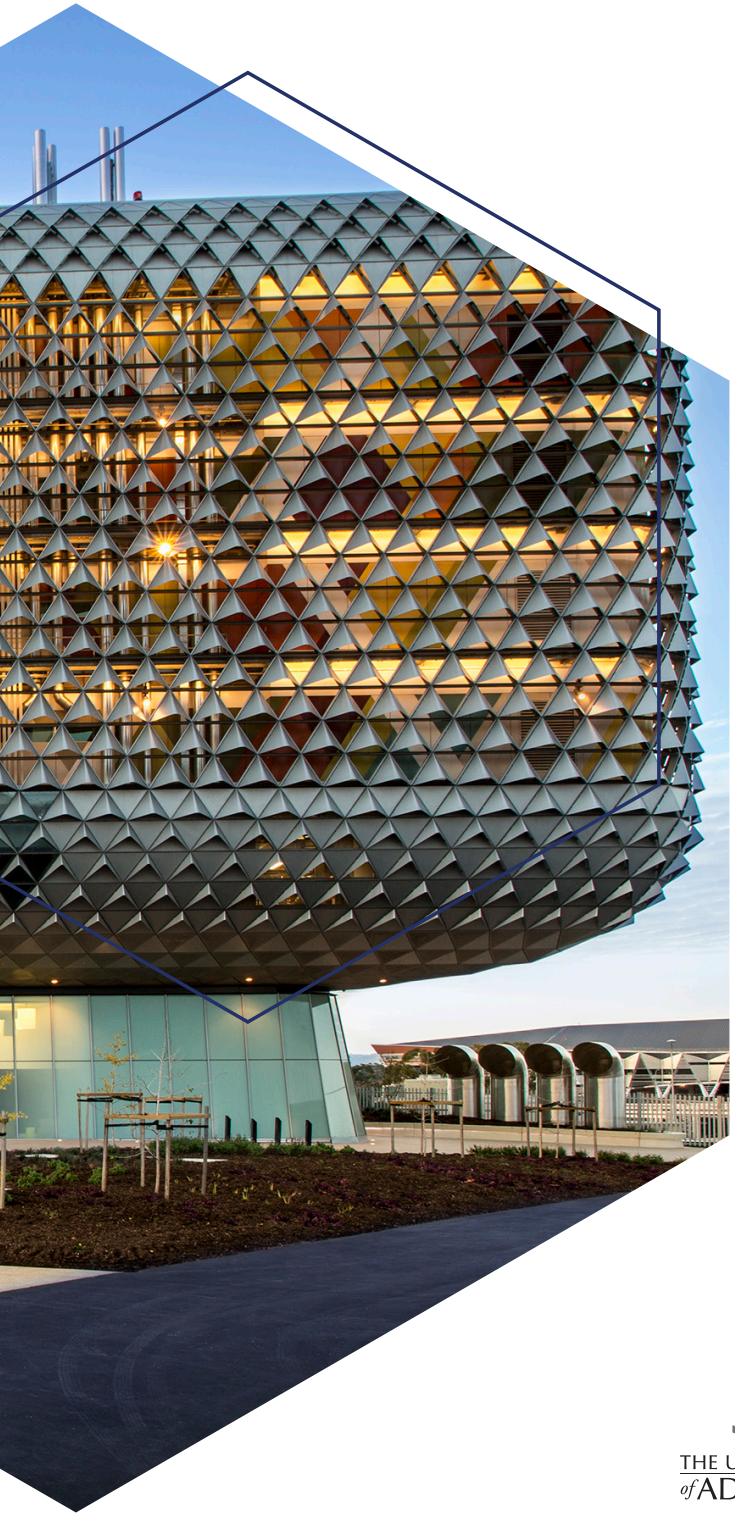
SAHMRI
South Australian Health & Medical Research Institute

ANNUAL REPORT 2017

Acknowledgement of Country



The South Australian Health and Medical Research Institute (SAHMRI) acknowledges the Kaurna People as the Traditional Custodians of the Adelaide region, where our buildings are located.

We recognize the Kaurna peoples' cultural, spiritual, physical and emotional connection with the land. We honour and pay our respects to Kaurna elders, both past and present, and all generations of Kaurna people, now and into the future.

We acknowledge the other Traditional Owners who live across South Australia, where SAHMRI research may be conducted.

THE UNIVERSITY of ADELAIDE
University of South Australia
Flinders UNIVERSITY
Government of South Australia
Australian Government
CSIRO
EMBL Australia
Cancer Council SA

Contents

Our Story

South Australia has a long history of excellence in health and medical research. The South Australian Health and Medical Research Institute (SAHMRI) was incorporated in December 2009 as the state's first flagship health and medical research institute after a review was conducted by Professor John Shine and Mr Alan Young AM, which recommended the establishment of a flagship research institute to increase South Australia's (SA) health and medical research capacity.

Following support of this recommendation from the State Government, the Federal Government's Health and Hospital Fund provided a $200 million grant to build our research facility.

SAHMRI's purpose is to translate research into health outcomes. Our research focuses on improving the prevention, treatment and diagnosis of some of the biggest health challenges that face our community.

We currently have over 600 researchers in the building who are committed to transforming innovative health and medical research into practical benefits for patients and the community.

EVERYTHING WE DO IS GEARED TOWARDS ONE VISION:

CONDUCTING INSPIRED RESEARCH THAT WILL LEAD TO BETTER HEALTH OUTCOMES

We have recruited some of the most talented researchers from across Australia and overseas, who are collaborating across our seven research themes:

- Aboriginal Health
- Cancer
- Heart Health
- Healthy Mothers, Babies and Children
- Infection and Immunity
- Mind and Brain
- Nutrition and Metabolism.

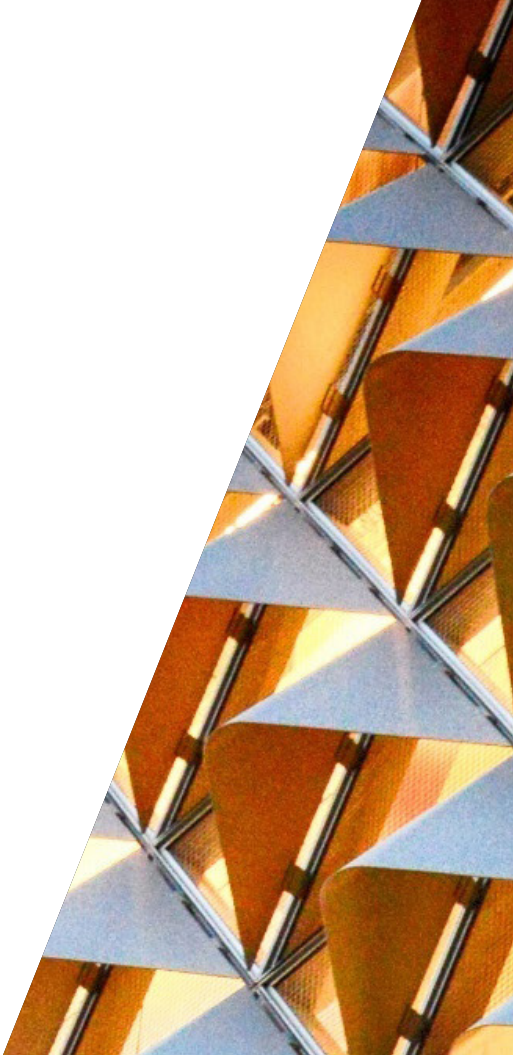
SAHMRI is a significant investment in the health and quality of life of all South Australians. Through collaboration and innovation, SAHMRI is leading the way in new discoveries, treatments and better health for the entire community. In response to the growing need for improved, affordable and more accessible health care, SAHMRI continues to focus on delivering real health reform back to the community.

Who we are

Our Aspirations

Our research will:

- Deliver the right interventions, to the right people, at the right time in their lives to optimise health
- Be translational and deliver health outcomes with global impact to communities
- Provide a focus and leadership for health and medical research.



Our Brand

Our identity is inspired by a microscope image of a stylised cell. A cell is an appropriate symbol because of our links to biology and as cells require linkages to other cells to provide structural support and carry nutrients and communications to neighbouring cells. While our research themes operate independently, they have important links to each other.

They share common objectives, facilities and knowledge. They are also linked to other health and medical research institutes in South Australia, interstate and overseas; sharing findings and working collaboratively.

Our Vision

Everything we do is geared towards one vision: to transform research into health.

