

2015

AMREP RESEARCH REPORT
The Alfred Medical Research & Education Precinct



The Alfred Medical Research and Education Precinct

The Alfred Medical Research and Education Precinct - AMREP - is a partnership between Alfred Health, Monash University, Baker IDI Heart and Diabetes Institute, Burnet Institute, La Trobe University and Deakin University. AMREP is located on the campus of The Alfred hospital, Melbourne.

AlfredHealth



Burnet Institute
Medical Research. Practical Action.



MONASH
University



LA TROBE
UNIVERSITY



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Report of Chair, AMREP Council

Professor Andrew Way CEO Alfred Health



The collaboration of the six AMREP partners remains one of the strongest and most enduring clinical research partnerships in Australia. The individual strengths of the partners are truly substantial, whilst it is a truism that the whole is greater than the sum of the parts.

With longevity comes the foresight of challenge, and it is not a surprise that NHMRC grant success rates are continuing to fall as the government's investment has remained static in recent years. The NHMRC is currently undertaking a structural review of its full suite of funding schemes to determine whether they can be streamlined and adapted to current circumstances while continuing to support the best Australian health and medical research. Public consultation forums will be held shortly in the capital cities, and AMREP and its partners stand ready to contribute to that debate.

In a boost to researchers at AMREP, Alfred Health is making available \$2.5 million of competitive funding from the Alfred Research Trusts, which will provide four Major Project Grants of \$500,000 each and five \$100,000 Seeding Grants. A total of 100 expressions of interest have been received and the outcomes are due to be announced in late 2016.

The AMREP Scientific Advisory Committee (SAC) was recently re-established to improve scientific collaboration at AMREP and develop joint platforms and other major research initiatives. In response to the need for 'big data' recruitment

on the campus, the AMREP SAC has set up a sub-committee of representatives from the partners to progress a joint bioinformatics platform along the lines of the successful AMREP biostatistics platform.

The AMREP Council has continued its work of creating strength across the campus, looking closely at our scientific opportunities, clinical and research infrastructure, and physical estate and plant. The long history of the AMREP partnership (founded in 1998) has meant that we have dealt with the loss of individuals and their successors as part of the normal ebb and flow of life on the Campus. Professor Garry Jennings AO, Director Baker IDI stepped down from his role in December 2015, and 2016 saw Professor Tom Marwick start as the new Director. It is remarkable that the membership of the Council has remained so constant over time – of the 15 Council members, 10 have served longer than five years and many substantially longer. I would like to put on record my thanks to those Council members for their ongoing support and deliberations.

In addition to Professor Marwick, we have been joined on the Campus by Professor David Tarlinton (Head, Monash Department of Immunology and Pathology), Professor Harshal Nandurkar (Head, Haematology and Australian Centre for Blood Diseases) and many others as the partners within AMREP continue to grow and strengthen their research and clinical endeavours.

Vale Henry Krum, 1958 - 2015

We were saddened to learn of the passing of leading AMREP cardiovascular researcher, Professor Henry Krum, on 28 November 2015.

Henry completed his Bachelor of Medicine, Bachelor of Surgery Degree at the University of Melbourne in 1981, became a Fellow of the Royal Australasian College of Physicians in 1989 and completed a PhD in the Clinical Pharmacology Unit at the Austin Hospital Clinical School in 1991. He joined Monash University in 1996 and was appointed Head of the Clinical Pharmacology Unit in the Department of Epidemiology and Preventive Medicine and Head of the Clinical Pharmacology Department at the Alfred Hospital.

Professor Krum was regarded as one of the world's finest cardiovascular researchers and specialists in heart failure management. He was renowned for his leadership in novel cardiovascular drug treatments and secured NHMRC grants in the 2015 funding round to develop a monitoring device for heart failure and another to research innovative prevention and treatment approaches for chronic heart disease.



AMREP 2015/2016

Honours and Awards

- Professor Robyn O’Hehir, Head of the Department of Allergy, Immunology and Respiratory Medicine, The Alfred and Head of Allergy Laboratory, Department of Immunology and Pathology, Monash University, received an Order of Australia (AO) in the 2016 Australia Day Honours for distinguished service to clinical immunology and respiratory medicine as an academic and clinician, to tertiary education, and to specialist health and medical organisations.
- Professor Max Schwarz, Head of the Medical Oncology department, The Alfred, was appointed Member of the Order of Australia (AM) in the 2016 Queen’s Birthday Honours for significant service to medicine in the field of oncology as a clinician, mentor and researcher.
- Professor Andrew Tonkin, Head of the Cardiovascular Research Unit at Monash School of Public Health and Preventive Medicine, was awarded the 2015 Heart Foundation Research Medal for Lifetime Contribution to Cardiovascular Research by the National Heart Foundation. The Heart Foundation Research Medal recognises outstanding contribution to the fields of heart, stroke and blood vessel disease research in Australia over a sustained period, as well as involvement with the Heart Foundation and a history of contributions to Heart Foundation goals and objectives.
- Professors Rinaldo Bellomo (Australia and New Zealand Intensive Care Research Centre, Monash University), Neville Owen and Paul Zimmet (Baker IDI) have been named by Thomson Reuters as some of the world’s most influential scientific minds in a recently launched ‘Highly Cited Researchers’ report, a compilation of influential names in science whose published work in their specialty area has consistently been judged by peers to be of particular significance and utility.
- Professor Mark Cooper, Chief Scientific Officer at Baker IDI, has been awarded the Claude Bernard Lecturer 2016 by the European Association for the Study of Diabetes (EASD). This is the highest scientific achievement award of the EASD, and recognises an individual’s innovative leadership and outstanding contributions to the advancement of knowledge in the field of diabetes mellitus and related metabolic diseases. Professor Cooper is the first and only Australian scientist to receive this honour in the history of the EASD.
- Alfred Health was awarded the Premier’s Health Service of the Year award for a large health service at the 2015 Victorian Public Healthcare Awards, which recognise leadership and excellence in the provision of publicly-funded healthcare for the Victorian community.
- In 2016 Professor John McNeil achieved the milestone of 30 years as Head of the Department of Epidemiology and Preventive Medicine, and subsequently, Head of the School of Public Health and Preventive Medicine (SPHPM). Under his leadership, SPHPM is now one of the largest Schools of Public Health in the Asia Pacific Region, and has become a leader in the establishment, management and analysis of clinical registries in Australia, housing 22 clinical registries.

- Four AMREP researchers were recognised in the 2015 NHMRC Research Excellence Awards for the top ranked applicants across NHMRC funding schemes in the 2014 funding round: Professors Brendan Crabb AC and James Beeson, Burnet Institute (highest ranked Program Grant); Associate Professor Kate Hoy, Monash Alfred Psychiatry Research Centre (highest ranked Career Development Fellowship – Biomedical Level 1) and Dr Catherine Chamberlain, Baker IDI (highest ranked Indigenous researcher Early Career Fellowship).



Associate Professor Kate Hoy (sitting, back left) researches restoring cognitive function in schizophrenia using transcranial Direct Current Stimulation.

- In 2015 Director of the Monash School of Public Health and Preventive Medicine’s Women’s Health Research Program, Professor Susan Davis was awarded the International Research Excellence Laureate Award by the US Endocrine Society for her exceptional contributions to endocrinology.



(L to R): AMREP Research Day speakers - Professor Christina Mitchell, Professor Paul Myles and Dr Paul Gilson with Professor Stephen Jane (Head of Monash Central Clinical School / Director of Research, The Alfred).

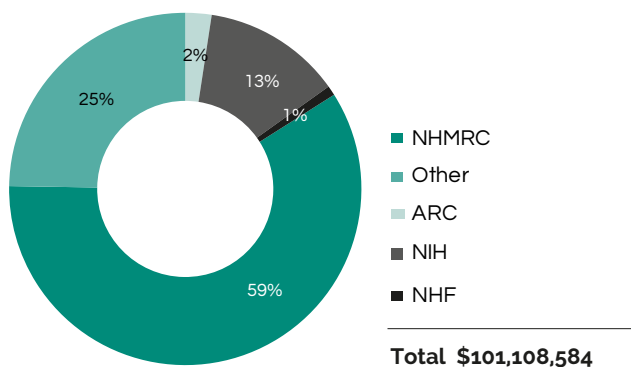
Research Poster Display and Research Day

The 2015 Alfred Week Research Poster Display showcased 182 posters from across AMREP with prizes awarded for those best in their category.

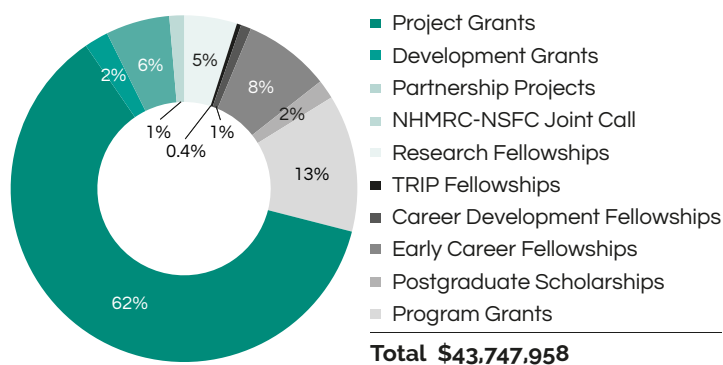
Research Day featured a keynote address by Professor Christina Mitchell, Dean of the Monash University Faculty of Medicine, Nursing and Health Sciences, titled ‘*Challenges in Medical Research: what can academic health science centres deliver?*’ The AMREP Research Prizes for 2015, for the best clinical and basic research articles from AMREP published in 2014, were presented to Professor Paul Myles (Alfred Department of Anaesthesia and Perioperative Medicine) and Dr Paul Gilson (Burnet Institute).

Research Outputs

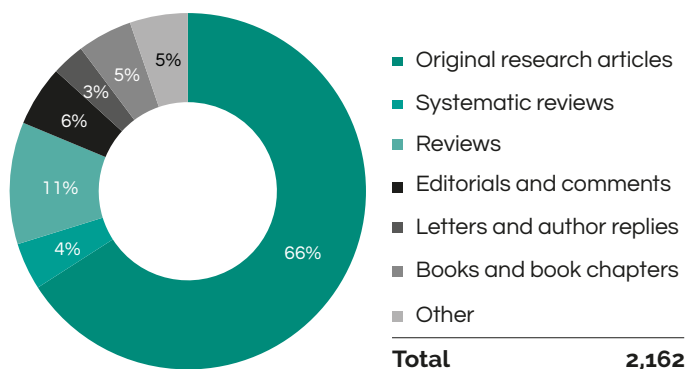
External funding received 2015



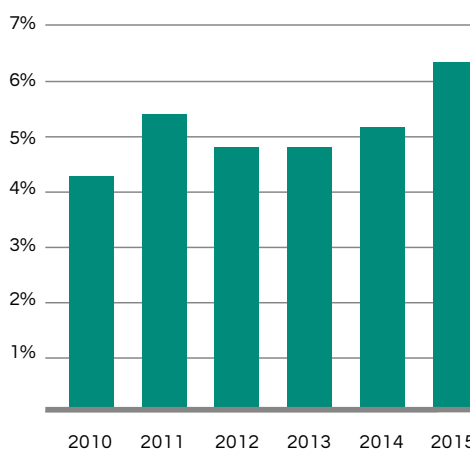
New NHMRC funding commencing in 2016



Publications 2015



Original research articles with impact factor > 10



For a list of high-impact factor publications by AMREP staff in 2015, see page 86 of this report.

Higher Degree completions 2015

69 PhD completions
 3 Other doctoral completions
 157 Masters completions

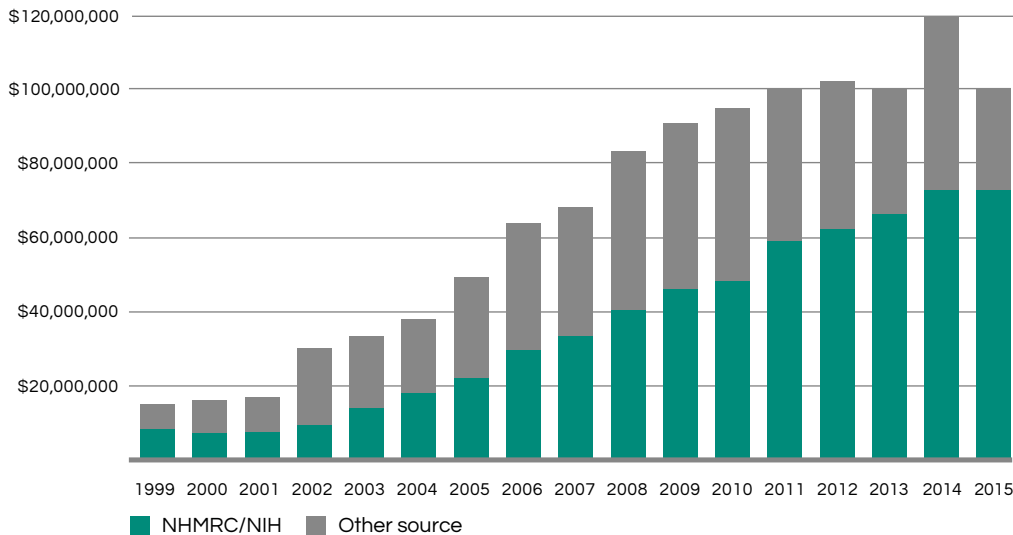
In 2015, there were 407 current PhD students and 18 other doctoral students at AMREP.

