council under s5 & s10 of the *Queensland Institute of Medical Research Act 1945.* The functions of the Council are to: (a) control and manage the Institute; (b) raise and accept moneys for the purposes of the Institute; (c) invest moneys raised and accepted by the Council for the purposes of the Institute; and (d) invest moneys derived from any property or other invested moneys of the Council for the purposes of the Institute.

Position	Incumbents term		2019-20	2018-19
	Date of initial appointment	Date of cessation		
Council members				
Prof Arun Sharma – Chair	4 Jul 2019		√	
Dr Douglas McTaggart – Chair	27 Nov 2014	3 May 2019		√
Mr Christopher Coyne – Deputy Chair#	2 Jun 2005	3 Jul 2019		√
Dr Sonya Bennett^	4 Jul 2019		√	
Dr Madonna Callaghan	4 Jul 2019		√	
Emeritus Prof John de Jersey	27 Nov 2014	3 Jul 2019		√
Mr Ian Fraser	9 Aug 2012	3 Jul 2019		√
Prof Paula Marlton	16 Feb 2006	3 Jul 2019		√
Ms Celeste Neander	4 Jul 2019		√	
Prof Alan Pettigrew	9 Sep 2011		√	√
Mr Mitchell Petrie	4 Jul 2019		√	
Ms Susan Rallings	4 Jul 2019		√	
Mr Michael Sargent*	27 Nov 2014		√	√
Emeritus Prof John Shine	27 Nov 2014	9 Mar 2020	√	√
Dr Clair Sullivan^	4 Jul 2019		√	
Emeritus Prof Janet Verbyla**	4 Jul 2019		√	
Dr Jeannette Young^	20 Sep 2005	3 Jul 2019		√
Director/CEO				
Prof Fabienne Mackay	18 May 2020		√	
Prof David Whiteman (Acting)	4 Jan 2020	17 May 2020	√	
Prof Frank Gannon^^	4 Jan 2011	3 Jan 2020	√	√

Acting Chair 3 May 2019 to 3 July 2019

^ Officer of the public service

* Also a Director of genomiQa Pty Ltd which is a controlled entity of Council (refer to note 33)

** Also a Director of Endpoint IQ Pty Ltd which is a controlled entity of Council (refer to note 33)

^^ Until time of retirement on 3 Jan 2020, also a Director of genomiQa Pty Ltd and Endpoint IQ Pty Ltd, which are controlled entities of Council (refer note 33)

32. Key management personnel (KMP) disclosures (cont'd)

Position	Position responsibility
Council member	Overall authority and responsibility for overseeing, directing and controlling the activities of the Institute
Director/ CEO	Overall efficient and effective administration of the Council operations

(b) Remuneration policies

The Chairperson and members of Council receive sitting fees in line with the 'Remuneration of part-time Chairs and Members of Government Boards, Committees and Statutory Authorities' guideline issued by the Queensland Government. Any member of the Council who is an officer of the public service does not receive fees or allowances for attendance at a meeting of the Council.

The remuneration policy for the Director/CEO is set by Council and approved by the Governor in Council as provided for under the *Queensland Institute of Medical Research Act 1945*. The remuneration and other terms of employment for the Director/CEO are specified in the employment contract.

The remuneration package for the Director/CEO comprises the following components:

i. Short-term employee expenses that include base salary, allowances and leave entitlements paid and provided for the entire year or for that part of the year, during which the Director/CEO occupied the specified position. Amounts disclosed equal the amount expensed in the statement of comprehensive income.

ii. Long-term employee expenses include amounts expensed in respect of long service leave entitlements earned.

iii. Post-employment expenses include amounts expensed in respect of employer superannuation obligations.

iv. Termination benefits are not provided for within the Director/CEO's contract of employment. The contract of employment provides only for notice periods or payment in lieu of notice on termination, regardless of the reason for termination.

v. There are no performance bonuses paid or payable to the Director/CEO.

The contract of the outgoing Director/CEO had also included non-monetary benefits of a vehicle and other minor benefits together with fringe benefits tax applicable to these benefits.

Key management personnel remuneration expense
The following disclosures focus on the expenses incurred by Council that are attributable to key management positions during the respective reporting periods. Therefore, the amounts disclosed reflect expenses recognised in the statement of comprehensive income.

Total remuneration is calculated on a 'total cost' basis and includes the base and non-monetary benefits, long term employee benefits and post-employment benefits. During either financial years, no termination benefits have been paid and no KMP remuneration packages provide for performance or bonus payments.