Our Values

- Excellence
- Innovation
- Courage
- Integrity
- Teamwork

Our Culture

- Bold, Driven, Dynamic
- Persistent and Focused
- Collaborative and Enabling
- Embrace Diversity, Demand Equity
- Friendly, Fast, Flexible and Fun

A letter from the Executive Director

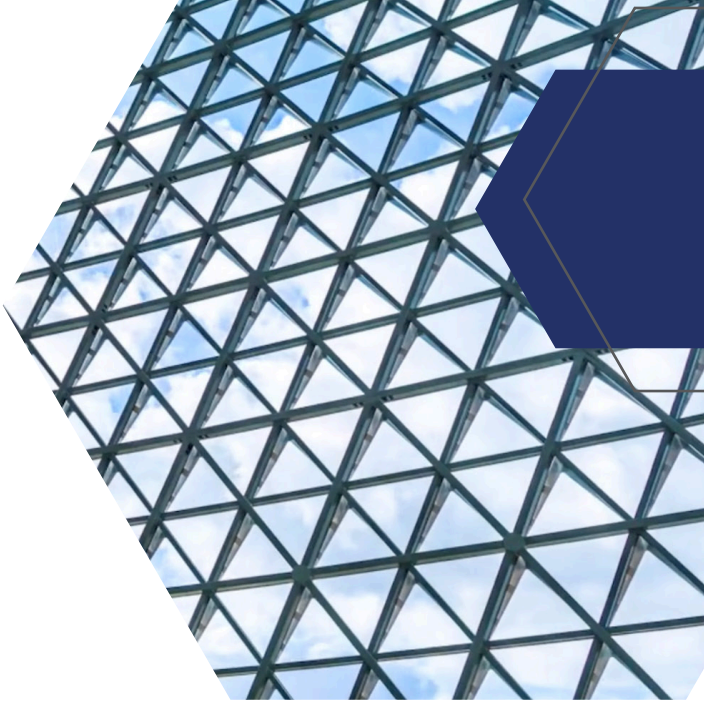
This time last year I wrote about what an exciting time it was to be involved with SAHMRI. Twelve months later, I believe our future is looking even brighter.

The past year has seen the opening of the Clinical and Research Imaging Centre (CRIC); a landmark partnership between SAHMRI and Dr Jones & Partners Medical Imaging, which exemplifies our collaborative philosophy that is better outcomes for research, for our commercial partners and for the diagnosis and treatment of patients. The CRIC provides state of the art cardiovascular CT, MRI and CT/PET platforms for clinical and research imaging, while its proximity to SAHMRI's cyclotron enables the development of new shorter half-life compounds to investigate conditions including dementia, cancers and cardiovascular disease.

One of many research fields to benefit from the CRIC is the revolutionary Neil Sachse Foundation, which has been formally welcomed into the SAHMRI community. The spinal cord injury research group's Project Discovery aims to revolutionise the diagnosis, prognosis and treatment through the use of radiopharmaceuticals to produce three-dimensional images.

SAHMRI has also strengthened its position as a leader in the health and aging sector, securing funding to develop the Registry of Older South Australians (ROSA). This unique resource promises economic and community benefits that will go beyond South Australian borders, including the analysis of models of care, assessment of health outcomes and provision of solutions for the sector.

Without losing focus on our core disciplines and strengths, we are also devoting much effort to the development of SAHMRI 2, to further expand the depth and breadth of our research while becoming the first site in the southern hemisphere to house a proton therapy unit. Our hosting of this year's National Particle Therapy Symposium was a great endorsement of SAHMRI's leadership in this field.



The pursuit of research excellence for better health outcomes is our mission, but SAHMRI proudly embraces our responsibilities that go beyond science; in corporate responsibility and as a champion for equity. Our appointment of a Gender Equity Project Officer is another important step towards earning our Athena SWAN Charter Bronze Award, we have established a LGBTQI+ committee, and are finalising our Reconciliation Action Plan, which will be launched in February next year.

Amid all of these successes, and the promise of more to come, our most valuable asset now and into the future remains our people. We boast an extraordinary wealth of talented, resourceful and inspirational researchers who are dedicated to addressing the greatest health issues of our time. The quality of our publications, which this year have numbered more than 900, plays a significant role in SAHMRI continuing to attract the best and brightest minds and productive partnerships.

SAHMRI would not exist without the cooperation of our partners including the University of Adelaide, the University of South Australia, Flinders University and the Central Adelaide Local Health Network including the newly opened Royal Adelaide Hospital. Together we will continue to strive to optimise health for people throughout South Australia, Australia and the world.

Professor Steve Wesselingh

A letter from the Chair of the Board

It gives me great pride, but also a great sense of anticipation, to share with you the 2017 South Australian Health and Medical Research Institute (SAHMRI) annual report. Pride because of the significant achievements we have made over the past 12 months and anticipation because of the confidence I have that this institute will continue to grow as a source of world-class medical research that improves the lives of people throughout the world.

SAHMRI is at the centre of a collaborative corridor of medical research that stands to be the rival of any in the world. Already, we are working closely with our neighbours the newly opened Royal Adelaide Hospital and the University of Adelaide's Health and Medical Science Building, to undertake translatable research that meaningfully impacts our communities. We look forward to the opening of the University of South Australia's Cancer Research Institute in the near future and we continue to work side-by-side with our colleagues from Flinders University.

In the longer term, plans are progressing for the construction of SAHMRI 2 with both the Federal and State Governments financially committing to the project. SAHMRI 2 will contain the Bragg Centre for Proton Therapy - the first of its kind in the southern hemisphere. This facility will mean Australian cancer sufferers no longer need to travel overseas to access life-saving treatment that targets tumour cells without damaging surrounding healthy tissue.

While SAHMRI is growing physically, the SAHMRI community too continues to grow through partnerships with businesses, trusts, foundations, families and individuals. While we can proudly stand by our record of earning grants from the National Health and Medical Research Council and other prominent foundations, it is support from all levels of our community that not just enables, but inspires, the work we do.

It is incredible to think of how far we have come together in just four years, and without hyperbole, I can predict the next four years and beyond will be even more significant for SAHMRI and our community.

I have said previously that my involvement with SAHMRI is the highlight of my career. That sense of pride only continues to grow.

Raymond Spencer

Board of Directors

Mr Raymond Spencer

Non-executive Chairman

Mr Spencer is Chairman or a board member of a number of private and public companies in Australia and the USA. Mr Spencer was appointed to the Board as Chairman on 21 December 2009.

Professor Alastair Burt
BSc (Hons), MBChB, MD (Hons)

Non-executive Director

Professor Burt is the Executive Dean of the Faculty of Health and Medical Sciences at The University of Adelaide and is the Editor in Chief of "MacSweens Pathology of the Liver" and the journal "Histopathology". Professor Burt was appointed to the Board on 16 May 2017.

Mr Alan Young
AM, MSAA, SAFin, AFPA (Snr), FAICD, SIA (Aff), C.UnivFlin

Non-executive Deputy Chairman

Mr Young was co-author of the Shine Young Report, a review of health and medical research in South Australia commissioned by the South Australian Government which led to the establishment of SAHMRI. Mr Young is Co-Founder and Joint Managing Director of Baker Young Stockbrokers Limited. He is also the current Founder/Chair of Belvidere Winery, Chair of the Australian Central School of Art, Vice Chair of Solstice Media Ltd, Co-Founder/Chair of Flinders Medical Centre Foundation, Founder/Chair of Flinders Bio Medical Engineering Pty Ltd, Director of NoQ Holdings USA and Director of eGrowcery Inc (USA). In 2013 he was made a Companion of Flinders University, an award recognising his contribution to the University through his commitment to medical research and the visual arts. Mr Young was appointed to the Board as a Founding Member on 21 December 2009.

Emeritus Professor John Hopwood AM, FAA, FAHMS, Dip.App.Chem, PhD, FRCPA (Hons)

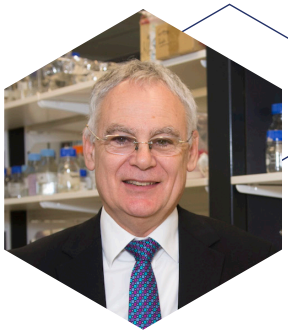
Non-executive Director

John Hopwood is an Emeritus Professor at The University of Adelaide and affiliate Professor in the Department of Pharmacy at the University of South Australia. Professor Hopwood was appointed to the Board on 21 December 2009.

Professor Steve Wesselingh BMBS, FRACP, PhD

Executive Director

Professor Wesselingh is the Executive Director of the Group and Leader of SAHMRI's Infection and Immunity Theme. He is an Infectious Diseases Physician with research interests in Neurovirology, HIV, microbiome research and vaccine development. Professor Wesselingh was appointed to the Board on 1 February 2011.