For a list of Doctoral degrees completed and passed in 2015, see page 84 of this report.

Research Outputs

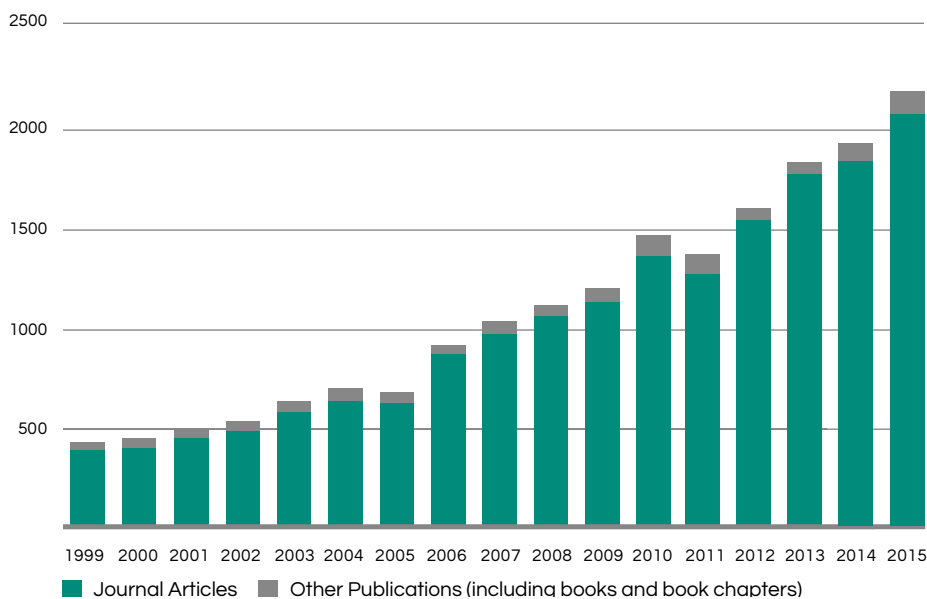
year by year

External research funding received



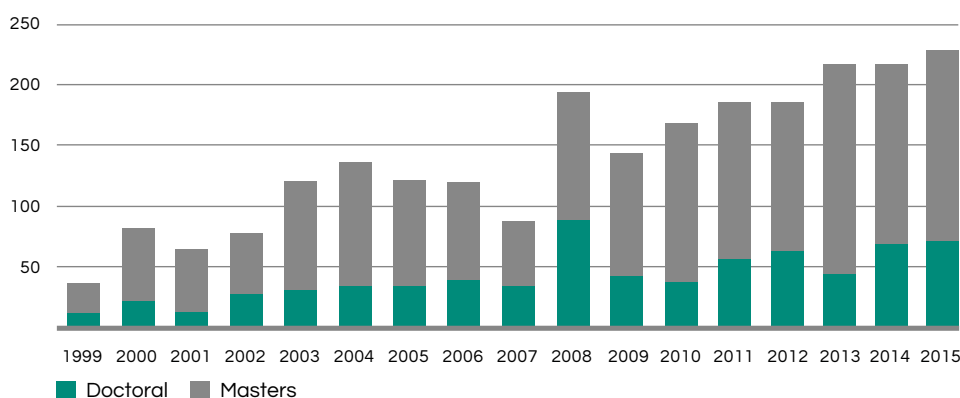
External research funding refers to competitive peer reviewed grants from schemes offered by funding bodies such as NHMRC, National Heart Foundation (NHF) and NIH or government grants (e.g. Department of Human Services), industry and university grants. Funds received from commercially sponsored clinical trials are not included.

Publications



Abstracts, conference proceedings and 'in press' articles are not included.

Completed and passed higher degrees



Masters include course work and research degrees.

Baker IDI Heart and Diabetes Institute Research Programs and Domains

Director: Professor Tom Marwick

PROGRAMS

Diabetic Complications
Head: Professor Merlin Thomas

Hypertension and Cardiac Disease
Head: Professor David Kaye

Atherothrombosis
Head: Professor Karlheinz Peter

Metabolism
Head: Associate Professor Peter Meikle

Physical Activity
Head: Associate Professor Andre La Gerche

DOMAINS

Basic
Head: Professor. Karin Jandeleit-Dahm

Diabetes and Kidney Disease - K Jandeleit-Dahm
Diabetes and Atherosclerosis - T Allen
Diabetes and Dyslipidaemia - A Calkin
Molecular Group - M Cooper
Glycation, Nutrition and Metabolism - M Coughlan
Experimental Cardiology - X-J Du
Human Epigenetics - A El-Osta
Muscle Research and Therapeutics - P Gregorevic
Epigenomic Medicine - T Karagiannis
Cardiac Hypertrophy - J McMullen
Haematopoiesis and Leukocyte Biology - A Murphy
Heart Failure Pharmacology - R Ritchie
Biochemistry of Diabetic Complications - M Thomas
Genomics and Systems Biology - K Bozaoglu

Translational
Head: Professor David Kaye

Heart Failure Research - D Kaye
Vascular Biology and Atherothrombosis - A Bobik
Neuropharmacology - G Head
Metabolic and Vascular Physiology - B Kingwell
Human Neurotransmitters- G Lambert
Metabolomics - P Meikle
Atherothrombosis and Vascular - K Peter
Lipoproteins and Atherombosis - D Sviridov

Clinical
Head: Professor Graeme Maguire

Health Services - G Maguire
Diabetes Clinics - N Cohen
Heart Clinics - A Elims
Healthy Hearts - G Maguire
Clinical Electrophysiology - P Kistler
Sports Cardiology - A La Gerche
Imaging Research - T Marwick
Allied Health and Education Services - S Middleton
Heart Imaging - A Taylor

Population Health
Head: Associate Professor Jonathan Shaw

Clinical Diabetes - J Shaw
Clinical Obesity - J Dixon
Physical Activity - D Dunstan
Diabetes and Population Health - D Magliano
Behavioural Epidemiology - N Owen

Aboriginal Health
Head: Professor Sandra Eades

Aboriginal Health - S Eades
Infection and Chronic Disease - L Einsiedel

Baker IDI Heart and Diabetes Institute

Director: Professor Thomas Marwick MBBS, PhD, MPH, FACC, FESC, FRCP, FRACP, FAHMS

Baker IDI Heart and Diabetes Institute is an independent medical research facility, with a history in cardiovascular and diabetes research spanning 90 years. The Institute's work extends from the laboratory to hospital research and wide-scale national and international community studies.

Our mission is to reduce death and disability from cardiovascular disease, diabetes and related disorders: two prevalent and complex diseases responsible for the most deaths and the highest costs in the world in terms of treatments and hospitalisation. The Institute's researchers draw on expertise in cell and molecular biology, through to epidemiology and public health research, to inform health strategies and drive better health. Our focus is on translating research findings into new approaches to prevention, treatment and care.

Baker IDI's scientific laboratories and patient clinics located at AMREP are complemented by a research facility in Alice Springs, dedicated to addressing the health disadvantage in Aboriginal communities. In the Institute's 90-year history, it has grown from a small laboratory established on the grounds of The Alfred hospital in 1926 to a thriving hub of around 450 staff including scientists, clinicians and students.

A New Director for Baker IDI

In 2015, Professor Garry Jennings AO announced that he would step down as Director after 14 years. An extensive global search followed, and in January 2016, Baker IDI welcomed Professor Thomas Marwick as the new Director. Professor Marwick also heads Baker IDI's Imaging Research Unit, with his research focusing on heart failure, cardiac imaging and detection of the early stages of heart disease.

Professor Marwick was formerly the Director, Menzies Institute for Medical Research, University of Tasmania, and a cardiologist at the Royal Hobart Hospital. Prior to that, he was Head of the Cardiovascular Imaging at the Cleveland Clinic.

Science Strategy

The organisation is structured around five domains that span the breadth of Baker IDI's research, with each domain led by a senior clinician scientist. The domain leaders, together with Head of the Science Faculty, Professor Karlheinz Peter; Chief Scientific Officer, Professor Mark Cooper; Chief Operating Officer, Mr David Lloyd; and Institute Director, Professor Tom Marwick, make up the Science Executive. This group is responsible for recruitment, personnel decisions and guiding the Institute's Science Strategy.



Professor Thomas Marwick, Director of Baker IDI, from January 2016.

The Five Domains

Basic Research: Headed by Professor Karin Jandeleit-Dahm, the domain encompasses most of the Institute's laboratory-based cellular and molecular biology and pre-clinical research.

Translational Research: Headed by Professor David Kaye, the domain encompasses the Institute's human research focused laboratories and our efforts in pre-clinical to clinical translation.

Clinical: Headed by Professor Graeme Maguire, the domain encompasses our clinical service activities in both Melbourne and Central Australia, and oversees them in partnership with other organisations.

Population Health: Headed by Associate Professor Jonathan Shaw, the domain encompasses the Institute's epidemiological and public health groups.

Aboriginal Health: Headed by Professor Sandra Eades, the domain encompasses the Institute's work in Aboriginal health across Australia, the activities of the Baker IDI campus in Alice Springs and our interests in international Indigenous health.

Addressing Big Picture Questions

The Institute has established five programs that facilitate collaboration around key areas of strategic importance and strength. The programs, each led by a senior Institute scientist, underpin Baker IDI's major scientific goals and address a key question of interest. Broadly speaking, this approach aims to achieve more breakthroughs, across more areas of our research program with greater impact on the most urgent issues in human health.



Associate Professor André La Gerche (L), Head of the Sports Cardiology Laboratory and the Physical Activity Program, with an athlete undergoing cardiac magnetic resonance imaging.

The Five Programs

Physical Activity: Headed by Associate Professor André La Gerche, the program explores the impact of exercise at all levels of cardiovascular disease management from prevention through to treatment of advanced disease.

Metabolism: Headed by Associate Professor Peter Meikle, the program looks at the role of lipid metabolism and the progression of heart disease, diabetes, chronic kidney disease and heart failure.

Diabetic Complications: Headed by Professor Merlin Thomas, this program is looking at the progression of diabetes to complications affecting arteries, the heart, the kidneys and the eyes.

Atherothrombosis: Headed by Professor Karlheinz Peter, the program is examining how to identify and treat vulnerable, rupture-prone plaque.

Hypertension and Cardiac Disease: Headed by Professor David Kaye, this program is considering how to reverse chronic heart disease, prevent and repair structural damage to the heart from hypertension, heart disease and associated rhythm disturbances.

Research Highlights

Below are some of the scientific discoveries in 2015 that span the Institute's five broad areas of focus:

Basic Research

Sensor protein to combat obesity and diabetes

Researchers identified an internal 'sensor' that helps fight obesity by instructing cells to burn their fat stores. A protein called NLRP1 is switched on when increased dietary energy (food) intake triggers the cell to become 'unstable'. Activating the protein sets off a chain of events that instructs cells to use up their energy or fat stores to prevent excess fat accumulating. The research, led by Dr Seth Masters from Walter and Eliza Hall Institute and Associate Professor Andrew Murphy and Dr Michael Kraakman from Baker IDI, with Professor Mark Febbraio from the Garvan Institute of Medical Research, was published in *Cell Metabolism* in October 2015. The finding could play a major role in the fight against obesity and metabolic diseases, including type 2 diabetes.

Diabetes Complications Research Centre

Professor Mark Cooper and colleagues are leading a new research centre to find better treatments and methods to prevent type 1 diabetes. The \$2.5m NHMRC-JDRF Diabetes Complications Centre of Research Excellence aims to translate new experimental findings into strategies for the prevention, treatment and management of type 1 diabetes and its complications, as well as training clinical investigators in the field.

Excess salt disturbs immune system

Baker IDI-led research revealed that too much salt in food could push the immune system out of balance. A team of researchers, led by Dr Katrina Binger, established that increased salt consumption by rodents resulted in delayed healing of their wounds by reducing the activity of protective immune cells. The study, published in *The Journal of Clinical Investigation* in October 2015, contributes to the growing body of evidence about how the immune system reacts to environmental changes, and may offer new targets for better treatment of a number of diseases, especially those that are caused by immune system imbalances.



Dr Brian Drew, Group Leader in the Diabetes and Dyslipidaemia Laboratory, headed by Dr Anna Calkin. The Laboratory, which is part of the Basic Research Domain, focuses on identifying novel pathways in metabolic tissues including muscle, liver and fat that are modulated in the setting of diabetes and dyslipidaemia.

Translational Research

Pregnancy peptide to combat heart disease

Research by Professor Karlheinz Peter and colleagues identified that a peptide secreted during pregnancy could lower inflammation and prevent atherosclerosis. The study, published in *Thrombosis and Haemostasis* in February 2016, established that the peptide, pre-implantation factor (PIF), was a strong drug candidate for the treatment of atherosclerosis. PIF has already been approved for initial human therapeutic trials and it is expected to have a low side-effect risk, making this an exciting and potentially important new finding for the prevention of heart attacks and stroke.

Management options for advanced heart failure

A slow-release oral form of the drug Milrinone for people with advanced heart failure has been developed by Professor David Kaye, Head of the Heart Failure Research Laboratory. The product, patented by the Institute, aims to meet the growing demand for better management options for patients with advanced heart failure. The Medical Research Commercialisation Fund was impressed by Baker IDI's trial data from a proof-of-concept study and has invested in further development of the product through spin-out company, Cardiora.