32. Key management personnel (KMP) disclosures (cont'd)

1 July 2019 - 30 June 2020

Position	Short term employee expenses		Long term employee	Post-employment expenses	Total expenses
	Monetary expenses $'000	Non-monetary benefits $'000	$'000	$'000	$'000
Chair of Council (1)	7	-	-	-	7
Council Members (10)	23	-	-	-	23
Director/CEO (from 18 May 2020)	53	-	1	7	61
Director/CEO (to 3 Jan 2020)	477	25	8	47	557
Acting Director / CEO (4 Jan 2020 to 17 May 2020)	153	-	4	14	171
Total	**713**	**25**	**13**	**68**	**819**

1 July 2018 - 30 June 2019

Position	Short term employee expenses		Long term employee	Post-employment expenses	Total expenses
	Monetary expenses $'000	Non-monetary benefits $'000	$'000	$'000	$'000
Chair of Council (1)	-	-	-	-	-
Council Members (7)	27	-	-	-	27
Director/CEO	646	42	16	82	786
Total	**673**	**42**	**16**	**82**	**813**

The table above includes $9,000 in fringe benefits tax paid by Council in 2019-20 in relation to key management remuneration (2019: $12,000).

33. Controlled entities

(a) Q-Pharm Pty Ltd

In August 2014 Council acquired full ownership of clinical trials company Q-Pharm Pty Ltd, for-profit in nature. On the 31 January 2019 (date of sale), the Council sold all of its shares in Q-Pharm Pty Ltd to NN Bid Co Pty Ltd. Q-Pharm Pty Ltd's registered office up to the date of sale was is in Brisbane, Queensland, with its activities also being conducted there.

33. Controlled entities (cont'd)

The net results and position of Q-Pharm Pty Ltd were not considered material and are therefore not consolidated in the Council's financial statements for 2018-19 financial year.

(b) Vaccine Solutions Pty Ltd

Vaccine Solutions Pty Ltd was established in 1998, for-profit in nature, to provide clinical trial sponsorship, intellectual property management and commercialisation services to the Cooperative Research Centre for Vaccine Technology (CRCVT). Following the winding up of the CRCVT, Vaccine Solutions manages a number of licensing arrangements for the benefit of the members of CRCVT Trust II.

In July 2015 Council acquired full ownership of Vaccine Solutions Pty Ltd. As at 30 June 2020 the Council holds 100% of the shares of Vaccine Solutions Pty Ltd (2019: 100%). Vaccine Solutions Pty Ltd's registered office is in Brisbane, Queensland, with its activities also being conducted there.

Vaccine Solutions does not own any physical or intellectual property assets on its own and was required to return 97% of all commercial income received from licensing activities to the CRCVT Trust II for distribution to members of that trust. This trust was terminated during the 2018-19 financial year.

Vaccine Solutions Pty Ltd did not pay a dividend in 2019-20 (2018-19: $0).

Vaccine Solutions Pty Ltd was not required to prepare financial statements for the years 30 June 2020 and 30 June 2019. The net results and position of Vaccine Solutions Pty Ltd were not considered material and are therefore not consolidated in the Council's financial statements.

The company did not have any material contingent liabilities or commitments as at 30 June 2020 (similar as at 30 June 2019).

(c) genomiQa Pty Ltd

The Minister for Health approved the formation of genomiQa Pty Ltd in May 2017.

genomiQa Pty Ltd is for-profit in nature, offering high-quality precision analysis of data from whole genome sequencing. As at 30 June 2020, the Council holds 66% of the shares in genomiQa Pty Ltd (2019: 66%). genomiQa Pty Ltd's registered office is in Brisbane, Queensland, with its activities also being conducted there.

	2020 $'000	2019 $'000
genomiQa Pty Ltd		
Investment – at cost	500	275
	500	**275**

Council provides support to genomiQa Pty Ltd through a Letter of Comfort, duly authorised by a resolution of the Council, which represents a contingent liability for the Council. This Letter of Comfort is in accordance with sections 60A and 61A (1) of the *Statutory Bodies Financial Arrangements Act 1982*. Council will provide financial support to ensure business continuity of genomiQa Pty Ltd until 31 December 2021, unless the Council ceases to be a majority shareholder.

33. Controlled entities (cont'd)

genomiQa Pty Ltd was not required to prepare financial statements for 30 June 2020 and 30 June 2019. The net results and position of genomiQa Pty Ltd were not considered material and are therefore not consolidated in the Council's financial statements.

The company did not have any material contingent liabilities or commitments as at 30 June 2020 (similar as at 30 June 2019).