Professor Robert Saint AM BSc (Hons), PhD

Non-executive Director

Professor Saint is Deputy Vice-Chancellor (Research) at Flinders University. He was previously a member of the Australian Research Council College of Experts and was a standing member of the Prime Minister's Science, Engineering and Innovation Council. Professor Saint was previously a member of the Board between 2014 and 2015 and was reappointed to the Board on 1 August 2017.

Professor Marie Wilson GAICD

Non-executive Director

Professor Wilson is Pro Vice Chancellor (Business and Law) of the University of South Australia Business School. Her specialities include the management of performance (with a focus on professionals and knowledge work), decision-making and the human side of entrepreneurship and economic development Professor Wilson was appointed to the Board on 29 June 2016.

Professor Michael Brooks
FTSE, FACS

Non-executive Director

Professor Brooks is the Deputy Vice-Chancellor (Research) and Vice-President (Research) at The University of Adelaide. Professor Brooks served as a member of the Board from 4 August 2015 to 17 May 2017.

Ms June Roache
BAcc, GradCertMgt, FAICD, FCPA, FAIM

Non-executive Director

Ms Roache has extensive business experience having held several senior executive roles including Chief Executive of SA Lotteries, and a number of governance roles including Vice President of the World Lottery Association and Chair of the Asia Pacific Lottery Association. Ms Roache served as a member of the Board from 5 May 2014 to 1 February 2018.

Ms Loretta Reynolds
LLB, BEc, FAICD, SFFin

Non-executive Director

Ms Reynolds is a corporate partner and Chairman of national law firm, Thomson Geer, Chairman of the Royal Flying Doctor Service, Central Operations and a non-executive director of ASC. Ms Reynolds served as a member of the Board from 6 May 2014 to 1 August 2017.

Professor Colin Stirling
BSc, PhD

Non-executive Director

Professor Stirling is the Vice-Chancellor of Flinders University. He is a Member of Universities Australia as well as a Chairman or a board member of a number of companies and associations in Australia. Professor Stirling served as a member of the Board from 4 March 2015 to 7 September 2017.

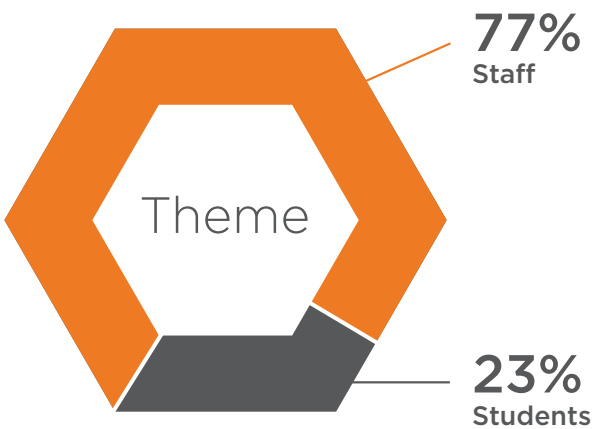
Aboriginal Health

WARDLIPARINGGA
Aboriginal Research

The Wardliparingga Aboriginal Research Unit seeks to improve health and wellbeing through the development, implementation, evaluation and translation of interventions that reduce inequalities in health and social outcomes for Aboriginal people and the communities in which they live. Our primary research interests include population health monitoring, clinical research into chronic diseases, health services research and health policy.

Research Highlights

- Professor Alex Brown participated in the development of the Mauritius Diabetes Strategy, at the request of the Mauritius Government.
- Wardliparingga received $840,000 from the Fay Fuller Foundation in 2017 to produce health status and outcomes reports for Aboriginal people in 18 geographical areas across SA. These reports highlight inequalities in health and social outcomes at the community level rather than state level, which will assist with targeted policy and services approaches to improving health outcomes. The Reports also provide the baseline for monitoring the effects of policy and practice over time and will be the first time for many Aboriginal communities have had their own data to use for planning, advocacy and the like. Additionally, the project will seek to develop and implement a protocol for Indigenous data governance.
- The Aboriginal Diabetes Study (PROPHECY) completed comprehensive baseline diabetes assessments on the first 700 Aboriginal and Torres Strait Islander participants. Recruitment to the study will continue in 2018 with the participants forming the world's largest study cohort of Indigenous diabetic and non-diabetic people. PROPHECY will examine the progression of diabetes and diabetic complications within the cohort, and will use phenotypic characterisation to investigate genetic predispositions to type 2 diabetes in Indigenous people, whilst looking for ancient genetic clues to the question of why some people develop the disease and its complications, and others don't.



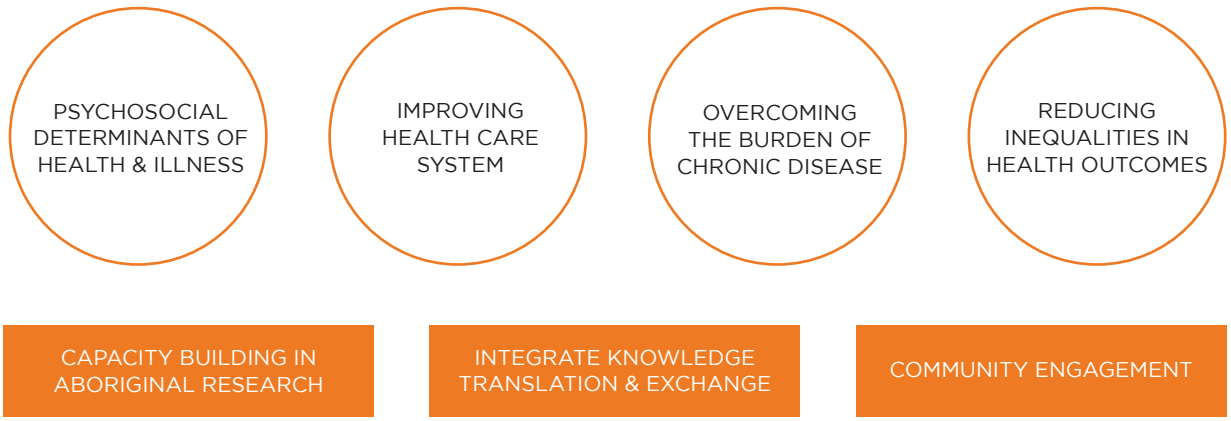
The theme is comprised of 51 staff, in addition to 15 students.

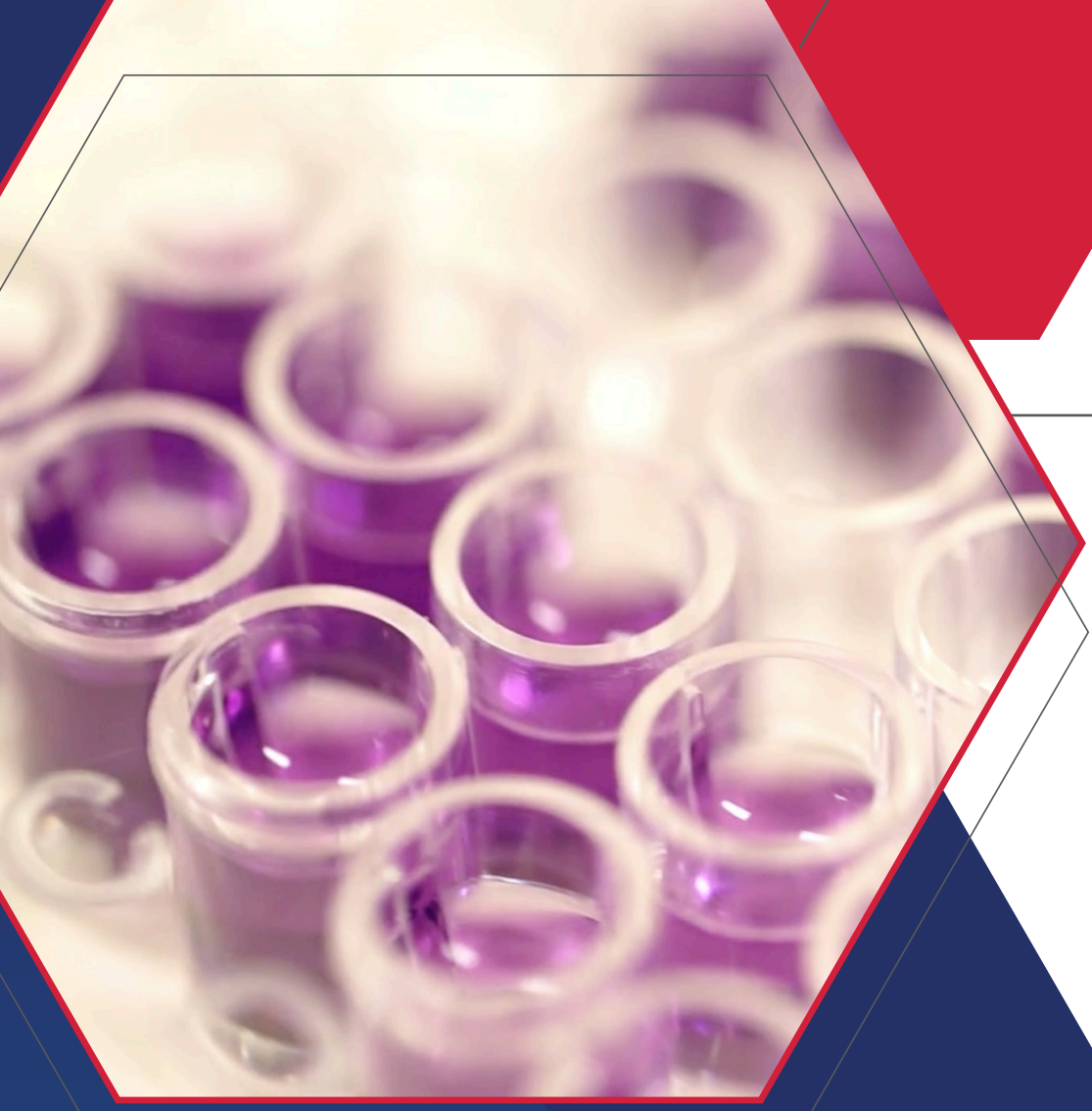
Over 50% of research and professional staff employed by Wardliparingga are of Aboriginal or Torres Strait Islander descent.