Test to assess risk of future plaque instability

A licensing deal with Finnish company, Zora Biosciences Oy, was established to commercialise a low-cost method for determining coronary artery disease risk. Developed by Associate Professor Peter Meikle and patented by Baker IDI, the test uses plasma-lipid profiling to assess risk of future plaque instability. It is anticipated that collaboration with Associate Professor Meikle, combined with licensed Baker IDI technology, will lead to the successful development of clinical diagnostic products with strong commercial potential.

Clinical Research

Importance of testing hearts during exercise

A study by Associate Professor André La Gerche, Head of Sports Cardiology, showed that doctors underestimate the severity of irregular heartbeats in athletes because patients are tested while resting instead of when they are doing exercise. The study, which built on previous research showing more strain is put on the right side of the heart during exercise, concluded that doctors were missing signs of the potentially fatal condition by conducting tests on the left side of the heart or while a patient is idle. The study, published in the *European Heart Journal* in June 2015, has important implications for patient management when it comes to the cardiovascular health of athletes.

Pilot test of needle-free device for diabetes

Head of the Diabetes Clinics, Associate Professor Neale Cohen, led a study into InsuJet™, a needle-free insulin delivery device, which showed InsuJet™ had the same efficacy and tolerability as insulin pen injections. The study was published in *Diabetes Technology and Therapeutics* and funded by the company, Pharmaco. Associate Professor Cohen said needle-free technology was a welcome solution for those living with diabetes, who struggle to start injecting insulin because of their fear or strong dislike of needles.

Specialised clinic for hypertrophic cardiomyopathy

Dr Andris Ellims, Head of Cardiovascular Clinics at Baker IDI, highlighted the clinical benefits of a specialised clinic for hypertrophic cardiomyopathy (HCM). A retrospective study of patients attending the HCM Clinic at The Alfred during the first two years of operation was undertaken. The results, published in the *Internal Medicine Journal* in March 2015, showed that attendance at a specialised HCM clinic led to facilitation of cardiac investigations, optimisation of medical therapy, streamlining of referrals for implantable cardioverter-defibrillators and septal reduction therapy, and improved family screening. It found referral to a specialised clinic offering comprehensive management should be considered for all patients with HCM.

Population Health

Guidelines: Reducing workplace sitting time

A group of international experts including Head of Physical Activity at Baker IDI, Professor David Dunstan, developed a set of recommendations to help employers promote the reduction of prolonged periods of sedentary work. The recommendations, which were published in the *British Journal of Sports Medicine* in June 2015, include encouraging workers to accumulate two hours a day of standing and light activity during working hours, eventually progressing to four hours. The experts say there is a growing case for change towards better health and productivity based on the current body of scientific evidence.

Sedentary behaviour and fatigue

A study by Swedish and Australian researchers including those at Baker IDI, shows that intermittent, light-intensity walking may counteract fatigue, particularly among office workers. The study, published in February 2016 in the *British Medical Journal*, examined the energy levels of 19 overweight adults in Melbourne aged between 45 and 75. The findings provide further support that the relationship between sedentary behaviour and fatigue may be causal and that light-intensity walking breaks may counteract increased fatigue. Although this study only examined short-term effects, there

may be longer term relevance and implications for sedentary behaviour, particularly among office workers and others with highly sedentary occupations.

Association between type 1 diabetes and cancer

Researchers found that type 1 diabetes was associated with differences in the risk of several common cancers, with the strength of these associations varying with the duration of diabetes. Data for this study came from five nationwide diabetes registers: Australia (2000-2008), Denmark (1995-2014), Finland (1972-2012), Scotland (1995-2012) and Sweden (1987-2012), which looked at 9000 cancers in type 1 individuals. The study, published in *Diabetologia* in February 2016, was undertaken by Baker IDI's Head of Diabetes and Population Health, Associate Professor Dianna Magliano and colleagues. Australia has one of the highest rates of type 1 diabetes in the world and the study has important implications for the management of people with type 1 diabetes.



Paddy Dempsey is a PhD candidate in the Physical Activity Laboratory, headed by Professor David Dunstan. Paddy's PhD research is concerned with developing evidence-based physical activity guidelines to help people manage type 2 diabetes. He examines the effect of breaking up sitting time (with intermittent bursts of movement) on blood sugar levels in people with type 2 diabetes.

Aboriginal Health

Heart failure in Indigenous people in Central Australia

A study by Baker IDI researchers including Dr Camilla Tuttle and Professor Graeme Maguire looked at heart failure in an Indigenous Australian population. Rates of cardiovascular disease, with resultant poor life-expectancy, remain high in Indigenous Australians and there is a paucity of data examining its disease burden, particularly in remote communities. The study, published in *Heart, Lung and Circulation* in December 2015, found that incident heart failure occurs more frequently in the Indigenous peoples of Central Australia and is characterised by younger and more complex case presentations.

Epidemiology of a virus endemic to Central Australia
Associate Director of Aboriginal Health, Dr Lloyd Einsiedel, provided epidemiological insights from a retrospective hospital-based cohort study looking at the Human T-lymphotropic virus 1 (HTLV-1) in Indigenous Australians in Central Australia. To date, no attempt has been made to control transmission of this virus amongst Indigenous Australians. The study, published in *Retrovirology* in August 2015, utilised the Alice Springs Hospital pathology database to examine the HTLV-1 serology of Indigenous adults admitted in 2013. Among the findings were childhood infections suggestive of mother-to-child transmission and cultural practices that may have further amplified infection rates in older men. The study concluded that multiple modes of transmission are likely to contribute to higher rates of this virus in the Indigenous population of Central Australia.

Unregistered births among Aboriginal children
Evidence of identity, particularly a birth certificate, is essential to access many rights. However, the births of many Aboriginal Australians are not registered as infants. Baker IDI researchers examined factors related to birth registration among Western Australian children born to an Aboriginal mother. The study, published in the *Australian and New Zealand Journal of Public Health* in July 2016, found that unregistered births were common among Western Australian children, particularly in disadvantaged families.



Aboriginal health and wellbeing project in Central Australia.

Major Initiatives

Research Centre of Excellence:

Cardiac, Diabetes and Metabolic Imaging

Baker IDI is home to leading researchers skilled in the use of cardiac imaging technology. To cement the Institute's position in this field, Baker IDI is establishing Australasia's first comprehensive 'Research Centre of Excellence in Cardiac, Diabetes and Metabolic Imaging'. The facility forms the basis of a broad-based preventative health and clinical research centre that is helping drive the scale and speed of research into clinical practice.

The Clinical Research Centre at Baker IDI occupies a dedicated research suite, which was opened in 2015. The centre piece is a state-of-the-art research-dedicated Siemens Prisma 3 Tesla MRI scanner, which is equipped with a high powered magnet that is able to use short scanning times to produce extremely high resolution images. The Centre provides infrastructure, radiology and clinical

support to facilitate research and educational activities using MRI technology. The facilities are available for Baker IDI researchers and their collaborators, as well as external researchers who wish to use these technologies and services on a user-pays basis.

Strategic Role in Aboriginal Health

The Aboriginal Health program, which will celebrate 10 years in 2017, is continuing to expand and now supports a national network of researchers. The unit is continuing to attract highly skilled staff, with the appointment of Dr Lloyd Einsiedel, who joined the Institute as the Associate Director of Research in Aboriginal Health in 2015. Dr Einsiedel is an infectious diseases physician who has worked in Central Australia for the past 10 years. His research looks at the interactions between the social determinants of health, infectious diseases and non-communicable diseases.

In addition to capacity building, the Institute is committed to playing a strategic role in improving the health outcomes of people in Central Australia. In 2014, Baker IDI was a partner in the proposed Central Australia Advanced Health Research and Translation Centre (Central Australia AHRTC), with a governance committee chaired by Mr John Paterson, Chief Executive Officer of Aboriginal Medical Services Alliance Northern Territory (AMSANT).

The partners to the proposed Centre presented a case for recognition to the NHMRC based on the strong track record of a critical mass of clinicians, researchers and academics who are undertaking complex and challenging work on behalf of the most disadvantaged population in Australia. While this Centre has not been formally recognised by the NHMRC, the partners believe it is a valuable initiative for Central Australia and are continuing to progress the partnership in the pursuit of improved health outcomes in Central Australia.

Centre for Eye Research Australia

The Institute welcomed the country's leading eye research institute, The Centre for Eye Research Australia (CERA), to AMREP in 2015, with the organisation moving both laboratory and non-laboratory staff to the Baker IDI tower. The move gives researchers access to shared platform technologies and research facilities, as well as co-locating them with an extensive network of existing and potential collaborators at Baker IDI. The move also benefits patients who utilise Baker IDI's clinics, ensuring health care is informed by the latest research in eye health.

Gender Equity at Senior Science Level

In September 2015, Baker IDI was selected for the Science in Australia Gender Equity (SAGE) pilot, an initiative of the Australian Academy of Science in partnership with the Australian Academy of Technological Sciences and Engineering. SAGE is the first Australian trial of the UK Athena Swan gender equity accreditation program, and Baker IDI is pleased to be one of 32 science and research organisations nationally to participate in the pilot.

The accreditation process is being driven by the Institute's Gender Equity Committee. The Committee was formed in 2014 to establish initiatives that support scientists address the issue of female under-representation at senior levels, and more broadly, across the sector. Such initiatives include making available grants designed to minimise the effect of career breaks, such as maternity leave, on academic trajectories. As a result, two inaugural Women in Science Support Grants were announced in 2015.



Associate Professor Andrew Murphy, Head of the Haematopoiesis and Leukocyte Biology Laboratory, with his research team. L to R: Man Kit Sam Lee (PhD Student), Associate Professor Andrew Murphy, Michelle Flynn (Honours Student), Annas Al-Sharea (PhD Student), Dr Helene Kammoun (Research Officer), Dragana Dragoljevic (PhD student) and Dr Sarah Heywood (Postdoctoral Researcher; departed Baker IDI, mid-2016).

Awards and Achievements

Top Metabolism Discovery

The work of Associate Professor Andrew Murphy and his group was cited in the top ten metabolism discoveries in the past decade by the prestigious journal, *Cell Metabolism*. Obesity-associated inflammation is widely regarded as one of the major factors driving insulin resistance and the onset of type 2 diabetes. It was previously unknown how fat communicated with stem cells that reside in the bone marrow, which give rise to the blood cells that drive inflammation. Leading an international team of investigators, Associate Professor Murphy discovered that fat from obese mice and humans released a molecule called IL-1 that travelled to the bone-marrow stem cells to instruct them to increase the production of inflammatory cells. This work has identified new pathways to target obesity and provides a sound rationale to treat obese people with anti-inflammatory agents.

International Diabetes Research Award

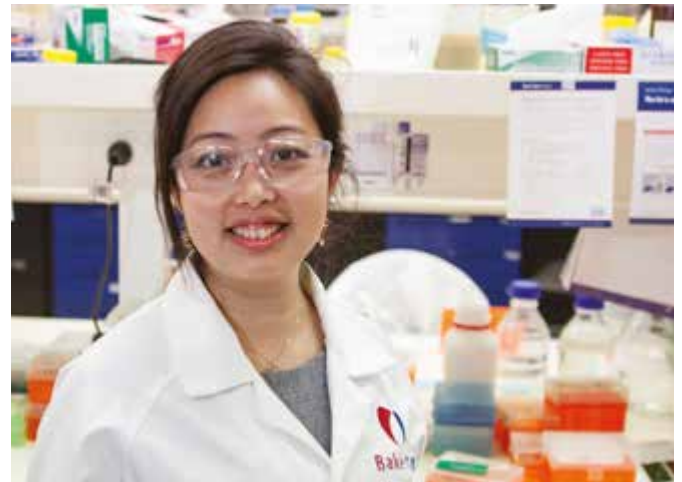
Chief Scientific Officer, Professor Mark Cooper has been announced as the recipient of the prestigious Claude Bernard Award for 2016, by the European Association for the Study of Diabetes (EASD). The award recognises an individual's innovative leadership and lifetime achievements in diabetes research. Professor Cooper, who is the first Australian scientist to receive this honour in the history of the EASD, will be presented with this award in Germany in September 2016.

Diabetes Data Award

Diabetes researcher and clinician, Associate Professor Jonathan Shaw, received the 2015 Australian Diabetes Society Jeff Flack Diabetes Data Award. The award recognises an Australian researcher who has made an outstanding contribution to diabetes data collection in Australia. Associate Professor Shaw is the co-Chief Investigator of the AusDiab Study, the largest population-based study in Australia examining the natural history of diabetes, pre-diabetes, heart disease, and kidney disease.