(d) Q-Gen Pty Ltd

During the 2004-05 financial year, the Council incorporated a wholly owned subsidiary, Q-Gen Pty Ltd. The operations of Q-Gen Pty Ltd were wound up as at 30 June 2009 with activities of the entity being taken over by the Council. The entity still exists as a shelf company but is dormant. A letter confirming current dormancy has been issued by the sole director of Q-Gen Pty Ltd.

(e) Endpoint IQ Pty Ltd

The Minister for Health approved the formation of Endpoint IQ Pty Ltd in September 2018.

Endpoint IQ Pty Ltd is for-profit in nature offering bespoke research management systems to the health and research community. As at 30 June 2020, the Council holds 80% of the shares in Endpoint IQ Pty Ltd (2019: 80%). Endpoint IQ Pty Ltd registered office is in Brisbane, Queensland, with its activities also being conducted there.

Council provides support to Endpoint IQ Pty Ltd through a Letter of Comfort, duly authorised by a resolution of the Council, which represents a contingent liability for the Council. This Letter of Comfort is in accordance with sections 60A and 61A (1) of the *Statutory Bodies Financial Arrangements Act 1982*. Council will provide financial support to ensure business continuity of Endpoint IQ Pty Ltd until 31 December 2021, unless the Council ceases to be a majority shareholder.

Endpoint IQ Pty Ltd was not required to prepare financial statements for 30 June 2020 and 30 June 2019. The net results and position of Endpoint IQ Pty Ltd were not considered material and are therefore not consolidated in the Council's financial statements.

Accounting policy – Controlled entities
Controlled entities are entities over which the Council has the power to govern the financial and operating policies, generally accompanying a shareholding of more than one half of the voting rights. Any controlled entities that are not considered as material are not consolidated with the Council's financial statements and the amount of the investment is recorded at cost.

As at 30 June 2020, the Council holds 100% (2019: 100%) each of directly controlled entities Q-Gen Pty Ltd, Vaccine Solutions Pty Ltd, 66% of genomiQa Pty Ltd (2019: 66%) and 80% in Endpoint IQ Pty Ltd (2019: 80%). On 31 January 2019, Council sold its 100% holding in Q-Pharm Pty Ltd. As the amount of the investments and the transactions of all entities are not considered material, they are not consolidated within the Council's financial statements.

The auditor for all controlled entities is the Auditor-General of Queensland.

Notes to the financial statements
For the year ended 30 June 2020

34. Related party transactions

	2020 $'000	2019 $'000
Transactions with other related party		
Q-Pharm Pty Ltd		
The following transactions occurred with related party Q-Pharm Pty Ltd during the financial year 2018-19 up to the date of sale:		
Sales and purchases of goods and services		
Sale of scientific services to Q-Pharm Pty Ltd	-	430
Provision of temporary staff and related on-costs to Q-Pharm Pty Ltd	-	-
Purchase of clinical services from Q-Pharm Pty Ltd	-	47
Other transactions		
Cash advances (made and repaid within the year)	-	1,810
Trade reimbursements of third party expenses	-	121

The Institute also provided, up to the date of sale, financial and administrative support services for Q-Pharm Pty Ltd. These services were not charged, and weren't considered material.

genomiQa Pty Ltd

The following transactions occurred with related party genomiQa Pty Ltd:

Sales and purchases of goods and services		
Provision of staff and related on-costs to genomiQa Pty Ltd	130	78
Licence of premises	9	-
Advance	517	407
Other transactions		
Equity investments	225	275
Trade reimbursements of third-party expenses	-	18
Outstanding balances arising from sales/purchases of services and reimbursements		
The following balance is outstanding at the end of the reporting period 2019-20:		
Current receivables	12	-
Advance	924	407

The Institute also provided administrative support services for genomiQa Pty Ltd. These services were not charged and weren't considered material.

34. Related party transactions (cont'd)

Endpoint IQ Pty Ltd

The following transactions occurred with related party Endpoint IQ Pty Ltd:

	2020 $'000	2019 $'000
Other transactions		
Advance	-	171
Loan – principal plus capitalised interest	533	-
Purchase of software support and maintenance services	132	-
Employee entitlements payout	52	-
Royalty revenue received from Endpoint IQ Pty Ltd	(8)	-
Outstanding balances arising from sales/purchases of services and reimbursements		
The following balances are outstanding at the end of the reporting period 2019-20:		
Loan – principal plus capitalised interest	704	-
Advance	-	171

The Institute also provided administrative support services for Endpoint IQ Pty Ltd. These services were not charged and weren't considered material.