This demonstrates Wardliparingga's overarching commitment to developing the Aboriginal and Torres Strait Islander research workforce.

The team has established wide ranging partnerships with key Aboriginal stakeholders, community groups and health services; leading national and international researchers; has built a network of people interested and involved in Aboriginal health research in South Australia; and has invested in the development of existing and new Aboriginal and Torres Strait Islander and non-Aboriginal researchers to develop capacity in working within Aboriginal health.

The theme's structure remains based on four key research domains, under-pinned by three key pillars of capacity building, research translation and community engagement.





Heart Health

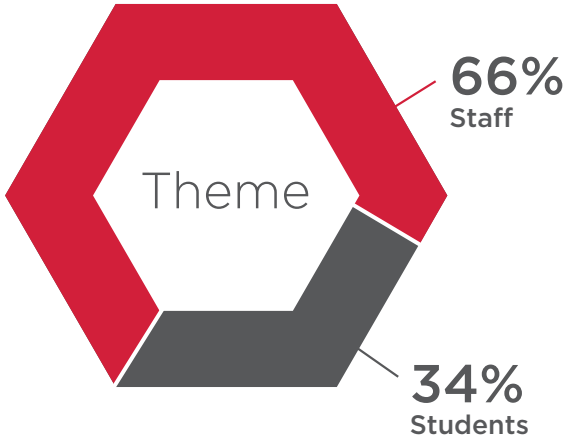
The theme is working to develop better approaches to prevention, diagnosis and treatment of heart disease with a major focus on diseases of blood vessels, heart structure and function, and heart rhythm disorders.

Research Highlights

- *A Phase II Multi-Center, Double-blind, Placebo-controlled, Dose-focusing Trial Of CER-001 In Subjects With Acute Coronary Syndrome CER-001 Atherosclerosis Regression ACS Trial (CARAT study).* This was the first international multicentre study that SAHMRI conducted from conception to completion as the international lead. We provided services as the Academic Research Operation (ARO) including global project management, Australian site management and monitoring. The Atherosclerosis Imaging Core Laboratory were responsible for the imaging endpoint analysis. SAHMRI ICT were key in developing the data management tool (eCRF) and supporting the trials systems. Professor Stephen Nicholls led the trial with a global academic steering committee. The study recruited 301 participants from 37 sites located in Australia, Hungary, The Netherlands and United States. The final study visit occurred at the end of November 2016, with database lock occurring in February 2017. Professor Nicholls presented the study results at the American College of Cardiology meeting in Washington, USA in March 2017. This was a negative study - CER-001 showed no benefit over placebo in subjects with Acute Coronary Syndrome. This study was important for Heart Health and SAHMRI both financially and across the institute, and has laid a foundation for clinical research and future endeavours.

- Dr Anjali Nagpal, a final year PhD student at SAHMRI from the University of Adelaide whose thesis focuses on the steps required to achieve a clinical trial using stem cell therapy in stroke, was recognised by an editorial request to provide a review and perspective on early phase clinical trials for a high impact stem cell journal, Stem Cell Research and Therapy. This review achieved the status of a featured article by the journal and has already had more than 3000 requests for access.

- The Cardiac Imaging Research Group commenced a study 'Prognostic Utility of Blood Oxygen Level Dependent (BOLD) Cardiovascular Magnetic Resonance (CMR) Imaging in Chronic Kidney Disease (CKD)'. This study aims to evaluate 150 participants with CKD or renal transplant using echocardiography and BOLD CMR. Blood Oxygen Level Dependent (BOLD) CMR imaging has a relatively high sensitivity/ specificity and a low risk profile. It allows visualisation of the oxygenation status of the myocardial tissue and, therefore, gives a clearer understanding of myocardial ischaemia. The study will assess if BOLD CMR can be used as a prognostic tool to predict risk for cardiovascular death, heart failure hospitalisation and acute coronary syndrome at 2 years. Preliminary results of this work have been published and if confirmed in this larger trial, the results have the potential to improve clinical care in patients with CKD.

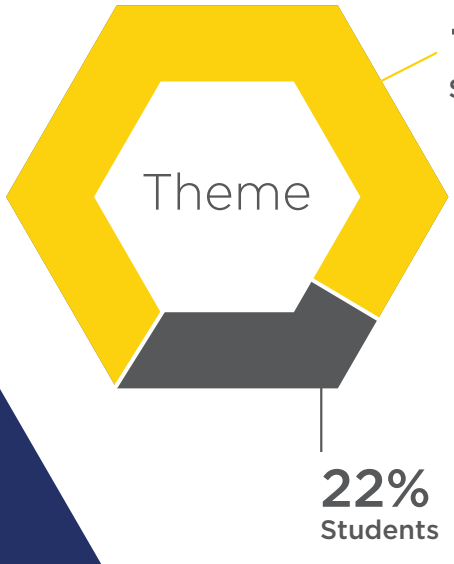


The theme is comprised of 75 staff, in addition to 38 students.

Cancer

The unifying goal of the Cancer theme is to improve the management and outcome for patients with cancer by fostering excellence in the full spectrum of cancer-related research including fundamental discovery, systems biology, translational research, and the design and implementation of innovative clinical trials.

The theme is comprised of 73 staff, in addition to 21 students.



We led the global Phase I Asciminib study, which

recruited **220** CML patients

at **19** centres

in **10** countries

21 patients were treated at SAHMRI/RAH. We were the only Australian site for the study.

Research Highlights

- Cancer Theme Leader, Professor Tim Hughes, led the international clinical trial of the new generation CML drug, asciminib. Through Professor Hughes's collaboration with Novartis Pharmaceuticals, the clinical trial has contributed to a high impact publication in Nature. This study characterised ABL001 (asciminib), a potent and selective allosteric ABL1 inhibitor that is undergoing clinical development testing in patients with CML and Philadelphia chromosome-positive (Ph+) acute lymphoblastic leukaemia. In contrast to catalytic-site ABL1 kinase inhibitors, ABL001 binds to the myristoyl pocket of ABL1 and induces the formation of an inactive kinase conformation. Combination studies of ABL001 with conventional kinase inhibitors are the focus of ongoing studies within the Cancer Theme at SAHMRI and will contribute to the ongoing improvements in CML treatment.
- Dr Agnes Yong, Dr Amy Hughes and colleagues published a seminal Blood paper describing the phenomenon that immunological control may contribute to achievement of deep molecular response in chronic myeloid leukemia (CML) patients. They investigated effector and suppressor immune responses in CML patients at diagnosis, which indicated defects of innate effector natural killer (NK) cells and cytotoxic T-lymphocyte responses. Importantly, patients with good responses to therapy displayed a more mature cytolytic NK cell phenotype, consistent with restoration of an active NK cell repertoire, comparable to normal healthy donor. Immune responses were retained in treatment free remission (TFR) patients off-therapy, further suggesting restored immune function/control in 'good responders'. These studies may result in novel therapeutic targets for CML treatment, through immune function manipulation.
- Cancer Research UK's Grand Challenge is the most ambitious cancer research grant in the world - a series of £20m awards seeking international, multidisciplinary teams willing to take on the toughest challenges in cancer - providing the freedom to try novel approaches, at scale, in the pursuit of life changing discoveries. Impressively, Professor Andrew Zannettino, head of the Myeloma Research Group within the SAHMRI Cancer Theme, is part of a collaboration that has been short-listed (130 application world-wide with only 10 short-listed) for the CRUK Grand Challenge, a most prestigious achievement.