Other Awards: 2015

- Dr Catherine Chamberlain received the NHMRC Rising Star Research Excellence Award, which recognises the top-ranked application by an Indigenous researcher in the Early Career Fellowship scheme.
- Elyse Di Marco was awarded the best research oral presentation by a young investigator at the Australian Vascular Biology Society's Annual Scientific Meeting.
- Head of Aboriginal Health, Professor Sandra Eades, was the recipient of the Lowitja Institute Research Leadership Award.
- Jessica Harding was awarded the best PhD thesis presentation at the International Diabetes Epidemiology Group scientific meeting.
- Dr Hamid Hosseini was the recipient of the Early Career Award presented at the Australian Atherosclerosis Society's Annual Meeting.
- Dr Sam Keating won the award for the best oral presentation at the 17th Diabetes and Cardiovascular Risk Factors - East Meets West Symposium in Hong Kong.
- Dr Helena Qin was awarded the British Pharmacology Society's Outstanding Young Investigator Prize at the Society's flagship Annual Meeting, Pharmacology.
- Yow Keat Tham was the recipient of the International Society for Heart Research (ISHR) Student Publication Prize for the best original research article from a PhD student in the last 12 months at the joint Cardiac Society of Australia and New Zealand / International Society for Heart Research Annual Scientific Meetings.



Dr Helena Qin is an Early Career Researcher in the Heart Failure Pharmacology Laboratory, headed by Associate Professor Rebecca Ritchie. Dr Qin has conducted preclinical studies that demonstrate the cardio-protective effects of the anti-inflammatory protein annexin-1 following heart attack. Dr Qin was awarded the British Pharmacology Society's Outstanding Young Investigator Prize for her research.

Postgraduate Students

72 PhD Students
1 Masters Student

Publications

424 Journal Articles
13 Book Chapters
2 Books
1 Commissioned Report



www.nucleusnetwork.com.au

Nucleus Network

Managing Director: Cameron Johnson



Dr Jason Lickliter, Nucleus Network Medical Director and Consultant Medical Oncologist, in the Nucleus Network facility. Dr Lickliter has extensive experience in all aspects of early-phase cancer trials.

Nucleus Network is a not-for-profit clinical research company wholly owned by Baker IDI Heart and Diabetes Institute. The organisation is one of Australia's leading early phase clinical research facilities. The not-for-profit status enables the establishment of unique collaborations with hospital-based principal investigators, medical schools and access to dedicated research facilities and capabilities across AMREP.

In May 2016, Cameron Johnson took over from Bev Thomas as the Managing Director of Nucleus Network.

The Centre for Clinical Studies at AMREP is a purpose-built facility for the conduct of clinical trials and is core to the business of Nucleus Network. In addition to conducting early phase clinical trials, Nucleus Network provides clinical trial consulting services focusing on the transition of new products from preclinical testing into clinical application.

Phase 1 clinical trials, which involve a new drug therapy being tested in a healthy volunteers or in patients with specific medical conditions, are integral in the development of new therapies. Nucleus Network relies on community involvement in this process, and is grateful for the time and effort volunteered by participants, without whom new medicines would not reach those who need them most. The information collected from clinical trials monitors and protects the participants' health and also provides crucial information about the therapy under trial.

Highlights in 2015

- Over \$7 million in services, donations, education subsidies and contract work paid to AMREP members;
- Approximately \$24 million in direct export revenue generated on behalf of the Australian biopharmaceutical industry in addition to flow-on benefits for the industry and other economic sectors;
- Clients include international pharmaceutical and biotech companies from Australia, USA, France, New Zealand, China, India and the United Kingdom;
- More than 40 clinical trials conducted;
- Expansion of AMREP facility from 41 to 50 beds, including a four-bed infusion suite and four single rooms for patient studies;
- Three direct student placements, plus support provided to external researchers (including PhDs).



A Research Nurse and volunteer in the Nucleus Network facility.





Associate Professor Heidi Drummer, Deputy Head of Burnet's Centre for Biomedical Research.

Burnet Institute Centres and Working Groups

Director: Professor Brendan Crabb AC
Deputy Directors: Professor Mike Toole AM and Associate Professor David Anderson

Centre for Biomedical Research

Head: Prof. James Beeson
Deputy Head: Assoc. Prof. Heidi Drummer

Anderson Laboratory
Diagnostics Development

Beeson Laboratory
Malaria Immunity & Vaccines

Caminschi Laboratory
Dendritic Cell Biology & Immunotherapy

Churchill Laboratory
HIV Neuropathogenesis

Crosby Laboratory
Hepatitis B Antivirals

Crowe Laboratory
International Clinical Research

Drummer/Poumbourios Laboratory
Viral Entry & Vaccines

iCRL
International Clinical Research Laboratory (HIV monitoring)

Gilson/Crabb Laboratory
Malaria Research

Gorry Laboratory
HIV Molecular Pathogenesis

Gugasyan Laboratory
Lymphocyte Biology

Hogarth Laboratory
Inflammation, Cancer & Infection

Jaworowski Laboratory
Infection, Inflammation & Innate Immunity

Lahoud Laboratory
Dendritic Cell Receptors

Palmer Laboratory
Immunometabolism in HIV & Inflammatory Disease

Ffrench Laboratory
Viral Immunology

Richards Laboratory
Malaria & Tropical Diseases

Fowkes Laboratory
Malaria & Infectious Diseases Epidemiology

O'Keeffe Laboratory
Dendritic Cell Research

Pietersz Laboratory
Bio-organic & Medicinal Chemistry

Ramsland Laboratory
Structural Immunology

Tachedjian Laboratory
Retroviral Biology & Antivirals

Tannock Laboratory
Influenza

Wright Group
HIV Prevention & Management of Infection

Gowans/Loveland Laboratory
Hepatitis C

Centre for Population Health

Head: Prof. Margaret Hellard
Deputy Head: Prof. Paul Dietze

Malaria and Infectious Diseases Epidemiology: F Fowkes

Alcohol & Other Drugs: P Dietze & P Higgs

Justice Health: M Stoové

Viral Hepatitis: M Hellard & J Doyle

HIV: M Stoové

Sexual Health & Young People's Health: M Lim

Infectious Disease Modelling: D Wilson

Infectious Disease Surveillance: C El-Hayek

Centre for International Health

Head: Prof. Robert Power

International Operations: M Tennant

Infectious Disease & Harm Reduction: C Hughes

Women's & Children's Health: S Luchters

Education & Capacity Development: J Davis



Burnet Institute
Medical Research. Practical Action.

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Burnet Institute

Director: Professor Brendan Crabb AC, PhD

The Burnet Institute has had a highly successful 2015 – from Australian-centred public health research into high-risk behaviours in young people, through to international programs improving the health of poor communities in our region, and laboratory-based research where discoveries and new innovations have underpinned health solutions in the field. While it was a tough year nationally for NHMRC grant funding, we continued to better the national average for the third year running. In fact, over that period our success rate has been around double the national average.

In 2016 we will expand our range of ‘whole-of-institute’ programs, primarily through the establishment of our disease elimination initiative. Over the next three to five years, we will focus on how to eliminate diseases rather than just treatment and control. This includes elimination science for hepatitis C, malaria and HIV. A trial of direct-acting antivirals for the cure of people infected with the hepatitis C virus (HCV) is already under way. Our work towards an anti-HCV vaccine is making progress with potential for clinical trials with a new international partner. HIV has always been a major focus for Burnet. Our innovations, especially in the laboratory, appear to be accelerating in ways that underpin how the world might approach elimination of HIV.

Centre for Biomedical Research

Through integrating discovery-based research, translational research, and clinical and population research, the Centre aims to achieve new advances in treatments, vaccines, diagnostic tests and prevention strategies to address diseases of major global importance. The Centre has a broad research program in infectious diseases, autoimmune and inflammatory diseases, and cancer. This includes the infectious diseases HIV, malaria, hepatitis B and C, tuberculosis (TB) and influenza, as well as the autoimmune diseases arthritis and lupus, and breast, ovarian, cervical and prostate cancer.

New Drug Class to Tackle HIV

Drug resistance, toxicity and intolerance could lead to exhaustion of drug options for people living with HIV with little in the way of new drug classes in the pipeline. To address this unmet need we have employed a relatively new paradigm in drug discovery to identify new drug building blocks with unique modes of action in blocking a vital HIV molecule. These small chemical building blocks represent promising starting points for an entirely new drug class for HIV.

Latham CF, La J, Tinetti RN, Chalmers DK, Tachedjian G. Fragment based strategies for discovery of novel HIV-1 reverse transcriptase and integrase inhibitors. Curr Top Med Chem 2016;16(10):1135-53.



The Burnet Institute's mission is to achieve better health for poor and vulnerable communities in Australia and internationally through research, education and public health. Professor Brendan Crabb AC (R) and Mr Rob Milne (L) (Chair, Burnet Board of Directors) with children in Myanmar.

Why HIV Causes Atherosclerosis?

HIV-infected individuals have a higher risk of atherosclerosis and coronary artery disease, even when successfully treated by antiretroviral therapy. We showed that circulating monocytes from these individuals have a higher propensity to differentiate into fatty foam cells, the cells that characterise atherosclerotic plaques, after migrating across an activated endothelium. These properties were associated with altered expression of molecular transporters for cholesterol. This work points to new diagnostic tests and treatment modalities for coronary artery disease in HIV-infected individuals and others with chronic inflammatory conditions.

Maisa A, Hearps AC, Angelovich TA, Pereira CF, Zhou J, Shi MDY, Palmer CS, Muller WA, Crowe SM, Jaworowski A. Monocytes from HIV+ individuals show impaired cholesterol efflux and increased foam cell formation after transendothelial migration. AIDS 2015;29(12):1445-57.

HIV Therapy Less Effective in Brain

A study identified that HIV found in the brain is genetically distinct from HIV found in the blood of the same patient. We showed that viruses located in the brain had less efficient replication, which was primarily due to the reduced recruitment of a cellular protein called Sp1. Importantly, we showed that drugs being trialed for the cure of HIV were less effective against brain viruses. These findings suggest HIV cure strategies may have different outcomes depending on the location of the HIV reservoir.

Gray L, Cowley D, Welsh C, Lu H, Brew B, Lewin S, Wesselingh S, Gorry P, Churchill M. CNS-specific regulatory elements in brain-derived HIV-1 strains affect responses to latency reversing agents with implications for cure strategies. Mol Psychiatry 2016;21(4):574-84.



Associate Professor Gilda Tachedjian (R), Head Retroviral Biology and Antiviral Laboratory, with Senior Research Officer, Dr Cath Latham (L) and Research Assistant, Adam Johnson.



Dr Clovis Palmer, Head, Immunometabolism in HIV and Inflammatory Diseases Laboratory.

illuminating Malaria's Hidden Secrets

Burnet Institute scientists have revealed for the first time how parasites invade red blood cells and of the various molecular steps that take place. This important work could help fellow scientists think of novel ways to treat and prevent disease.

Weiss GE, Gilson PR, Taechalertpaisarn T, Tham WH, de Jong NWM, Harvey KL, Fowkes FJI, Barlow PN, Rayner JC, Wright GJ, Cowman AF, Crabb BS. Revealing the sequence and resulting cellular morphology of receptor-ligand interactions during Plasmodium falciparum invasion of erythrocytes. PLoS Pathog 2015;11(2):e1004670.

Malarial Natural Immunity: Clue to Vaccine

New studies have revealed that antibodies work in partnership with other proteins in the blood, known as complement, to block and kill malaria infection. Burnet researchers showed that people living in malaria-endemic areas, who had high levels of this immune activity, were generally protected from malaria, and that this protective activity could be generated by experimental malaria vaccines. These findings have identified a new pathway towards developing a highly effective vaccine.

Boyle MJ, Reiling L, Feng G, Langer C, Osier FH, Aspeling-Jones H, Cheng YS, Stubbs J, Tetteh KK, Conway DJ, McCarthy JS, Muller I, Marsh K, Anders RF, Beeson JG. Human antibodies fix complement to inhibit Plasmodium falciparum invasion of erythrocytes and are associated with protection against malaria. Immunity. 2015;42(3):580-90.

Centre for Population Health

The Centre for Population Health's (CPH's) mission is to improve the health of the community, both regionally and globally, by conducting high quality, policy-relevant and innovative research that addresses the major public health problems associated with infectious diseases, drug use and related behaviours. In 2015 the CPH established 'Elimination' as its strategic priority for the next five years. Throughout the year its work focused on providing an evidence base for the elimination of HIV, HCV, hepatitis B virus (HBV), malaria and TB and the elimination of harms associated with alcohol use, other drug use and sexual risk behaviour.

Malaria Prevention Trial: Myanmar

Commencing in April 2015, a randomised controlled trial aims to discover whether distributing personal insect repellent to high-risk populations (mobile and migrant people and forest dwellers) through Village Health Volunteers reduces malaria incidence and the spread of antimalarial drug (artemisinin) resistance. The trial involves ~30,000 participants living in 116 villages in eastern Myanmar.

Methamphetamines

Methamphetamine use and harms has attracted major media interest. We have shown that the issues relate to increased purity and changes in user behaviour rather than an increase in prevalence of use. Nevertheless, there is a clear need for new research on methamphetamine use and harms, particularly as they relate to regional and rural Australia.

Hepatitis C Treatment and Prevention

The Hepatitis C Treatment and Prevention Study – the TAP Study – aims to deliver new oral hepatitis treatments to people who inject drugs (PWID) using an innovative nurse-led model of care. Further, it aims to show how treatment of the injecting network can prevent HCV transmission, which will be critical to its elimination.

The hepatitis C treatment in primary care versus tertiary care study – the PRIME Study – aims to prove that treatment for HCV can be delivered through community-based clinics and drug and alcohol services. The conventional approach to care of HCV-infected individuals involved general practitioners referring all patients to hospitals for specialist-led care, but the new oral medications against HCV enable community-based treatment.