Transactions with people/entities related to Key Management Personnel (KMP)

During the 2019-20 financial year Council's KMP did not enter into any transaction/arrangements with any related parties including close family members and entities controlled or jointly controlled by the KMP or a close family member. The 'Declarations of Related Party Information by non-Ministerial KMP' at 30 June 2020 support this disclosure.

Transactions with other Queensland Government–controlled entities

The Council receives an annual operational grant from the Department of Health, Queensland (Queensland Health). Refer to notes 3 & 28.

The Council leases land and buildings from the State of Queensland (represented by Queensland Health) for two buildings at nominal rental. In addition, the Central Building, completed on 1 June 2012, occupies MNHHS land without a current lease in place. Refer to note 18.

The Council undertakes a number of transactions, such as employer superannuation contributions, WorkCover premiums and insurance payments to a range of Queensland Government controlled entities on normal terms and conditions.

The Council has short-term cash on call funds invested in Queensland Treasury Corporation (QTC). Included in cash on call is $6.1m (2019: $6.1m) as at 30 June 2020. Refer to note 10.

The Council has long-term research funds invested in managed funds with QIC Limited (QIC). Refer to note 13.

35. First year application of new accounting standards or change in accounting policy

Accounting standards applied for the first time

Three new accounting standards with material impact were applied for the first time in 2019-20:
- AASB 15 *Revenue from Contracts with Customers*
- AASB 1058 *Income of Not-for-Profit Entities*
- AASB 16 *Leases*

No other accounting standards or interpretations that apply to the Council for the first time in 2019-20 have any material impact on the financial statements.

Accounting standards early adopted for 2019-20

No Australian Accounting Standards have been early adopted for 2019-20.

AASB 15 *Revenue from Contracts with Customers*

The Council applied AASB 15 *Revenue from Contracts with Customers* for the first time in 2019-20. The nature and effect of changes resulting from the adoption of these standards are described below.

1. New revenue recognition model

AASB 15 establishes a new five-step model for determining how much and when revenue from contracts with customers is recognised. The five-step model and significant judgments at each step are detailed below:

Step 1 – Identify the contract with the customer	Grant funding that the Council receives may contain a contract with a customer and thus fall within the scope of AASB 15. This is the case where the funding agreement requires the Council to transfer goods or services to third parties on behalf of the grantor, it is enforceable, and it contains sufficiently specific performance obligations.
Step 2 – Identify the performance obligations in the contract	This step involves first identifying all the activities the Council is required to perform under the contract, and determining which activities transfer goods or services to the customer. Where there are multiple goods or services transferred, the Council must assess whether each good or service is a distinct performance obligation or should be combined with other goods or services to form a single performance obligation. To be within the scope of AASB 15, the performance obligations must be 'sufficiently specific', such that the Council is able to measure how far along it is in meeting the performance obligations.
Step 3 – Determine the transaction price	When the consideration in the contract includes a variable amount, the Council needs to estimate the variable consideration to which it is entitled and only recognise revenue to the extent that it is highly probably a significant reversal of the revenue will not occur. This includes sales with a right of return, where the amount expected to be refunded is estimated and recognised as a refund liability instead of revenue.

35. First year application of new accounting standards or change in accounting policy (cont'd)

Step 4 – Allocate the transaction Price to the performance obligations	When there is more than one performance obligation in a contract, the transaction price must be allocated to each performance obligation, generally this needs to be done on a relative stand-alone selling price basis.
Step 5 – Recognise revenue when or as the department satisfies performance obligations	Revenue is recognised when the Council transfers control of the goods or Services to the customer. A key judgement is whether a performance obligation is satisfied over time or at a point in time. Where it is satisfied over time, the Council must also develop a method for measuring progress towards satisfying the obligation.

2. Other changes arising from AASB 15
AASB 15 also specifies the accounting for incremental costs of obtaining a contract and costs directly related to fulfilling a contract.

The standard requires contract assets (accrued revenue) and contract liabilities (unearned revenue) to be shown separately and requires contract assets to be distinguished from receivables. There are extensive new disclosures, which have been included in notes 3, 4, 11 and 21.

3. Transitional impact
Transitional policies adopted by Council are as follows:
- applied the modified retrospective transition method and has not restated comparative information for 2018-19, which continue to be reported under AASB 118 *Revenue*, AASB 1004 *Contributions and related interpretations*.

- elected to apply the standard retrospectively to all contracts, including completed contracts, at 1 July 2019. Completed contracts include contracts where the Council had recognised all of the revenue in prior periods under AASB 1004 *Contributions*.

- applied a practical expedient to reflect, on transition, the aggregate effect of all contract modification that occurred before 1 July 2019.