Healthy Mothers, Babies and Children

The theme's goal is to improve pregnancy and childhood health outcomes through diet and lifestyle changes, and by implementing these changes in an equitable manner.

Research Highlights

- The New England Journal of Medicine (NEJM) (Associate Professor Carmel Collins, Professor Maria Makrides, Dr Andrew McPhee) published on 30 March, the paper: Docosahexaenoic Acid and Bronchopulmonary Dysplasia in Preterm Infants. This paper reports the results of the N3RO trial that involved 13 centres in Australia, New Zealand and Singapore and showed that giving extra omega 3 fats to babies born <29 weeks has no effect on chronic lung disease and may increase risk. Associate Professor Carmel Collins presented the findings at a plenary session of the Perinatal Society Australia and New Zealand Annual Conference. There were over 3420 views in the first two weeks after publication.
- Docosahexaenoic acid (DHA) supplementation during pregnancy and cognitive functioning of children at seven years of age was published in the Journal of the American Medical Association (JAMA) (Dr Jacqueline Gould, Professor Maria Makrides, Dr Lisa Yelland). The paper conclusively found that taking supplements in pregnancy has no effect on a child's IQ. The paper drew worldwide media attention both on radio, television and in print. Following on from this, Dr Jacqueline Gould wrote an opinion piece for the Conversation: 'You can't rely on fish oil supplements in pregnancy to make your children smarter'.
- Professor Tim Green is working with the WHO and Kiribati Ministry of Health on a sustainable strategy to improve the thiamine intake of all in Kiribati. This will involve fortification of a food staple with thiamine. The research looks to identify the best food and the amount of thiamine that needs to be added. A report from the survey of over 700 participants is currently with the Kiribati Government awaiting approval. The Republic of Kiribati is a small country of just over 100,000 in the Pacific Ocean. It comprises 33 coral atolls spread out over 3.5 million km2. In 2015, there was a beriberi outbreak (thiamine deficiency) on one of the smaller atolls, where a number of people died. The cause of beriberi is likely poor thiamine intakes due to a diet that consists mainly of white rice, coconut, sugar, and fish.

The Theme had two papers published (JACI 2017;139:1600-07 and JAMA Ped 2017;171, 5:489-490) from the STEP trial (Starting Time for Egg Protein), that have been influential to changes in infant feeding guidelines to minimise the risk of food allergies in young children.

New guidelines have been issued nationally and internationally. In Australia, consensus guidelines were developed with all the stakeholder groups and published in 2017 (JACI Pract 2017;5,6:1617-1624).

The guidelines state:

- When your infant is ready, at around 6 months, but not before 4 months, start to introduce a variety of solid foods, starting with iron-rich foods, while continuing breast-feeding.
- All infants should be given allergenic solid foods including peanut butter, cooked egg, dairy, and wheat products in the first year of life. This includes infants at high risk of allergy.
- Hydrolyzed (partially or extensively) infant formula is not recommended for the prevention of allergic disease.

The theme is comprised of 42 staff, including partner organisations, 29 of which are SAHMRI employed, in addition to 17 students.

Infection and Immunity

The theme focuses on molecular and cellular interactions that regulate our immune response, the impact of our microbiome on health and disease, and ways to reduce the impact of sexually transmitted infections and blood borne viruses on Aboriginal people.

Research Highlights

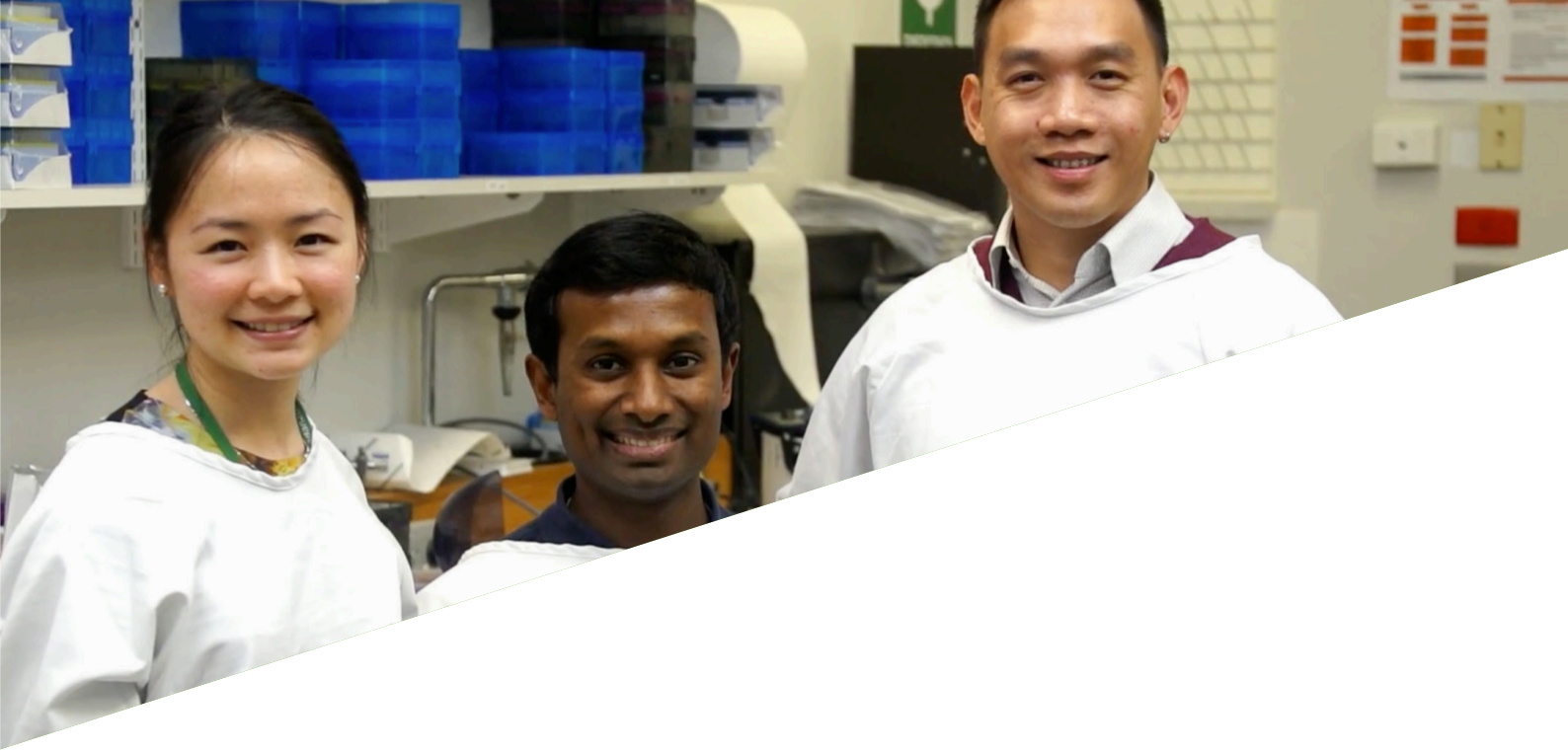
Infectious Diseases Research Aboriginal and Torres Strait Islander Health (Group Leader: James Ward)

This group has been leading a response to a syphilis outbreak in remote communities- encompassing advocacy, health promotion research activities, resulting in a commitment of $8.8 million by the Commonwealth Government to address the outbreak.