Exploring Youth Risky Behaviour

The Sex Drugs and Rock'n'Roll study collects data about risk behaviours and the health of young Australians. In 2015, 1000 young people were surveyed online, with a particular focus on social media and health. Around half of young people have engaged in sexting and 100% of young men and 81% of young women had ever viewed pornography. The average age of first viewing pornography was 13 years among boys and 16 years among girls.

Risky single-occasion drinking by young people in Australia is a serious public health issue. The Young Adults and Alcohol Study (YAAS) is addressing this gap. YAAS involves 802 young (aged 18-24) risky drinkers from across metropolitan Melbourne, surveyed about their most recent heavy drinking occasion in late 2012 and late 2013. Participants self-report the amount of alcohol consumed and money spent on alcohol. Initial analysis shows a small decrease in overall single-occasion consumption from an average of 13 Australian Standard Drinks (ASD) at baseline to 12.24 ASD 12 months later.

Monitoring Infectious Disease

ACCESS – Australian Collaboration for Coordinated Enhanced Sentinel Surveillance – is Australia's largest surveillance system for monitoring HIV, hepatitis C, syphilis, chlamydia and gonorrhoea. We have set up this system in collaboration with The Kirby Institute and the National Reference Laboratory, with funding from several state governments. ACCESS directly extracts non-identifiable clinical records and test results from clinics and laboratories in participating states, enabling detailed analyses of the epidemiology of the targeted infections.

Infectious Disease Modelling Group

Epidemiological and health economic modelling permits assessment of past and expected epidemic trends, and the population-level health impact of interventions and their financial implications. The infectious disease-modelling group has made major contributions in several areas. HCV modelling is informing vaccine preparedness strategies and likelihood of achieving World Health Organization elimination targets, along with informing treatment prioritisation approaches. TB modelling has been assessing the relative benefit of various approaches and directly informing national TB programs in

lower-middle-income countries. The internationally renowned Optima modelling team recently joined the Burnet Institute and works with policymakers, funders and program managers to optimise allocation of limited resources for greatest population health impact.

Centre for International Health

Burnet Institute's expertise spans the prevention and care of infectious diseases, women's and children's health, sexual and reproductive health, harm reduction, primary health care, and strengthening national health systems. The Centre responds effectively to local health issues, working closely with communities, civil society organisations, governments, international non-government organisations and U.N. agencies.

Women's and Children's Health

The Women's and Children's Health team is focused on sexual and reproductive health among women and men, including adolescents. In 2015 we undertook two reviews of young people's sexual and reproductive health in Asia and the Pacific for UNFPA – the United Nations Population Fund. The reviews described young people's health needs and identified effective approaches to inform evidence-based policy and practice in the region.

Burnet also contributed to *The Lancet* Commission on Adolescent Health and Wellbeing, led by The University of Melbourne, London School of Hygiene and Tropical Medicine, University College London, and Columbia University. The landmark report will be launched in 2016.

In Myanmar, a qualitative inquiry was conducted with colleagues from The Monash Institute of Pharmaceutical Sciences to assess the feasibility and acceptability of a new inhaled oxytocin drug currently being developed. Burnet also partnered with Ipas (International Pregnancy and Advisory Services), a global non-government organisation, to conduct a study into women's access to, and experiences of, post-abortion care in Myanmar.

Infectious Disease and Harm Reduction

In Indonesia and the Philippines, Burnet worked with partners to address the rising rates of HIV, focusing efforts on adolescents from key populations, and linking them to services and models for retaining them in care. In Papua New Guinea (PNG), Burnet supported the government's response to the emerging multidrug-resistant TB epidemic in Western Province, and in building capacity for home-based testing of malaria in East New Britain.

In Myanmar, we supported program delivery to PWID and men who have sex with men (MSM) to access HIV prevention care and support services. In 2015, the HIV prevention program reached more than 10,000 men in these categories, providing 340,000 condoms and lubricant packs, and more than 3000 tests for HIV through Burnet's drop-in centres in five cities. Burnet Institute reached 3,800 PWID with harm reduction services, including distributing more than 900,000 clean needles and syringes, and providing more than 2000 HIV tests.

Education and Capacity Development

Burnet maintained regular postgraduate teaching and training activities, and supervised nine PhD students, plus two of our own staff who are working towards doctorates. We hosted 20 Fellows visiting from Fiji, Tonga and Myanmar in 2015, as part of the Australian Awards Fellowship program.

Focal Programs

Myanmar

2015 was a year of consolidation for Burnet's Myanmar program. Our partnerships program expanded with a Memorandum of Understanding with Deakin University and a partnership agreement with Water Aid Australia, thereby bringing complementary skills and expertise to public health programming and research in Myanmar. We now aim to develop further in two areas: first, to expand the geographical area and extent of our TB service provision to increase active case finding, testing and treating, including paediatrics. Second, we will develop our new adolescent health thematic area through supporting 'Life Skills' education in high schools.

Papua New Guinea

Burnet has continued to implement the 'Home-Based Management of Malaria' program with 300 volunteers providing testing, treatment and referral services across three districts. A tool kit designed to address the health of adolescent boys was launched in Port Moresby and is being promoted amongst employers throughout PNG. We also developed capacity in East New Britain facilities to better inform and prepare women and their partners for pregnancy, childbirth and parenthood.

Burnet's contribution to the TB response in the South Fly District in Western Province has been extended for two years. In 2015 the development of the 'Accelerated Response Plan' promoted effective co-ordination of partners in the response. Strengthened case management and referral pathways led to a significant increase in the proportion of patients retained on Drug Resistant-TB treatment, and improvements in the quality of care.

Other Activities

Despite an unpredictable and challenging funding landscape, our Centre for International Health accumulated 24 new contracts during the year, with a total value nearing \$14 million. Our Australian Government-funded bilateral programs continued in Indonesia (HIV prevention) and China (providing health system capacity development in the Tibet Autonomous Region).

Burnet worked in a range of other countries including Lao PDR, The Philippines, Solomon Islands and Kenya, alongside activities in healthy ageing in Sri Lanka and philanthropic-funded programs in Southern Africa.

On the research front, we were successful in each of the three research bids to the NHMRC, reinforcing our commitment to balancing our development profile with robust research and evidence.



Burnet Institute Papua New Guinea staff outside the Burnet office in Kokopo, East New Britain.

Key Theme Highlights

Infectious Diseases

Malaria Invades Red Blood Cells on Film

Understanding the interactions required for the malaria parasite to invade its erythrocyte host is important for the development of drug-based therapies and vaccines. For the first time, Burnet scientists, led by Dr Paul Gilson, filmed *Plasmodium falciparum*, the deadliest of the malaria-causing parasites, invading erythrocytes while systematically blocking several specific interactions between the parasite and the erythrocyte, demonstrating interactions in at least four steps leading up to invasion. If a single vaccine were designed to block interactions at all four steps, the combined effect might so reduce invasion that parasite growth and disease progression would be arrested.

Tuberculosis Initiative

Burnet Institute prioritised the fight against TB with the announcement on World TB Day of the Burnet TB Initiative, to be headed by Professor Steve Graham. This includes a research-to-development response and regional technical leadership. This was demonstrated by Burnet's support for the first GeneXpert machine to be incorporated into Timor-Leste's national TB program. The machine provides rapid and accurate diagnosis of TB, which is a major health problem in Timor-Leste with an estimated 8000 active cases nationally.

Hepatitis C Drugs: Towards Elimination

The Federal Government's announcement that new, highly effective hepatitis direct-acting, antiviral drugs would soon be available through the pharmaceutical benefits scheme was widely welcomed as a watershed initiative. Used in combination with opioid substitution therapy, and high-quality harm reduction and needle and syringe programs, it is forecast that the direct-acting antivirals could hasten the elimination of HCV in Australia within 10 years. The next challenge is to prevent infection and re-infection through the development of an anti-HCV vaccine. The Drummer Laboratory is in the late pre-clinical stage of vaccine development.

Alcohol, Drugs and Other Harm Reduction

Burnet is committed to addressing the adverse health effects of alcohol and other drug use through the application of behavioural and clinical research, treatment practice and community-based harm reduction programs based on sound evidence.

Harm Reduction Services: Myanmar and Indonesia

In Myanmar, the provision of harm reduction services continued to broaden its scope, including an increasing focus on addressing viral hepatitis, with an aim to test and vaccinate against hepatitis B virus (HBV) and increase access to testing and treatment for HCV infection.

Burnet continued as Technical Lead for the HIV Co-Operation Program for Indonesia (HCPI). Funded by the Australian Government, HCPI delivered comprehensive harm reduction services both in the prison setting and in the wider community. The introduction of a model prison program in 11 prisons and the development of 'Comprehensive Guidelines for HIV in Prisons' were considerable achievements. Local agency partners also conducted intensive behaviour change interventions in eight provinces at the community level.

This involved working closely with local government-run community health centres to refer people who inject drugs to methadone maintenance treatment, providing sterile needles and condoms, testing and treatment of HIV, and other related health care services.

Needle and Syringes Program

A commonly-used measure of effectiveness in needle and syringe programs is individual needle and syringe coverage. Researchers from the Centre for Population Health examined whether a sample of around 900 PWID stockpiled needles and syringes and, if so, how this impacted on measurement of individual-level syringe coverage. They showed that Australian PWID did stockpile and this impacted on coverage measurement; when stockpiling was taken into account their sample showed higher levels of coverage. Further, this new measure was better at identifying risky injecting practices.

Immunity, Vaccines and Immunisation

Developing vaccines against infectious diseases including malaria, tuberculosis, HCV, HBV and HIV, or to cancer, requires a deep understanding of how key elements of the immune system interact.

Malarial Natural Immunity: Vaccine Hope

Burnet researchers from the Beeson Laboratory achieved a major advance with the discovery of a key strategy used by the body's immune system to protect against malaria infection. The research, published in *Immunity*, reveals how antibodies work in partnership with other proteins in the blood, known as complement, in blocking malaria infection. Knowledge of this pathway gives rise to a new strategy for vaccine development.

Hepatitis C Vaccine Development

In a study published in the *Journal of Virology*, researchers from the Drummer/Poumbourios Laboratory and collaborators from Monash University describe how the removal of variable regions from the major HCV surface protein improves the binding of protective antibodies, and how these variable regions modulate interactions with cellular attachment molecules used by the virus to initiate replication. This research supports work on a prophylactic HCV vaccine that is in late pre-clinical development by suggesting that the variable regions reduce the ability of protective antibodies to recognise HCV.

International Health: Immunisation

The Centre for International Health and Burnet Myanmar won a grant from the International Initiative for Impact Evaluation to investigate new ways to involve communities in immunisation services in challenging settings such as in rural Myanmar. This project will run through 2016. Integrating immunisation is a core component of our maternal and child health programs under way in PNG, Lao PDR, Zimbabwe and Myanmar.

Biomarker of Autoimmunity

The Gugasyan Laboratory and collaborators have identified the essential function of a regulatory protein called NF- κ B1 that prevents premature ageing and multi-organ autoimmune disease. Using a mouse model lacking the NF- κ B1 gene, B-cells produce excessive levels of the inflammatory protein, interleukin-6. This promotes self-reacting antibodies and the consequent destruction of target organs. Importantly, NF- κ B1 prevents disease by silencing the gene for interleukin-6.

Maternal and Child Health

Burnet is working with many communities in resource-poor settings to better understand, and address, the underlying factors that prevent access to crucial health care services such as family planning, postnatal and newborn care, vaccinations, management of childhood illnesses and nutrition.

Healthy Mothers, Healthy Babies

The first of five separate but linked studies in Burnet's Healthy Mothers, Healthy Babies program is under way in East New Britain province in PNG to define the major causes of poor maternal, newborn, and child health, and to identify feasible, acceptable and effective interventions and service delivery strategies to improve reproductive, maternal, neonatal and child health outcomes in PNG.

Maternal - Infant Health: Rural Zimbabwe

Burnet is working in a rural area of Zimbabwe that has one of the highest infant mortality rates in the country to increase uptake of an essential package of services during pregnancy and the first two years of life. The program supports eight rural and remote clinics providing quality services, and engages surrounding communities to address barriers that prevent women and children from reaching these services. Our work empowers women to make informed decisions about seeking care, and supports men to challenge harmful gender norms and community practices that restrict care-seeking.

Under-Nutrition: Lao PDR

A project aimed at reducing child under-nutrition (stunting) in Lao PDR was awarded a \$1.5 million NHMRC grant. Based on a successful pilot study, a three-year randomised, controlled trial of a package of community-based nutrition interventions to prevent child stunting will begin in 204 villages in July 2016.

Sexual and Reproductive Health

Sexual and reproductive health problems significantly contribute to the global burden of ill health. Increasing global efforts are needed to achieve access to quality sexual and reproductive health services for all women and men, including among adolescents and those who are marginalised.

Mobile Phone Intervention: Kenya

In Kenya, approximately 25 per cent of sex workers experience an unintended pregnancy each year. Mobile phones offer a promising means of accessing this population given their widespread use across the country. In collaboration with research partners (ICRH-Kenya and FHI360) and with female sex workers, Burnet has developed an mHealth intervention consisting of 70 SMS and six role model stories aimed at reducing unintended pregnancy. A cluster-randomised trial is now under way to assess the effectiveness of this intervention among more than 800 female sex workers in Mombasa, Kenya.