User charges and fees
To align with new terminology in AASB 15, accrued revenue and unearned revenue arising from contracts with customers have been renamed as contract assets and contract liabilities respectively. They are separately disclosed in note 11 and note 21.

Under AASB 15, where upfront revenue is received that is not linked to a specific performance obligation, even if non-refundable, the fee is considered to be a payment of revenue in advance for future goods or services. Consequently, that revenue is to be recognised as the goods/services are delivered to the customer.

Licence fees
The Council has a 10 year licence agreement with a tenant whereby an upfront fee for the establishment of services has been received in prior years. Under the new standard, this fee is to be recognised over the 10 year period. The transitional impact on 1 July 2019 was to recognise $3.25m as a contract liability, offset by a decrease in accumulated surplus.

35. First year application of new accounting standards or change in accounting policy (cont'd)

Contract research revenue
The largest of Council's contract research contracts are for the provision of research services for specific time periods in return for revenue. Council had previously recognised contract research revenue immediately when invoiced based on progress payments generally invoiced by calendar quarters in advance. Under AASB 15 *Revenue from Contracts with Customers*, revenue is now recognised as the performance obligations are delivered to the customer. Council now recognises each payment over the period to which it relates. The transitional impact on 1 July 2019 was to adjust revenue invoiced in advance as at 30 June 2019, resulting in an increase in contract liabilities by $0.5m offset by a decrease in accumulated surplus.

Grants
No change in treatment for the majority of Council's research grants is required. One grant was identified whereby a portion of revenue to cover overheads has historically been recognised up-front which, under AASB 15, should now be recognised over time in line with expenditure of the grant funds. The balance at 1 July 2019 of $34k was adjusted against contract liabilities, with an offsetting decrease in accumulated surplus.

The following table summarises the transitional adjustments on 1 July 2019 relating to the adoption of AASB 15. The net impact is recognised as an adjustment to opening accumulated surplus.

	$'000
Contract liabilities	(3,784)
Accumulated surplus	3,784

AASB 1058 *Income of Not-for-Profit Entities*
The Council applied AASB 1058 *Income of Not-for-Profit Entities* for the first time in 2019-20. The nature and effect of changes resulting from the adoption of AASB 1058 are described below.

1. Scope and revenue recognition under AASB 1058
AASB 1058 applies to transactions where Council acquires an asset for significantly less than fair value principally to enable the Council to further its objectives.

The Council's revenue line items recognised under this standard from 1 July 2019 include some grants and other contribution and user charges and fees.

General revenue recognition framework
The revenue recognition framework for in-scope transactions, other than specific-purpose capital grants, is as follows.
1. Recognise the asset – e.g. cash, receivables, PP&E, a right-of-use asset or an intangible asset
2. Recognise related amounts – e.g. contributed equity, a financial liability, a lease liability, a contract liability or provision
3. Recognise the difference as income up front

Specific-purpose capital grants
In contrast with previous standards such as AASB 1004, AASB 1058 allows deferral of income from capital grants where the grant:
- requires Council to use the funds to acquire or construct a recognisable non-financial asset (such as a building) to identified specifications;
- does not require Council to transfer the asset to other parties; and
- agreement is enforceable.

35. First year application of new accounting standards or change in accounting policy (cont'd)

For these capital grants, the funding received is initially deferred in a contract liability and subsequently recognised as revenue as or when the Council satisfies the obligations under the agreement.

Where funds are received after the fact, such as a reimbursement, or there is no enforceable agreement or no identified specifications of the asset to be purchased or constructed, the revenue will continue to be recognised on receipt under AASB 1058. This treatment is the same as in prior years.

Special-purpose donations
Council has previously recognised special purpose donations, where the donor specifies a researcher and area of research where the funds are to be directed, as deferred revenue until those funds are spent by the scientist. As there is no enforceable agreement, these donations must now be recognised immediately on receipt under AASB 1058. The transitional impact on 1 July 2019 was to recognise $3.053m of previously deferred special-purposes donations resulting in a decrease of contract liability and an increase in accumulated surplus.

The following table summarises the transitional adjustments on 1 July 2019 relating to the adoption of AASB 1058:

	$'000
Contract liabilities	3,053
Accumulated surplus	(3,053)

2. Transitional impact
Transitional policies adopted by Council are as follows:
- applied the modified retrospective transition method and has not restated comparative information for 2018-19. They continue to be reported under relevant standards applicable in 2018-19, such as AASB 1004.
- elected to apply the standard retrospectively to all contracts, including completed contracts, at 1 July 2019. Completed contracts are contracts where Council had recognised all of the revenue in prior periods under AASB 1004.
- applied a practical expedient to not remeasure at fair value assets previously acquired for significantly less than fair value and originally recorded at cost.