Lynn EMBL Australia Group, Infection & Immunity Theme (Group Leader: David Lynn)

Antibody-mediated responses play a critical role in vaccine-mediated immunity, however, for reasons that are poorly understood, these responses are highly variable between individuals and between different populations. This has important implications for vaccine-mediated protection and for the duration of protection. Globally, an estimated 4–19 million children each year receive routine vaccines against childhood infections, but remain unprotected due to limited vaccine effectiveness. Associate Professor Lynn's group's work to date has shown that, in mice, antibiotic-driven dysregulation of the gut microbiota (dysbiosis), specifically in early-life, leads to significantly impaired antibody responses to five different vaccines that are routinely administered to human infants worldwide. The potential implications of our findings are highly significant, not only to global health, but also locally, as up to 50 per cent of infants in Australia are exposed to antibiotics, close to their first immunisations.

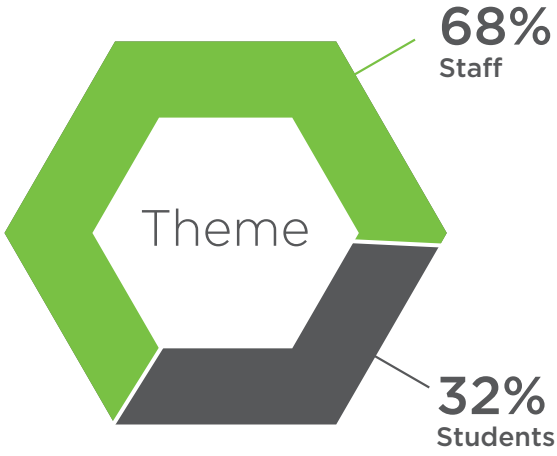
To investigate whether early-life antibiotic exposure also leads to impaired vaccine responses in human infants, a paediatric vaccine study with Professor Helen Marshall has been established at the Women's and Children's Hospital. This study is called the Antibiotics and Immune Responses (AIR) study. AIR is an ANZCTR-registered, clinical study assessing antibody responses to all scheduled infant immunisations administered in the first 6 months of life (plus the recommended but not currently funded meningococcal B vaccine). The study has been rigorously assessed and approved by the Women's and Children's Health Network Research Ethics Committee (HREC/17/WCHN/19). Blood and stool samples are being collected from three cohorts of infants. Cohort 1: infants that have been directly exposed to antibiotics in the neonatal period; Cohort 2: infants that have been indirectly exposed to maternal intrapartum antibiotics; Cohort 3: healthy control group of infants not exposed to antibiotics. This study will be the first study to incorporate metagenomic and metabolomic analysis of the microbiota, together with vaccine-induced gene expression data, extensive profiling of immune cell populations using flow cytometry, and rich vaccine serology data in infants in their first weeks and months of life. As proving that associations uncovered in human studies are causally linked is difficult, the group will also experimentally validate several of the key associations in germ-free mouse models.



Microbiome Research, Infection & Immunity Theme (Group Leader: Geraint Rogers)

Infections by non-tuberculous mycobacteria (NTM) can have a devastating impact on the respiratory health of patients with cystic fibrosis (CF). Children and adolescents are particularly susceptible to a rapid decline in lung function following infection, which is fatal in many cases. As part of an NHMRC-funded national study (G Rogers, CIB), every CF patient in Australia is being screened for NTM. The genomes of NTM isolates are being sequenced in our facility, as is the wider airway microbiota of patients carrying this pathogen. These data are being linked with clinical and demographic data held in the comprehensive Australian CF Registry, and is being supported by partnerships with the Wellcome Sanger Institute and Cambridge University. The work aims to determine the characteristics of NTM strains in CF, identify potential routes of transmission, and understand the risk factors for acquisition and subsequent disease. Despite the completion of governance at the beginning of 2018, Associate Professor Rogers and his team have so far analysed 586 samples from 507 patients (of a total Australian CF population of around 3,300 individuals), with 41 active NTM infections identified.

The theme is comprised of 26 staff, in addition to 12 students.



Infectious Diseases Research Aboriginal and Torres Strait Islander Health secured a total of $2,678,638 in funding, including:

$533,500
Commonwealth

$2,145,138
NHMRC

Total: $2,678,638

- $2,145,138 from NHMRC to trial if hepatitis C can be eliminated at a community level. The group will establish a longitudinal cohort of people at risk of hepatitis C to determine this as well as scaling up diagnosis and treatment for hepatitis in 4 regional centres.
- $533,500 from Commonwealth Government to conduct a national study that will collect information about sexual health knowledge, behaviour, access to health care and previous diagnoses of sexually transmitted infections (STIs) or blood borne viruses (BBVs) from Australian Aboriginal and Torres Strait Islander people aged 16-29 years.

Microbiome Research, Infection & Immunity Theme

$1,410,000
Medical Research Future Fund

Mind and Brain

The theme is at the intersection of neuroscience and mental health and is strongly supported by SAHMRI's science platforms. The theme has a precision medicine focus, and study the continuum from clinical depression to wellbeing and resilience, using the tools of psychology, behaviour, molecular biology, stem cells, genetics and imaging.

Professor Malcolm Battersby, Professor Ma-Li Wong & Professor Julio Licinio were successful with their NHMRC application 'Validating novel biomarkers relevant to major depression'.

The NHMRC awarded $515,000 for this three year project.

Research Highlights

Chronic Fatigue Syndrome Study (in progress):

35 participants (23 people with CFS, and 12 controls) were interviewed, and each patient received initial blood tests, Dexa(dual xray absorptiometry), and clinical interview, followed by a full day of blood sampling 9am to 5pm, every 7 minutes. These samples are currently being examined for the three cytokines (Leptin, Interleukin 6, and ILB1) using enzyme linked immunosorbent assays (Elisas) to detect any differences between sufferers and controls.

Chronic Myeloid Leukaemia (CML) (in progress)

10 participants were interviewed across a year of treatment, examining the effects of CML treatments on neurocognitive function and mental health. Interviews occur at various points of treatment (beginning, middle of treatment, and cessation) depending on the individual. The participant will undertake an initial interview, another at the 3-6 month period, and then at 10-12 months (3 timepoints). Results will be examined in this cohort across a year. Interviews for some participants are complete, whilst some are still underway. New participants are being accepted as they arise. This is a collaboration between the Mind & Brain and the Cancer Themes.

Psychological Interventions for people who suffer from depression and are overweight:

This is registered as a clinical trial which involves tackling the issue of depression and weight gain at the same time. Both issues affect each other significantly and this treatment approach includes cognitive behavioural therapy, dietary advice, and lifestyle education. The program has been developed at SAHMRI, and two groups of 10 people have been completed. One was during the day, and second one as an evening class. The participants will be measured at four timepoints over 12 months.

Genetics of Depression

This study has now concluded because of the move of the Theme Leaders to Syracuse, New York. 110 participants had interviews lasting around four hours, involving the collection of a blood sample, hair sample, and information about the person's depression and lifestyle. The samples were compiled in order to investigate the genetic links to depression.

Laboratory for human neurophysiology and genetics group highlights (Cedric Bardy)

Grants succesful:

- Brain Foundation
  $30,000 (1 year)
- Perpetual Impact Philanthropy
  $107,000 (1 year)
- Flinders Medical Centre seed grant
  $20,000 (1 year)

Recruited postdoc Mark Van Den Hurk from overseas and obtained a European fellowship $236,000 (2 years)