HIV Prevention: Myanmar

An emerging global HIV prevention strategy is for 'at-risk' HIV-negative individuals to take anti-HIV drugs, known as pre-exposure prophylaxis (PrEP), to reduce their HIV risk. PrEP effectiveness is contingent on local health systems, overcoming barriers to accessing health services and acceptability among HIV risk populations. Burnet has conducted the first PrEP acceptability study among MSM in Myanmar. While HIV prevention resourcing and health system limitations remain a challenge, MSM participating in the study were positive about PrEP. As trusted service providers, community-based HIV services like those provided by Burnet Institute are likely to be crucial to providing PrEP to MSM in Myanmar in the future.



The Burnet Institute's Healthy Mothers, Healthy Babies program aims to save the lives of mothers and babies in Papua New Guinea.

Vaginal Microbiome: HIV Susceptibility

The vaginal microbiome, comprising bacterial communities that colonise the vagina, can either protect or promote susceptibility to HIV and other sexually transmitted infections. However, how the microbiota mediate these effects is largely unknown. The Tachedjian Laboratory was awarded NHMRC funding to elucidate how factors produced by beneficial and detrimental vaginal microbiota modify the innate immune responses elicited by cells at the vaginal luminal surface and how these responses modulate infection of HIV target cells in the mucosa.

Young People's Health

During young adulthood sexual risk behaviours and related health problems, mental health conditions, and use of alcohol, tobacco and other drugs often emerge or peak. Burnet is responding to these issues by designing and implementing programs that reduce young people's risk.

Mobile Phone Intervention: Drinking

Burnet has developed a novel alcohol intervention for risky young drinkers delivered via mobile phones. The online questionnaire collects hourly reports of alcohol consumption and spending, location and mood. In response to these data, participants receive an individually tailored feedback message via SMS, which aims to stop or slow down their drinking or avoid harmful consequences of drinking. Burnet has received a VicHealth Innovation Research Grant to conduct a trial with 300 young people to test the impact of the intervention.

Sexual Health Intervention: Indonesia

SMS4Health is a project assessing the acceptability of SMS to improve adolescent sexual and reproductive health, and reduce smoking among youth in Indonesia. In Central Java, Burnet recruited 523 young people for an eight-week SMS intervention. Each person received 12 health promotion SMSs relating to sexual and reproductive health and harms from smoking, tailored to the individual risk profile and gender. Most participants reported that SMSs was interesting or entertaining, informative and that they had learnt something.

Adolescents and HIV in Asia

In many Asian cities, 15-19 year olds are neglected in HIV testing and treatment strategies. In 2015 Burnet worked with UNICEF in Indonesia and in the Philippines to bring together key populations, health services staff and policymakers. Key populations included young MSM, transgender women, sex workers, and adolescents who inject drugs. They discussed ways to make HIV testing and treatment more accessible to young people. These initiatives are now being expanded to four cities in Indonesia and another four in the Philippines.

Postgraduate Students

32 PhD Students
1 Masters Student

Publications

211 Journal Articles
4 Book Chapters



Monash School of Public Health and Preventive Medicine

School of Public Health and Preventive Medicine

Head: Professor John McNeil AM



Epidemiology and Preventive Medicine

Head: Professor John McNeil AM, MSc, MBBS, PhD, FRACP, FAFPHM

The Department of Epidemiology and Preventive Medicine (DEPM) sits in the School of Public Health and Preventive Medicine (SPHPM) at Monash University. SPHPM is committed to the prevention of disease and disability through education, innovation and research; through our teaching we are helping to create the future's public health leaders.

DEPM's expertise spans large epidemiological studies, multi-centre clinical trials, clinical registries, evidence synthesis and health social science. Its collaborative work with national and international research institutes, the major Monash affiliated hospitals, public health institutes in Victoria and nationally, government, non-government and industry partners ensures its research informs public health and clinical practice.

The Department is a leader in the establishment, management and analysis of clinical registries in Australia, and is also home to Australia's largest clinical trial ASPREE (ASPirin in Reducing Events in the Elderly), a double-blind placebo controlled study of 19,000 participants in Australia and the United States of America.

Our research focuses on several of the principal agendas of healthcare including: chronic disease prevention; health promotion; increasing the evidence base of healthcare; improving quality and safety of healthcare; advancing health information technology and improving cost-effectiveness; prolonging disability free survival amongst the elderly; improving the care of the critically ill and injured; reducing adverse health impacts of the environment and the workplace; and maintaining good research practice, including authorship, collaboration, supervision, research ethics and agreements.

World First Statin Trial in the Elderly

In 2015, we launched the world's largest study to investigate whether statin treatment prolongs good health and maintains independence among healthy individuals aged 70 years and over. The STAtins in Reducing Events in the Elderly (STAREE) study, led by Principal Investigator Professor Sophia Zoungas, is a collaboration between Monash University, Menzies Research Institute for Medical Research (University of Tasmania), Australian National University, The University of Western Australia and Curtin University. The trial, which is funded by the NHMRC, received the largest amount of funding of all Project Grants commencing in 2014.

Statins prevent heart attacks and strokes in people with a history of cardiovascular disease by reducing cholesterol. The use of statins has become increasingly common with approximately 40% of Australians over the age of 65 taking them; however, it is not yet known if the benefits of statin



Professor Steve Webb, Intensive Care Specialist, will lead the Australian and New Zealand component of the OPTIMISE CAP trial, which will evaluate the impact of interventions to reduce mortality and morbidity for patients with Severe Community Acquired Pneumonia.

therapy outweigh the risks for healthy older people. STAREE is a randomised, double-blind, placebo controlled trial designed to determine whether older people should take statins to maintain good health and independence. It aims to give clinicians evidence-based information to guide prescribing behaviour and address the 'over-prescribing' debate. It is hoped that it will provide information about ways we can keep older Australians healthy and living happy, productive and independent lives in the community. The project addresses a significant knowledge gap and is likely to inform best practice worldwide.

Ground-breaking Pneumonia Trial

DEPM secured \$4.4 million of NHMRC funding for a novel new platform trial — the OPTIMISE CAP trial (Optimisation by Platform Trial Involving Multiple Interventions with Simultaneous Evaluation in Community Acquired Pneumonia). The grant was awarded to DEPM's Australian and New Zealand Intensive Care Research Centre (ANZIC-RC) in collaboration with the Platform for European Preparedness Against (Re-)emerging Epidemics (PREPARE). Adjunct Professor Steve Webb will lead the Australian and New Zealand component of the trial.

The OPTIMISE CAP trial will evaluate the impact of interventions to reduce mortality and morbidity for patients with Severe Community Acquired Pneumonia (Severe CAP) in Intensive Care Units (ICUs) across Australia. Currently, the mortality burden of severe community acquired pneumonia is similar to the annual road toll and it is responsible for more than 7000 ICU admissions and 1400 deaths each year. The trial will compare different types of ventilation, antibiotic and immunomodulation strategies that are currently used as standard care. It will preferentially randomise patients to treatments that the trial is finding to be more effective, leading to better outcomes for patients within the trial. In Europe the trial will be coordinated by the Julius Center for Health Sciences and Primary Care at University Medical Centre, Utrecht, in the Netherlands.

Currently, there is a stark contrast between the substantial public health impact of Severe CAP and the low quality of evidence that guides therapies. The trial is seeking to improve the evidence-base and to influence more streamlined and effective international guidelines. The trial represents a paradigm shift in the way evidence is generated to help clinicians provide optimal treatment to their patients with a trial design around five times more efficient than conventional trials. It is likely that this highly adaptive and innovative type of design will be used increasingly across all disciplines of medicine.

Pioneering Cardiac Arrest Trial

Professor Stephen Bernard was awarded a \$1.89 million NHMRC Project Grant to commence in 2016 for the pioneering EXACT trial (Reduction of oxygen after cardiac arrest), which is a five-year phase 3 multi-centre clinical trial to determine whether patient outcomes are improved with the delivery of a reduced dose of oxygen post-cardiac arrest.

Currently, patients who are successfully resuscitated from out-of-hospital cardiac arrest are administered 100% oxygen based on the idea that a higher dose of oxygen will benefit organs and tissues that have been deprived of oxygen during the cardiac arrest. However, there is now compelling data indicating that excessive oxygen during the early post-arrest period may lead to additional neurological injury and worse clinical outcomes. This novel investigation could transform practice in the field and seeks important data on a range of cardiac and neurological events.

Achievements

- In 2015, Professor John McNeil was honoured for his career contribution to Monash University with his appointment as a Sir John Monash Distinguished Professor, joining a small handful of staff recommended by their Dean for this high level of professional recognition. This title is highly distinguished and only granted to eminent professors of exceptional distinction who have made an outstanding contribution to their field or discipline and to Monash University.
- Dr Janet Bray, Senior Research Fellow and Associate Director of the Australian Resuscitation Outcomes Consortium (Aus-ROC) – NHMRC Centre of Research Excellence, was awarded the 2015 Bethlehem Griffiths Research Foundation Young Researcher of the Year. The award recognises a medical researcher or clinician working in Australia who has made an outstanding contribution in the area of progressive neurological disorders or palliative care. Dr Bray’s work has

a far-reaching effect on the community and public health, focusing on emergency responses, patient response to acute symptoms, analysis of large-scale public health campaigns and community-based CPR education programs.

- Injury epidemiologist and Head of the Pre-Hospital, Emergency and Trauma Research Unit, Professor Belinda Gabbe, won two prestigious best paper prizes, one at the Australasian Trauma Society (ATS) annual conference and the other at the 39th Australian and New Zealand Burns Association (ANZBA) Annual Scientific Meeting. Professor Gabbe was also awarded a \$372,000 grant to evaluate a new model of bladder management care at the Victorian Spinal Cord Service from the Institute for Safety, Compensation and Recovery Research.



Professor Sophia Zoungas, lead investigator on the STAREE trial, speaks at the trial launch in 2015. STAREE is the world’s largest study to investigate whether statin treatment prolongs good health and maintains independence among healthy individuals aged 70 years and over.

Postgraduate Students

158 PhD Students
5 Doctor of Public Health Students
650 Masters Students

Publications

834 Journal Articles
2 Books
19 Book Chapters

Cochrane Australia

Co-Directors: Professor Sally Green BAppSc(Physio), PhD
Steve McDonald BA(Hons), MA, GradDiplIntHLth

australia.cochrane.org



Cochrane Australia is part of the global Cochrane network, an independent, not-for-profit organisation comprising 37,000 contributors from 130 countries. We work together to make the vast amounts of evidence generated through research useful and accessible for individuals, organisations and governments around the world.

Cochrane Australia is an active part of this collaborative network, with over 3000 local researchers, clinicians and patient advocates. We support the development of Cochrane in the wider Asia-Pacific region by providing training and support to authors of Cochrane reviews and advocating on behalf of Cochrane regionally. We undertake methodological research and conduct commissioned reviews and reports.

Our areas of research focus on exploring effective ways to inform decisions through the uptake of evidence, and the use of technology to improve the efficiency of evidence syntheses. Cochrane Australia is funded by the Australian Government through the NHMRC.

Australasian Cochrane Symposium

Our biennial symposium, held at the State Library of Victoria in November 2015, centred on the theme of ‘Exploring spheres of evidence and influence’. Improving the flow of evidence from trials through to reviews, then into guidelines and clinical standards is a key challenge. Our keynote plenary focused on innovation in the production of evidence syntheses, national guideline reform and guideline producer challenges. Cochrane’s responses to the opportunities and challenges presented by new services, review types and linked data sets were also explored.

We considered how to promote health evidence to a wider audience. Award-winning journalist Ray Moynihan chaired a panel of journalists and researchers, who discussed the benefits and pitfalls of seeking mainstream media coverage. A workshop for journalists covered a range of current health reporting issues, with a strong focus on conflicts of interest and the judicious use of high quality health evidence. Both sessions inspired journalists and researchers to put health evidence at the centre of contemporary reporting.

Postgraduate Students

8 PhD Students

Publications

17 Journal Articles
1 Book Chapter

Rheumatology (Musculoskeletal Epidemiology)

Head: Professor Flavia Cicuttini MSc, MBBS, PhD,
FRACP, FAFPHM



Dr Donna Urquhart won a 2015 Monash School of Public Health and Preventive Medicine Excellence Award in the category of 'Mid-career Researcher - Best Paper'.

The Rheumatology Unit's research focus is on novel approaches to the treatment and prevention of musculoskeletal diseases, in particular, understanding the different patient sub-groups within common conditions such as knee and hip osteoarthritis and lower back pain. Our aim is to develop treatments targeting different phenotypes to provide optimum benefit to each patient group. We are investigating new approaches both for the treatment of knee pain as well as disease modification in knee osteoarthritis (OA), which are supported by a number of NHMRC funded trials.

Early Life and Hip Osteoarthritis

In a collaborative study with Baker IDI colleagues who lead the AusDiab registry, Dr Monira Hussain found that low birth weight and prematurity were significant risk factors for hip OA that ultimately requires hip replacement. We hypothesise that this is due to abnormal hip joint shape, a consequence of a poorly developed joint. This finding has the potential to inform development of new approaches to the prevention of hip OA, a condition for which we still do not have effective therapies.