Revenue recognition for the majority of Council's grants and other contributions will not change under AASB 1058, as compared to AASB 1004 with the exception of the items noted below. Revenue will continue to be recognised when Council gains control of the asset (e.g. cash or receivable) in most instances.

Impact of adoption of AASB 15 *Revenue from Contracts with Customers* and AASB 1058 *Income of Not-for-Profit Entities*

The following table shows the impacts of adopting AASB 15 and AASB 1058 on Council's 2019-20 financial statements. It compares the actual amounts reported to amounts that would have been reported if the previous revenue standards (AASB 1004, AASB 118, AASB 111 and related interpretations) had been applied in the current financial year.

35. First year application of new accounting standards or change in accounting policy (cont'd)

	As reported	AASB 1058 changes	AASB 15 changes	Previous standards
	$'000	$'000	$'000	$'000
Operating result for 2019-20				
Grants and other contributions	76,296	(1,217)	-	75,079
User charges and fees	28,916	-	(537)	28,379
Other expenses	7,222	-	(334)	6,888
Operating result for the year	**(9,567)**	**(1,217)**	**(203)**	**(10,987)**
Total comprehensive income	**(9,567)**	**(1,217)**	**(203)**	**(10,987)**
Balances as at 30 June 2020				
Assets				
Receivables	7,916	-	(140)	7,776
Total Assets	**467,614**	**-**	**(140)**	**467,474**
Liabilities				
Contract liabilities	44,096	4,269	(3,720)	44,645
Total liabilities	**56,670**	**4,269**	**(3,720)**	**57,219**
Equity				
Accumulated surplus	338,445	(4,269)	3,580	337,756
Total equity / net assets	**410,944**	**(4,269)**	**3,580**	**410,255**

Significant differences in the financial statement line items are described below.

(a) Grants and other contributions revenue – special purpose donations and philanthropic grants
During 2019-20, special purpose donations of $0.85m and philanthropic grants of $0.37m were recognised in full on receipt under AASB 1058. This amount would not have been recognised in full under previous standards, as in prior periods it would have been deferred until the funds were spent by scientists. At 30 June 2020, no unearned liability exists for these special-purpose donations and philanthropic grants, the balance of unspent funds would have existed under the previous standards.

(b) User changes and fees revenue
During 2019-20, upfront licence fees in relation to a tenant of $0.5m was recognised under AASB 15. This amount would not have been recognised under previous standards as all of the revenue had already been recognised in prior periods when the upfront licence fees were received. At 30 June 2020, a contract liability of $2.8m remains. This balance would not have existed under the previous standards.

35. First year application of new accounting standards or change in accounting policy (cont'd)

(c) User changes and fees revenue – contract research revenue
During 2019-20, contract research revenue of $0.04m was not recognised under AASB 15. This amount would have been recognised under previous standards as the revenue would have been recognised on progress invoicing by calendar quarters in advance. At 30 June 2020, a contract liability exists. This balance would not have existed under the previous standards.

AASB 16 *LEASES*
The Council applied AASB 16 *Leases* for the first time in 2019-20. The application of AASB 16 has no material impact on the financial statements.

AASB 16 introduced new guidance on the definition of a lease, being a contract that conveys the right to use an asset for a period of time in exchange for consideration.

As a Lessee, Council has only short-term leases and leases of low value assets. The payments for these leases are recognised as expenses on a straight-line basis over the lease term, rather than accounting for them on balance sheet. This accounting treatment is the same as that used for operating leases under the previous standard.

Lessor accounting remains largely unchanged under AASB 16, with leases still classified as either operating or finance leases.

Land
The Council's buildings are built on land owned by Metro North Hospital & Health Services (MNHHS). It is anticipated that Council will enter into a peppercorn lease with MNHHS for land occupied by the three buildings, for a 40 year term, in the reporting period ending 30 June 2021. Leases currently in place for the land and buildings know as Bancroft and CBCRC (refer to note 18) are to be terminated at this time.

AASB 2018-8 *Amendments to Australian Accounting Standards – Right-of-Use Assets of Not for profit entities* provides for a temporary option for not-for-profit entities to elect to measure a class of right-of-use assets arising under concessionary leases at cost or fair value at initial recognition. Council will recognise a ROUA for lease with MNHHS at cost and include suitable disclosures in the 2020-21 annual financial statements. As the lease to be entered with MNHHS is a peppercorn lease and therefore not material, there will be no recognition of the lease liability on the statement of financial position.