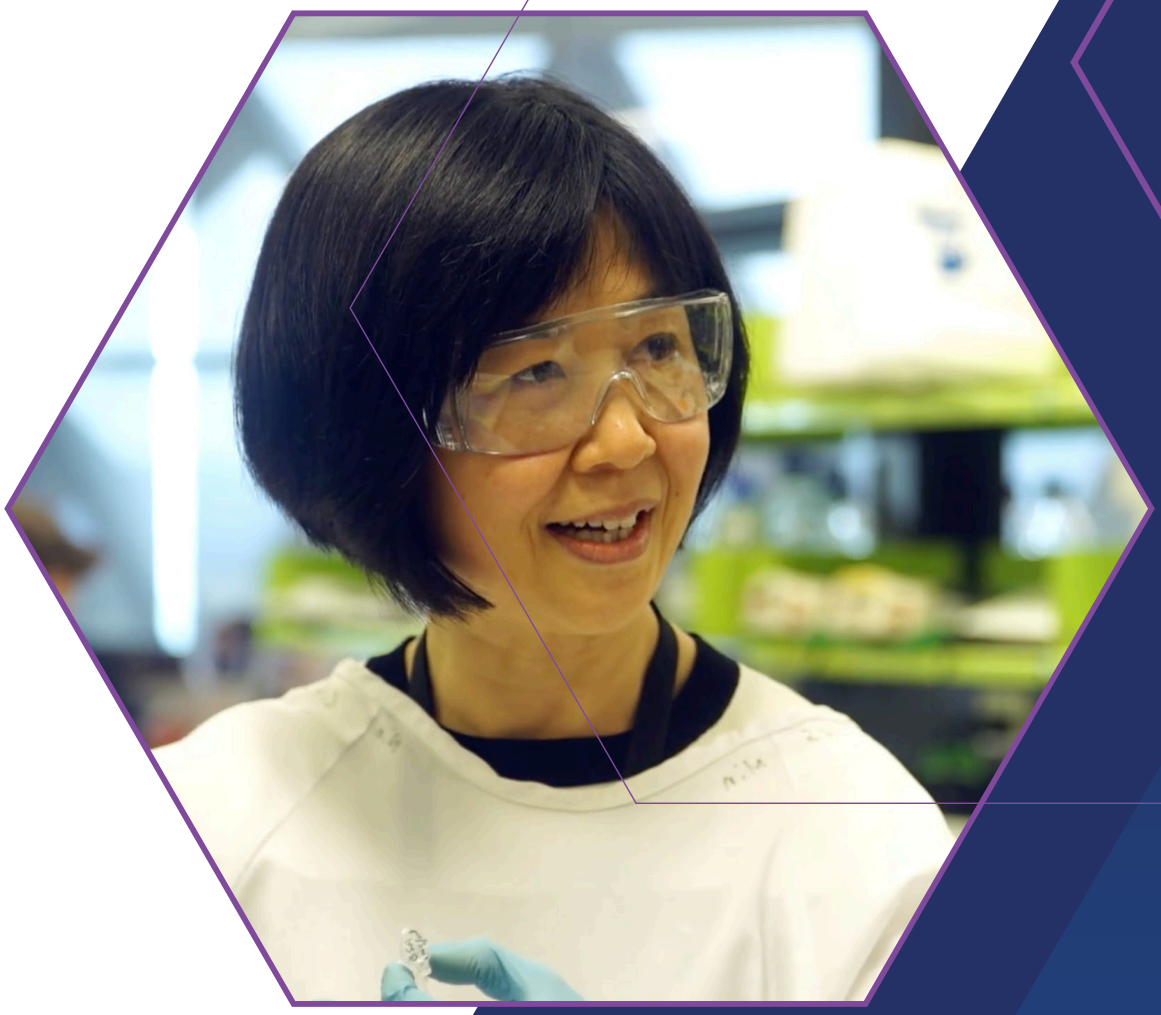
Neil Sachse Centre for Spinal Cord Research

Research Highlights

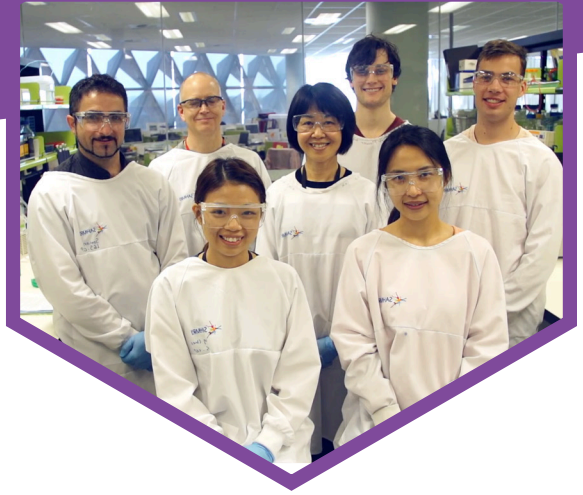
- Successfully produced and tested [^{18}F] GE-180 in spinal cord injured animals (first people in Australia to do so)
- Developed protocol for world first clinical trial for investigating [^{18}F]GE-180 as a clinical biomarker for spinal cord injury
- Raised over $150,000 through various events, for the Neil Sachse Centre for Spinal Cord Research.

Awarded Lifetime Support Authority Research Grant – $170,000.

"Project Discovery – Using molecular imaging for precision medicine approaches to spinal cord injury" (Principal Investigators: O'Hare Doig, Freeman, Licinio, Takhar).



Nutrition and Metabolism



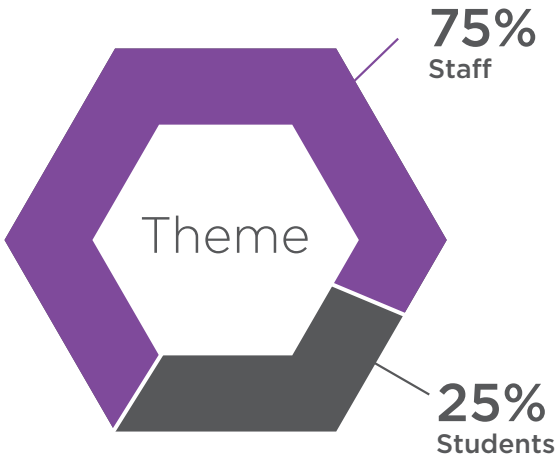
The theme conducts fundamental and clinical research into several important disorders. They include obesity and diabetes, where both basic mechanisms and how lifestyle or dietary changes can help prevent or manage these conditions are studied. The group also study neurological diseases, including inherited childhood disorders and Alzheimer's Disease.

Research Highlights

- The Obesity and Molecular Metabolism Group secured NHMRC, DARP and HORT Innovation funding (with CSIRO) worth >$1.5M.
- The Childhood Dementia Research Group were awarded funding for their early-onset dementia/lysosomal storage disorder research undertaken in 2017 – from the NHMRC, the Sanfilippo Children's Foundation and Industry = ~$2 million.
- EMBL Australia Organelle Biology and Disease group reported mutations in chloride channel CLC2 were recently identified in patients suffering from leukoencephalopathy involving intramyelinic oedema. CLC2 was linked with the protein complex involved in the regulation of the astrocyte cell volume, and is thus now a new player in the brain oedema formation.

The theme is comprised of over 90 staff, in addition to over 30 post graduate students.

- The Intestinal Nutrient Sensing Group discovered that dietary artificial sweeteners can impair control of blood sugar levels in healthy individuals (NHMRC Project, Associate Professor Richard Young) and were awarded the national Millennium Award in Type 2 Diabetes by Diabetes Australia (Associate Professor Richard Young). They were invited to a media conference at peak European Diabetes meeting in Lisbon and received global media attention on their findings on artificial sweeteners.
- The Visceral Pain Group published 10 papers including one in Cell. They received two CIA NHMRC Project Grants, one ARC Discovery grant and four industry research collaborations.



Population Health

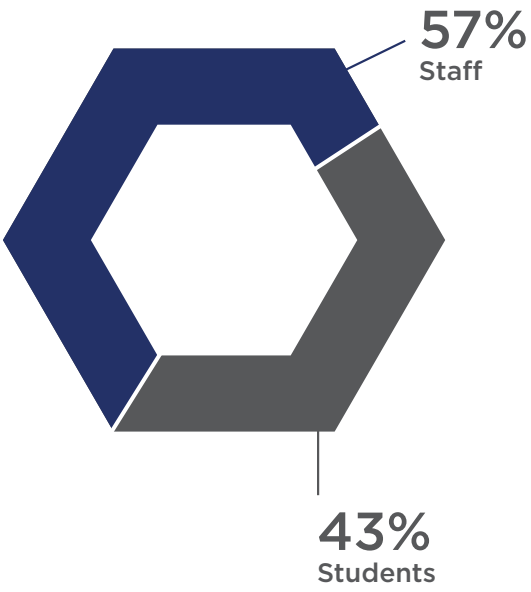
The SAHMRI Population Health Research Group specialises in research, evaluation and population monitoring to inform population-level interventions to reduce the impact of non-communicable disease (NCDs), including cancer, heart disease and diabetes.

With expertise in behavioural science, public health and economics, the Group's major research focus areas are:

- Tobacco control
- Obesity prevention
- Collaborative projects in cancer registries

Research Highlights

- In 2017, the Group's Director Associate Professor Caroline Miller, was awarded a National Health and Medical Research Council (NHMRC) Career Development Fellowship and a Heart Foundation Future Leader Fellowship. These Fellowships will advance the group's work investigating effective policy responses to over-consumption of sugar-sweetened beverages (SSB). These awards include research project funds to look at adolescents who are very high consumers of SSBs and to investigate the potential of warning labels.



The theme is comprised of 8 staff, in addition to 6 students.