Abdominal Fat and Knee Damage

In a collaborative study with The Alfred Infectious Diseases HIV service, led by Soula Fillipas, we found that abdominal fat in patients with HIV, was associated with early knee damage in the form of cartilage defects. This was despite these patients not being overweight, and provides further support for the growing evidence that obesity affects joints, not just through loading, but via metabolically driven inflammation.

Chronic Back Pain and Infection

Chronic back pain and disability remains a major challenge for patients and the community. There is a growing understanding that the causes of back pain are varied. Dr Donna Urquhart published a systematic review that provided support for the hypothesis that low-virulence bacteria may cause back pain in some patients, via chronic low grade infection. Based on this work, Dr Urquhart was successful in obtaining NHMRC Project Grant funding to undertake a clinical trial to determine whether antibiotics will reduce lower back pain in appropriately selected patients. This study is being undertaken with colleagues from the Departments of Neurosurgery and Infectious Diseases.

Knee Osteoarthritis

Significant progress has been made in our ongoing NHMRC-funded studies examining new approaches to the treatment of knee OA. We are examining whether either of the drugs simvastatin (a cholesterol lowering agent) or zoledronic acid (a bisphosphonate, commonly used in the treatment of osteoporosis) have a disease modifying effect in knee OA. These two different approaches reflect the changing view of this very heterogeneous disease. Emerging evidence suggests that there will be multiple treatments for knee OA reflecting the different pathological processes that are occurring. Associate Professor Anita Wluka will examine the utility of low-dose amitriptyline in pain reduction for knee OA, which is a new approach to treating this condition.

Grants

NHMRC Project Grants 2015-2017

- Dr Donna Urquhart (CIA) was awarded a grant of \$533,760 for the study 'Is antibiotic treatment effective in the management of chronic low back pain in those with disc herniation? A double-blind, randomised, placebo-controlled trial with an economic evaluation'. (Co-Investigators: Flavia Cicuttini (CIB); Jeffrey Rosenfeld (CIC); Maurits van Tulder (CID); Anita Wluka (CIE); Karin Leder (CIF)).
- Associate Professor Anita Wluka (CIA) was awarded a grant of \$401,362 for the study 'Does low dose amitriptyline reduce pain in knee osteoarthritis? A double-blind, randomised, pragmatic, placebo controlled clinical trial of amitriptyline in addition to usual care'. (Co-Investigators: Flavia Cicuttini (CIB); Donna Urquhart (CIC); Andrew Teichtahl (CID)).

Awards

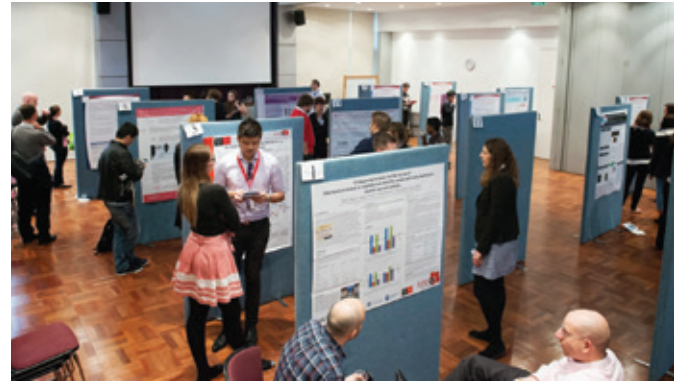
- Professor Flavia Cicuttini was awarded the Australian Rheumatology Association (ARA) President's Prize for collaborative research with Professor Graeme Jones from the University of Tasmania. The President's Prize, which is awarded triennially, recognises collaborative research endeavours within Australia and was announced at the 56th ARA Annual Scientific Meeting.

Postgraduate Students

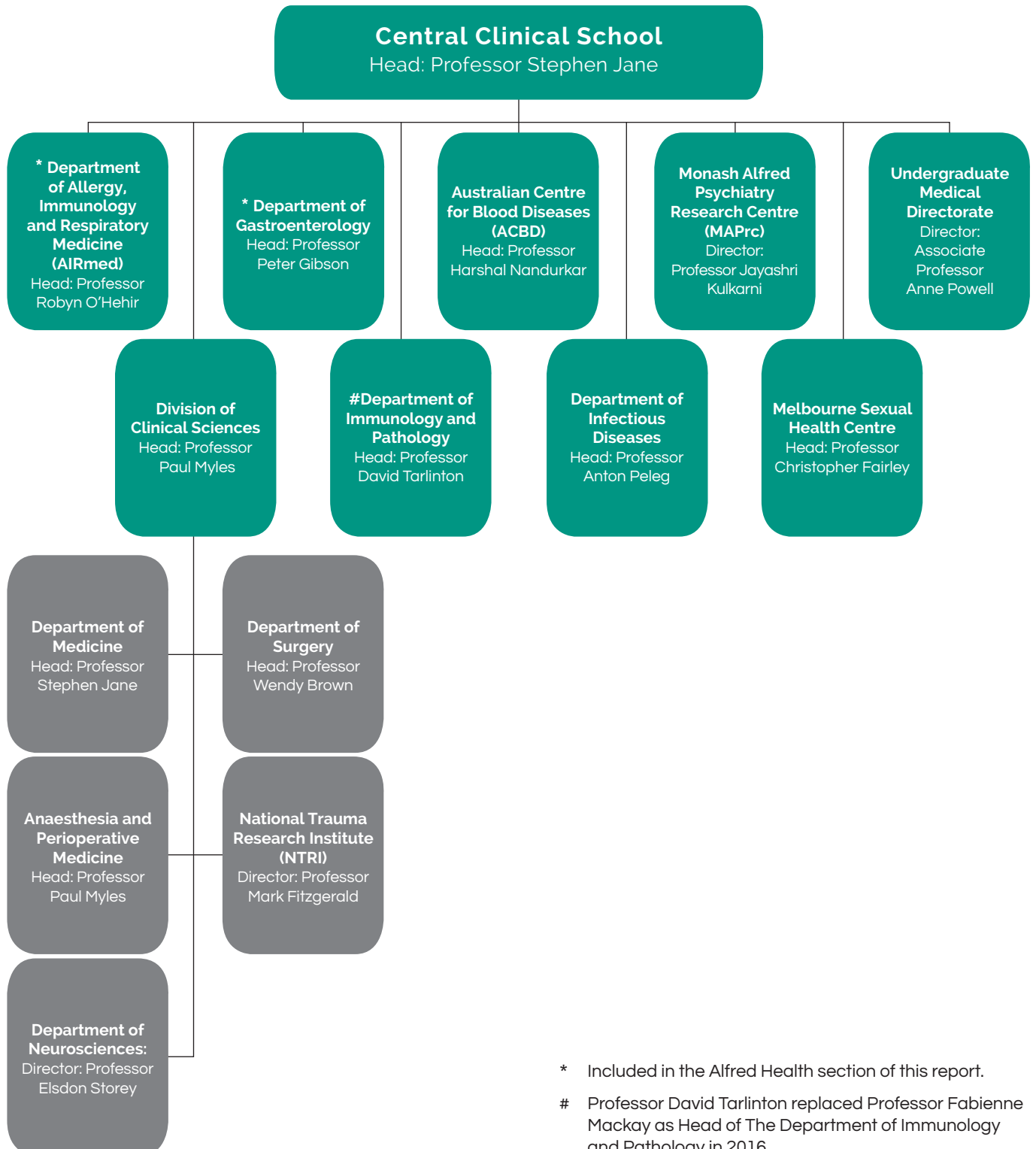
6 PhD Students

Publications

44 Journal Articles



Monash Central Clinical School



* Included in the Alfred Health section of this report.
Professor David Tarlinton replaced Professor Fabienne Mackay as Head of The Department of Immunology and Pathology in 2016.

Australian Centre for Blood Diseases

Head: Professor Harshal Nandurkar MBBS, PhD, FRACP, FRCPA

The Australian Centre for Blood Diseases (ACBD) is a leading national and international blood diseases centre with recognised research, treatment, and educational programs for blood diseases. ACBD is affiliated with Monash University, The Alfred hospital, Eastern Health and Southern Health, and is organised into three integrated divisions:

- Clinical and Diagnostic Haematology/Oncology
- Clinical and Basic Research Programs
- Teaching and Education

In March 2015 Professor Harshal Nandurkar commenced as Director of the ACBD, taking over from Acting Head, Professor Stephen Jane. Professor Nandurkar's research interests include the development of new anti-coagulants targeted to platelets or endothelium, identification of pathways that regulate haemostasis and understanding molecular mechanisms in anti-phospholipid syndrome. Professor Nandurkar supervises a basic and translational research laboratory supported with funding from both Australian (NHMRC and the Heart Foundation) and US (National Institutes of Health) sources. He is currently vice president of the Australasian Society of Thrombosis and Haemostasis and Secretary of the Australian and New Zealand Chapter of the International Union of Angiology.

During the year, other research leaders and their laboratories joined the department, namely Associate Professor Ross Dickins, Dr Christoph Hagemeyer and Dr Anissa Jabbour. Professor Shaun Jackson and his team relocated to the University of Sydney and Associate Professor Anthony Dear's research group moved to Eastern Health Clinical School at Box Hill. Associate Professor Dear remains affiliated with the department.

Blood Cancers and Stem Cells

Acute Leukaemia Research Group

Head: Associate Professor Ross Dickins

Our group focuses on several haematopoietic transcription factors recurrently mutated in acute lymphoblastic and myeloid leukemias (ALL and AML) and their role in tumour suppressor gene function. The laboratory also uses leukaemias derived from mouse models to screen for genes critical to leukaemia maintenance, which represent potential novel drug targets.



Professor Harshal Nandurkar, Director of ACBD (far left), with his Vascular Biology Research group.

Acute Myeloid Leukaemia Research Group

Heads: Dr Mark Guthridge and Associate Professor Andrew Wei

The Wei and Guthridge research groups focus on the mechanisms by which cancer cells co-opt and coerce intracellular signalling pathways to promote deregulated cell survival, proliferation and growth. Through the molecular analysis of intracellular signalling pathways, the laboratories seek to identify new therapeutic targets in leukaemia. In 2015 Associate Professor Wei's group published research in *Blood*, demonstrating a previously unsuspected and clinically relevant role for INPP4B (inositol polyphosphate 4-phosphatase, type II B) as a mediator of chemoresistance associated with poor survival and outcome in AML. This apparent gain of function in mediating chemoresistance was found to be independent of the enzyme's phosphoinositide phosphatase function (Rijal S *et al.*, *Blood* 2015).

Leukaemia Signalling Pathways

Head: Dr Anissa Jabbour

The normal human immune system functions not only to remove infected cells but also to remove damaged or pre-cancerous cells. Cancer cells are able to evade removal by acquiring mutations that result in increased survival, even in the presence of cues that would normally result in their removal. Our laboratory is identifying pathways that can be targeted therapeutically to bypass the survival signal in cancer cells and promote their clearance. We have already shown that deleting kinases that are normally activated by Interleukin-3 promotes clearance of AML.



Associate Professor Ross Dickins heads the Acute Leukaemia Research Group. (L-R) Oliver Le Grice (Undergraduate Research Student), Associate Professor Ross Dickins, Emilia Simankowicz (Research Assistant), Dr Margherita Ghisi (Research Fellow).

Mammalian Functional Genetics Unit

Head: Associate Professor Jody Haigh

Our group uses transgenic mouse models and ES / iPS (embryonic stem / induced pluripotent stem) cell-based technologies to study cell fate and cellular transformation at the molecular level. We are elucidating the role of the ZEB and SNAI family of transcription factors in normal haematopoietic stem cell differentiation and lineage commitment, as well as their roles in the development of leukaemic cancer stem cells with a focus on T-cell ALL (Goossens S *et al.*, *Nat Commun* 2015).

Myeloma Research Group

Head: Professor Andrew Spencer

Our group explores novel therapeutic approaches for multiple myeloma (MM) in preclinical and clinical studies. We are evaluating the activity and mechanism of action of epigenetic modifying agents as well as undertaking preclinical development of both a novel anti-MM monoclonal antibody, β Mab, and the orally bioavailable β -catenin inhibitor BC2059. We secured funding from the Victorian Cancer Agency, International Myeloma Foundation and pharmaceutical industry partners and activated the Myeloma and Related Diseases Registry aligned national biobanking initiative, the Myeloma 1000 Project.

Red Cell Research Group

Heads: Professor Stephen Jane and Associate Professor David Curtis

We have developed a novel drug for blocking the activity of an enzyme important for the control of haemoglobin production and growth of blood cancers such as polycythemia and myelofibrosis. This work has been developed under a collaboration with the Australian Cancer Therapeutics Cooperative Research Centre (CTx) and Cancer Research Technology (CRT), the development and commercialisation arm of Cancer Research UK. In addition, it has attracted a licensing deal with global healthcare leader MSD (known as Merck in the US and Canada).

Stem Cell Biology Group

Heads: Associate Professor David Curtis and Dr Stephen Ting

Our research focuses on the regulation of stem cells in haematopoietic and leukaemic cells through genetic and epigenetic studies. We found that the genes *Ap2a2* and *Gp2m2* enhance haematopoietic stem cell self-renewal and now study whether their respective dysregulation affects leukaemia. We constructed an *Ap2a2* conditional knockout mouse model, which shows embryonic lethality when constitutively deleted. Haematopoietic specific deletion of *Ap2a2* during development and adulthood is being assessed.