No transition adjustments to asset and liability balances at 1 July 2019 in relation to land were made.

36. Taxation

The Council is a State body as defined under the *Income Tax Assessment Act 1936* and is exempt from Commonwealth taxation with the exception of Fringe Benefits Tax (FBT) and Goods and Services Tax (GST). FBT and GST are the only taxes accounted for by the Council. GST credits receivable from, and GST payable to the ATO, are recognised. Refer to note 11. The operation of the Institute's commercial activities and commercial business entities does not impact on the Institute's charitable status with the Australian Charities and Not-for-profits Commission (ACNC).

Notes to the financial statements
For the year ended 30 June 2020

37. Climate risk disclosure

Climate Risk Assessment
The Council addresses the financial impacts of climate-related risks by identifying and monitoring the accounting judgements and estimates that will potentially be affected, including asset useful lives, fair value of assets, provisions or contingent liabilities and changes to future expenses and revenue.

The Council has not identified any material climate-related risks relevant to the financial report at the reporting date; however Council, constantly monitors the emergence of such risks under the Queensland Government's Climate Transition Strategy.

The Council of The Queensland Institute of Medical Research

Management Certificate
For the year ended 30 June 2020

Certificate of The Council of the Queensland Institute of Medical Research

These general purpose financial statements have been prepared pursuant to:
– section 62(1) of the *Financial Accountability Act 2009* (the Act),
– section 39 of the *Financial and Performance Management Standard 2019;*
– *Australian Charities and Not-for-profits Commission Act 2012; and*
– *other prescribed requirements.*

In accordance with section 62(1)(b) of the Act we certify that in our opinion:

a. the prescribed requirements for establishing and keeping the accounts have been complied with in all material respects; and

b. the financial statements have been drawn up to present a true and fair view, in accordance with prescribed accounting standards, of the transactions of The Council of the Queensland Institute of Medical Research for the financial year ended 30 June 2020 and of the financial position of the Council at the end of that year; and

c. there are reasonable grounds to believe that the Council of the Queensland Institute of Medical Research will be able to pay its debts as and when they become due and payable.

The Council acknowledges responsibility under s 7 and s 11 of the *Financial and Performance Management Standard 2019* for the establishment and maintenance, in all material respects, of an appropriate and effective system of internal controls and risk management processes with respect to financial reporting throughout the reporting period.

Dated at Brisbane this 25th day of August 2020

Professor Arun Sharma	**Professor Fabienne Mackay**	**Donna Hancock**
Chair of Council	Director and Chief Executive Officer	Secretary

Queensland Audit Office
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INDEPENDENT AUDITOR'S REPORT

To the Council of the Queensland Institute of Medical Research

Report on the audit of the financial report

Opinion

I have audited the accompanying financial report of the Council of the Queensland Institute of Medical Research.

In my opinion, the financial report:

a) gives a true and fair view of the entity's financial position as at 30 June 2020, and its financial performance and cash flows for the year then ended

b) complies with the *Financial Accountability Act 2009*, the Financial and Performance Management Standard 2019, the *Australian Charities and Not-for-profits Commission Act 2012*, the Australian Charities and Not-for-profits Commission Regulation 2013 and Australian Accounting Standards.

The financial report comprises the statement of financial position as at 30 June 2020, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year then ended, notes to the financial statements including summaries of significant accounting policies and other explanatory information, and the management certificate.

Basis for opinion

I conducted my audit in accordance with the *Auditor-General Auditing Standards*, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Report* section of my report.

I am independent of the entity in accordance with the auditor independence requirements of the *Australian Charities and Not-for-profits Commission Act 2012* and with the ethical requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) that are relevant to my audit of the financial report in Australia. I have also fulfilled my other ethical responsibilities in accordance with the Code and the *Auditor-General Auditing Standards*.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Responsibilities of the Council for the financial report

The Council is responsible for the preparation of the financial report that gives a true and fair view in accordance with the *Financial Accountability Act 2009*, the Financial and Performance Management Standard 2019, the *Australian Charities and Not-for-profits Commission Act 2012*, the Australian Charities and Not-for-profits Commission Regulation 2013 and Australian Accounting Standards, and for such internal control as the Council determines is necessary to enable the preparation of the financial report that is free from material misstatement, whether due to fraud or error.

The Council is also responsible for assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless it is intended to abolish the entity or to otherwise cease operations.

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Auditor's responsibilities for the audit of the financial report

My objectives are to obtain reasonable assurance about whether the financial report as a whole is free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with the Australian Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of this financial report.