- Building on the success of Australia's world leading plain packaging of tobacco laws, several other countries are implementing similar laws. Associate Professor Caroline Miller is an International Expert Adviser to the Government of Singapore, which is investigating introducing standardised packaging and larger graphic health warnings. At a local the group continues to work in partnership with the South Australian Government on tobacco control and obesity prevention initiatives and provide expert advice to the Australian Government on tobacco control policy.
- The group published research work investigating adolescent alcohol consumption and the important role of parents setting clear guidelines which received substantial national and international media coverage. The publication achieved an Altmetrics score in the top 5% of papers globally. A piece was also published in the Conversation entitled 'Three ways to help your teenage kids develop a healthier relationship with alcohol' as a translation strategy which achieved wide international readership (approximately 20,000 reads).

The Group secured competitive funding of $2.7M in 2017

Molecular Imaging and Therapy Research Unit (MITRU)

The Molecular Imaging and Therapy Research Unit (MITRU) is a commercial pharmaceutical production and research unit that houses a GE Cyclotron. By incorporating minute quantities (often in nanogram scale) of radioactive to the target molecule, MITRU is able to manufacture diagnostic radiotracers which are used for early detection of various cancers on a routine basis.

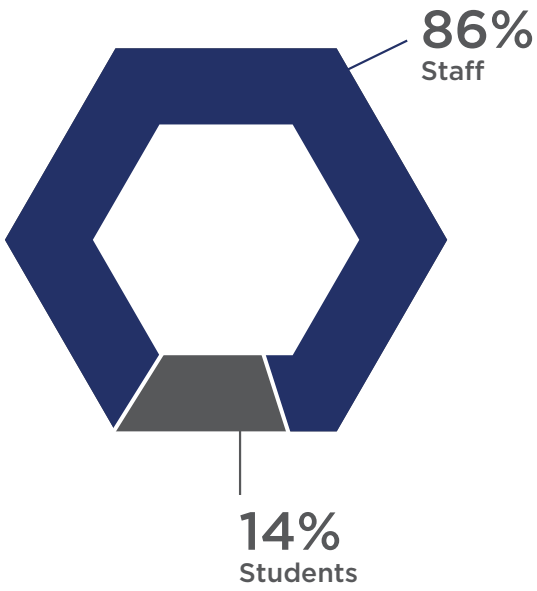
The unit also produces a range of Investigational Medicinal Products (IMPs) for research and clinical trial applications.

Research Highlights

- MITRU embarked on the development of solid target radioisotopes, which include the production of gallium-68, copper-64 and zirconium-89. Copper-64 was further used in phase I and phase IIa clinical trials sponsored by Clarity Pharmaceuticals for the detection of neuroblastoma in children and for the treatment of meningioma.
- Completed process validation of [^{64}Cu] Cu-ATSM which is used for hypoxia imaging (funds provided by Bellberry).
- Solid target – initiated pilot phase studies for the production of PET Ga-68, Cu-64 and Zr-89 and SPECT radioisotopes for commercial research.
- Completed the technical transfer and process validation of Cu-SARTATE, a proprietary molecule Clarity Pharmaceuticals that is to be used in phase I (detection of neuroblastoma in children) and phase I/IIa (detection and treatment of meningioma) clinical trials.
- Successfully brought [^{18}F]GE-180, a novel biomarker for spinal cord injury, online in South Australia as part of Project Discovery.

MITRU received a total of over $300,000 in funding this year.

Secured from research grants, commercial and philanthropic funds.



The theme is comprised of 12 staff, in addition to 2 students.

Fundraising Update

SAHMRI acknowledges and is grateful to our growing family of supporters. Overall, there has been an increase in donations received and guests in attendance at our events. Incredibly, over $2 million was donated in 2017. These funds have been directed across all our themes of research.

Most of these gifts have been the result of developing relationships with private trusts and foundations, as well as individuals who believe in supporting effective medical research.

Leaders in Philanthropy

This wonderful group consists of people and private foundations who are donating in excess of $1 million to SAHMRI. We currently have six members of this unique group of supporters.

Founding Ambassadors

With generous gifts of $25,000 and above, we are proud to have the support of 35 Founding Ambassadors who hold the distinction of donating significantly to SAHMRI since our inception.

Virtual Windows

To date, 738 virtual SAHMRI windows have been purchased online. The dedications and sentiments expressed on the website are truly moving and reflect the interest of the public, as well as a broad desire to effectively reduce the impact of chronic illness.

The Walker Society

Named after Helen Walker OAM, who left the first bequest to SAHMRI, the Society now has over 25 members who have indicated their intention to leave a legacy to medical research. These decisions follow much confidential discussion and are generally directed toward a particular theme or avenue of research.

SAHMRI Fundraising Manager Tony Ashdown receiving $65,000 donation from Sally Cameron, Maria Mantovan and Lorraine Jenson from the Adelaide Appeals Committee. Funds raised at Annual Race Day at Morphetville Racecourse.

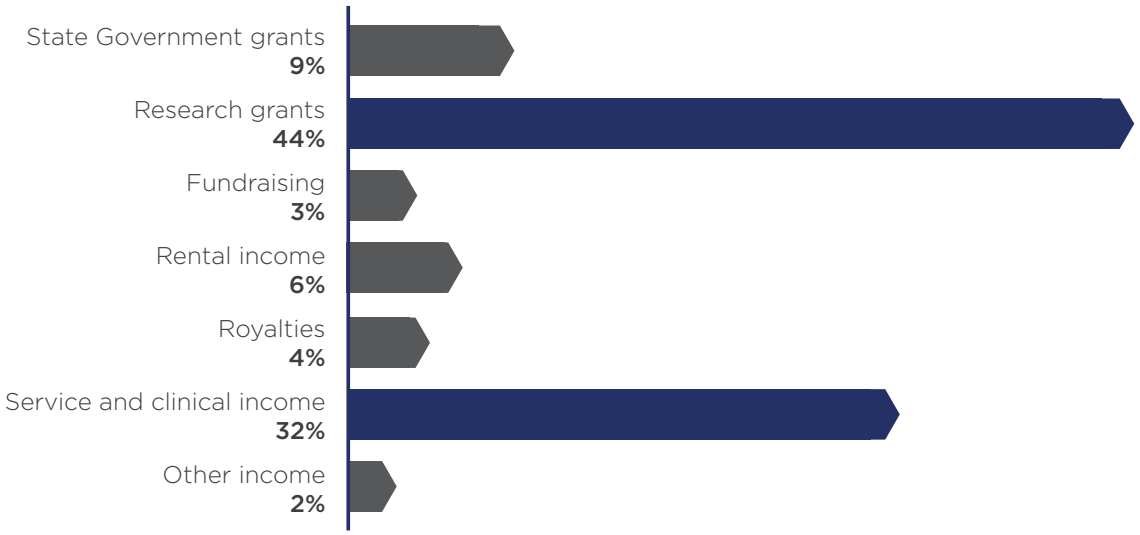
THANK YOU

Without the support we received throughout 2017, our researchers could not have made the progress they have.

Our work and the desire to genuinely make a difference is powerfully assisted by the generous gifts of our supporters.

Financial Highlights

Income



Expenses

Consolidated Statement of Profit or Loss and Other Comprehensive Income

For the year ended 31 December 2017

	31 Dec 2017 $'000	31 Dec 2016 $'000
Operating revenue and other income		
State Government grants	5,332	7,663
Research grants	26,325	24,350
Fundraising	2,088	2,023
Rental income	3,999	3,434
Royalties	2,587	2,899
Service and clinical income	19,675	17,068
Other income	1,269	962
Total operating income	**61,275**	**58,399**
Operating expenses		
Consumables	(5,330)	(5,729)
Employee benefits	(35,612)	(34,533)
IT maintenance	(1,378)	(3,720)
Building management costs	(5,102)	(3,879)
Research support	(6,163)	(4,689)
Professional fees	(2,096)	(1,415)
Travel and accommodation	(1,489)	(1,417)
Other expenses	(2,752)	(2,807)
Total operating expenses	**(59,922)**	(58,189)
Finance income	1,012	515
Finance cost	(1,067)	(703)
Net finance costs	**(55)**	**(188)**
Results from operating activities before depreciation, amortisation and derecognition expense	**1,298**	**22**
Depreciation, amortisation and derecognition expense	(9,742)	(10,036)
Total depreciation, amortisation and derecognition expense	**(9,742)**	**(10,036)**
Deficit for the period	**(8,444)**	**(10,014)**
Other comprehensive income/(loss) for the period		
Items that are or may be reclassified to profit or loss:		
Net change in fair value of held for trading assets	-	(476)
Other comprehensive income/(loss) for the period	**-**	**(476)**
Total comprehensive income/(loss) for the period	**(8,444)**	**(9,538)**

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Medical Research Institute

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