As part of an audit in accordance with the Australian Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- Identify and assess the risks of material misstatement of the financial report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances. This is not done for the purpose of expressing an opinion on the effectiveness of the entity's internal controls but allows me to express an opinion on compliance with prescribed requirements.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the entity.
- Conclude on the appropriateness of the entity's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial report or, if such disclosures are inadequate, to modify my opinion. I base my conclusions on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.
- Evaluate the overall presentation, structure, and content of the financial report, including the disclosures, and whether the financial report represents the underlying transactions and events in a manner that achieves fair presentation.

Report on other legal and regulatory requirements

Statement

In accordance with s.40 of the *Auditor-General Act 2009*, for the year ended 30 June 2020:

a) I received all the information and explanations I required.

b) I consider that, the prescribed requirements in relation to the establishment and keeping of accounts were complied with in all material respects.

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Better public services

Prescribed requirements scope

The prescribed requirements for the establishment and keeping of accounts are contained in the *Financial Accountability Act 2009*, any other Act and the Financial and Performance Management Standard 2019. The applicable requirements include those for keeping financial records that correctly record and explain the entity's transactions and account balances to enable the preparation of a true and fair financial report.

28 August 2020

Charles Strickland
as delegate of the Auditor-General

Queensland Audit Office
Brisbane

Compliance Checklist

Summary of requirement		Basis for requirement	Annual report reference
Letter of compliance	A letter of compliance from the accountable officer or statutory body to the relevant Minister/s	ARRs – section 7	3
Accessibility	Table of contents Glossary	ARRs – section 9.1	4 n/a
	Public availability	ARRs – section 9.2	2
	Interpreter service statement	*Queensland Government Language Services Policy* ARRs – section 9.3	2
	Copyright notice	*Copyright Act 1968* ARRs – section 9.4	2
	Information Licensing	*QGEA – Information Licensing* ARRs – section 9.5	n/a
General information	Introductory Information	ARRs – section 10.1	6–12
	Machinery of Government changes	ARRs – section 10.2, 31 and 32	(if applicable) n/a
	Agency role and main functions	ARRs – section 10.2	5, 13, 24–27
	Operating environment	ARRs – section 10.3	24
Non-financial performance	Government's objectives for the community	ARRs – section 11.1	24–25
	Other whole-of-government plans / specific initiatives	ARRs – section 11.2	n/a
	Agency objectives and performance indicators	ARRs – section 11.3	28–33
	Agency service areas and service standards	ARRs – section 11.4	n/a
Financial performance	Summary of financial performance	ARRs – section 12.1	66
Governance – management and structure	Organisational structure	ARRs – section 13.1	23
	Executive management	ARRs – section 13.2	13–22
	Government bodies (statutory bodies and other entities)	ARRs – section 13.3	n/a
	Public Sector Ethics	*Public Sector Ethics Act 1994* ARRs – section 13.4	37
	Human Rights	*Human Rights Act 2019* ARRs – section 13.5	39
	Queensland public service values	ARRs – section 13.6	37

Summary of requirement		Basis for requirement	Annual report reference
Governance – risk management and accountability	Risk management	ARRs – section 14.1	37
	Audit committee	ARRs – section 14.2	20
	Internal audit	ARRs – section 14.3	37
	External scrutiny	ARRs – section 14.4	n/a
	Information systems and recordkeeping	ARRs – section 14.5	39
Governance – human resources	Strategic workforce planning and performance	ARRs – section 15.1	38
	Early retirement, redundancy and retrenchment	*Directive No.04/18 Early Retirement, Redundancy and Retrenchment* ARRs – section 15.2	n/a
Open Data	Statement advising publication of information	ARRs – section 16	39
	Consultancies	ARRs – section 33.1	https://data.qld.gov.au
	Overseas travel	ARRs – section 33.2	https://data.qld.gov.au
	Queensland Language Services Policy	ARRs – section 33.3	https://data.qld.gov.au
Financial statements	Certification of financial statements	FAA – section 62 FPMS – sections 38, 39 and 46 ARRs – section 17.1	125
	Independent Auditor's Report	FAA – section 62 FPMS – section 46 ARRs – section 17.2	126–128

FAA *Financial Accountability Act 2009*

FPMS *Financial and Performance Management Standard 2019*

ARRs *Annual report requirements for Queensland Government agencies*

Copies of this annual report are available on QIMR Berghofer's website at www.qimrberghofer.edu.au/annualreport and by contacting QIMR Berghofer on (07) 3362 0222, freecall 1800 993 000 or enquiries@qimrberghofer.edu.au.

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