Thrombosis and Haemostasis Molecular Neurotrauma and Haemostasis Unit

Head: Professor Robert Medcalf

The blood-brain barrier (BBB) becomes compromised in traumatic brain injury (TBI) and ischemic stroke patients, particularly after treatment with the thrombolytic agent tissue-type plasminogen activator (t-PA). We identified an essential signalling event within key cells of the BBB that are triggered by t-PA and are important in the control of BBB permeability. Moreover, blockade of this signalling pathway attenuated the

capacity of the tPA to open the BBB. We are now evaluating the potential beneficial effects of this approach in mouse models of ischemic stroke and in TBI.

NanoBiotechnology Group

Head: Dr Christoph Hagemeyer

We are interested in how antibody targeted imaging agents and drug delivery vehicles can improve clinical diagnosis and therapy. One major challenge is how to attach targeting units in a site specific fashion without affecting antibody function. In 2015 we expanded our pioneering Sortase bioconjugation work and introduced the concept of 'BioClick', combining enzymatic and chemical ligation (Alt K *et al.*, *Angew Chem Int Ed Engl* 2015, Hagemeyer CE *et al.*, *Nat Protoc* 2015). In collaboration with Professor Frank Caruso at The University of Melbourne, we have developed activated platelet targeted novel thrombin sensitive nanocapsules loaded with potent clot busters that can provide fast and risk free treatment of myocardial infarction and stroke (Gunawan ST *et al.*, *Adv Mater* 2015).

Platelets and Thrombosis: Novel Anti-thrombotics

Head: Dr Justin Hamilton

Arterial thrombosis underlies heart attacks and strokes and is the most common cause of death in Australia. Platelets are the blood cells that form arterial thrombosis and antiplatelet drugs are the major therapy for heart attack and stroke prevention. As a result, there is a major clinical need for improved drugs to block platelet function. Our research aims to develop such drugs. Recent work has focused on our discoveries of two new antiplatelet drug targets with potential to prevent heart attack and stroke: one that involves intracellular signalling enzymes (PI3Ks; Mountford JK *et al.*, *Nat Commun* 2015) and another that involves cell surface thrombin receptors (PARs; French SL *et al.*, *J Thromb Haemost* 2016).

Systems Haematology Unit

Heads: Associate Professor Robert Andrews and Dr Elizabeth Gardiner

Our group investigates platelet receptor levels in health and disease and how changes result in altered platelet function. Our work addresses an unmet need by developing tools, assays and approaches to assess patients with an increased risk of bleeding. In 2015 we analysed samples from 17 patients with unexplained bleeding referred by Alfred Hospital haematologists and 73 samples from healthy donors.

Vascular Biology Group

Head: Professor Harshal Nandurkar

Our research aims to identify pathways linking inflammation and thrombosis and to develop novel therapeutics targeted to specific vascular beds. We have developed novel endothelial-targeted therapeutics with specificity to activated vascular beds, thereby delivering benefit with minimal systemic bleeding compromise. Our group is also developing state-of-the-art platforms based on microfluidic technology to screen chemical libraries for anti-thrombotic potential and develop pointofcare devices for the diagnosis and management of haemostatic disorders.

Postgraduate Students

22 PhD Students
3 Masters Students
1 MD Student

Publications

58 Journal Articles

Division of Clinical Sciences

Head: Professor Paul Myles MBBS, MPH, MD, FANZCA, FFARCSI, FRCA



Professor Paul Myles heads the Division of Clinical Sciences and the Department of Anaesthesia and Perioperative Medicine.

The Division of Clinical Sciences within the Monash Central Clinical School (CCS) has an emphasis on the integration of clinical practice with basic scientific research. It is closely affiliated with Alfred Health, with many staff holding joint appointments as practising clinician-researchers. These links make the division well placed to expedite the clinical translation of research projects into innovative treatments. The division has 370 staff, including adjuncts, affiliates and higher degree research students.

The Division of Clinical Sciences includes:

- Department of Anaesthesia and Perioperative Medicine
- Department of Medicine
- Department of Neuroscience (formerly Van Cleef / Roet Centre for Nervous Diseases)
- Department of Surgery
- National Trauma Research Institute

Research projects investigate disease processes, applications and treatments and span a wide range of medical subject areas from anaesthetic protocols to vision prosthetics.

Research methodology ranges from investigating fundamental physiological processes involved in the aetiology of disease, to creating clinical registries. We enable fresh approaches to solving problems and improving current treatment options for patients by drawing on novel technological advances and collaborations with other disciplines.

All the research ultimately contributes to improved diagnosis of complex illnesses, better treatment for acute problems and improving the quality of life for people with chronic conditions. In addition, our work contributes to the body of knowledge for researchers and clinicians worldwide. The division provides quality education to MBBS undergraduates and research opportunities to university graduates and medical practitioners from a variety of disciplines. In 2015 our achievements included 188 peer-reviewed publications and nine PhD completions.

Each of the centres and departments within the Division of Clinical Sciences has a number of research projects. In this report, we highlight major initiatives for each area.

Anaesthesia and Perioperative Medicine

Head: Professor Paul Myles

www.med.monash.edu.au/cecs/anaesthesia/

The Department of Anaesthesia and Perioperative Medicine at The Alfred hospital is amongst the largest in Australia, consisting of 28 fulltime and over 65 visiting specialist anaesthetists, as well as 40 registrars in training. In 2015 its

research unit coordinated three multicentre international trials, and participated in several other major research studies including clinical trials, audits and surveys. Its expected income is approximately \$16 million over the duration of the trials.

ITACS: Iron Therapy for Anaemia before Cardiac Surgery

In 2015 Professor Paul Myles was awarded an NHMRC grant for \$2,285,289 over five years (2016-2020) to investigate the use of intravenous iron for the Treatment of Anaemia before Cardiac Surgery (ITACS trial). The ITACS trial will be coordinated jointly between The Alfred hospital and Monash University, and will recruit 1000 patients from around the world.

Iron deficiency is very common in patients having coronary artery surgery. It is the commonest cause of anaemia worldwide, and independently worsens outcomes after surgery. The ITACS trial will determine whether a single dose of intravenous iron, given to anaemic patients before elective cardiac surgery improves outcome after surgery. The primary endpoint is days alive and out of hospital from surgery to 30 days following operation. Secondary endpoints include blood transfusions, perioperative complications, hospital stay, survival, quality-of-life and disability-free survival.

ITACS Sub-study

A sub-study will be undertaken in the 'ITACS' patient population to investigate optimal markers of iron deficiency and whether these markers can predict response to iron therapy in the peri-operative period. Dr Joel Symons has been awarded the Robin Smallwood bequest from the Australian and New Zealand College of Anaesthetists for \$98,000 to undertake this so called HERROES sub-study (HEpcidin, Reticulocyte haemoglobin (Ret-Hb) and soluble transferrin Receptors (STrF) in Reported OutcomEs in cardiac Surgery).

Most studies on iron deficiency and iron deficiency anaemia use haemoglobin, transferrin saturation and ferritin as markers of iron deficiency and response to iron supplementation. These markers are unable to distinguish between patients with absolute iron deficiency and those that have functional iron deficiency (i.e. those patients who are unable to utilise iron effectively). STrF-log F levels, Ret-Hb content and hepcidin may be better indicators of response to intravenous iron therapy because they give a better picture of iron storage and utilisation. Using these markers would potentially allow the peri-operative clinician to better characterise iron deficiency, and its response to treatment, in the elective cardiac surgical population and therefore aid in more targeted and cost-effective iron supplementation to correct iron deficiency and improve both short and long-term outcomes in all patients.



Dr Joel Symons, Consultant Anaesthetist, was awarded the Robin Smallwood bequest to investigate optimal markers of iron deficiency that could potentially predict response to iron therapy during the peri-operative period.

Postgraduate Students

2 PhD Students

Publications

34 Journal Articles
39 Book Chapters
3 Books

Department of Medicine

Head: Professor Stephen Jane MBBS, PhD, FRACP, FRCPA, FAHMS

www.med.monash.edu.au/medicine/alfred/

The Department of Medicine has a broad ranging program of research including dermatology, developmental biology, endocrinology, neuroscience, oncology and pathology. Here, we have highlighted research from the Stem Cell Therapies for Brain Disorders group. We also congratulate Professor Stephen Jane, Dr Charbel Darido and Dr Smitha Georgy for securing two NHMRC Project Grants to commence in 2016 and Dr Gabriela Khoury, Dr Michael Cangkrama, Dr Jonathan Habersberger, Dr Janine Trevillyan and Dr Matthew Kitson for completion of their PhDs.

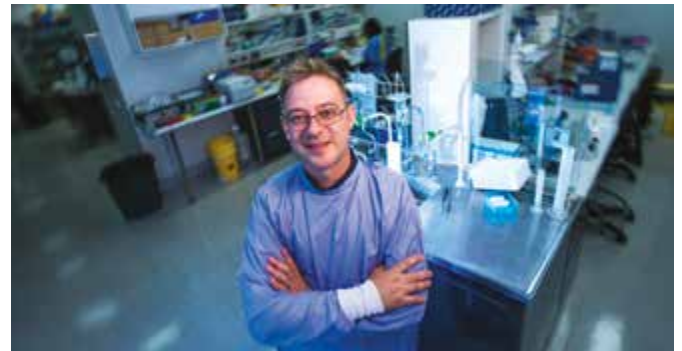
Axonal Degeneration in Multiple Sclerosis

Multiple sclerosis (MS) affects approximately 2.5 million people worldwide, and is an insidious neurological disease that can have a severe and disabling course. Currently, the best therapies can only limit relapses in patients but as these individuals age with the disease, they become vulnerable to progression. MS is commonly induced by the specific destruction of the protective sheath of nerve fibres, known as myelin. It has been shown in recent years that MS is a multifactorial disease with continual destruction of the nerve fibres even without large numbers of immune cells invading the brain and the spinal cord. Its classification as an 'outside-in', primary autoimmune disease, being based on symptoms rather than causes, is now being reconsidered as its mechanisms become better understood.

In addition to his role as Senior Lecturer and Education lead for the CCS, Dr Steven Petratos is Group Leader of the 'Stem Cell Therapies for Brain Disorders' laboratory in the Department of Medicine. In 2015 his research was awarded a \$160,000 grant by Multiple Sclerosis Research Australia, a continuation of his recent international grant from the Progressive MS Alliance. Dr Petratos' research is adding weight to the evolving 'inside out' hypothesis, that the original malfunction in MS takes place within the central nervous system (CNS), evoking inflammatory responses and neurodegeneration, governing permanent disability.

While the aetiology is still not fully understood, Dr Petratos' research is identifying not only mechanisms that underlie neurodegeneration in MS but also the means for combatting it. He has developed a specific technique using the 'classic' mouse model of MS. It involves the specific delivery of a therapeutic fusion protein to limit deleterious axonal signalling during inflammation. It is introduced to bone marrow derived precursor cells by a lentivirus. When the precursor cells differentiate into adult immune cells, they go directly to where the disease is active. The therapeutic fusion protein can then act to block the production of a particular molecule known as phosphorylated collapsin response mediator protein 2 (CRMP-2), which accumulates in nerve fibres during MS activity and has a neurodegenerative effect. Previous research by Dr Petratos showed that axons were preserved in the optic nerve during peak inflammation by inhibiting the phosphorylation of CRMP-2 in retinal neurons.

Dr Petratos is investigating a further novel strategy with the aid of MS Research Australia funding. The question he would like to answer is whether the signalling of a neuroreceptor known as NgR1 elicits axonal degeneration, and whether it is involved in immune-mediated demyelination and axon damage. He will use the stem cell based delivery system that his group has developed.



Dr Steven Petratos, Group Leader of Stem Cell Therapies for Brain Disorders Laboratory in the Department of Medicine, researches the mechanisms underlying neurodegeneration in multiple sclerosis and ways to combat the disease.

Postgraduate Students

37 PhD Students
3 MD Students

Publications

123 Journal Articles
1 Book Chapter

Department of Neuroscience

Head: Professor Elsdon Storey MBBS, DPhil, FRACPS

www.med.monash.edu.au/medicine/alfred/research/neuroscience/

The Department's principal areas of research are the neurobiology of movement disorders, including progressive supranuclear palsy (PSP) and ataxias, and clinical aspects of cognitive disorders, especially the dementias.

Our cerebellar ataxia research continued along several lines. NHMRC-supported work on symptomatic treatment of incoordination in spinocerebellar ataxia type 1 mice was continued with input from Honours student, Tien Wong. Part-time PhD student, Evelyn Lindsay, continued development of a portable electronic battery of upper limb coordination tasks, in conjunction with Deakin University specialists.

Professor Storey's involvement as a trial investigator continued in the large international NIH-funded ASPREE trial of aspirin in the normal elderly, and its NHMRC-funded ENVISION (MRI

and retinal vascular imaging) and SNORE-ASA (sleep apnoea) substudies. He is also a Chief Investigator on the STAREE trial of statins in the healthy elderly, which started recruiting in 2015. These studies are being carried out in the Monash Department of Epidemiology and Preventive Medicine.

The Movement Disorder Team has continued its research interests in biomarkers, clinical and pathological aspects of neurodegenerative Parkinsonism including Parkinson's disease (PD), PSP and other movement disorders.

In 2015 we continued our prospective study of patients with PSP, PD and multiple system atrophy (MSA) using transcranial magnetic stimulation (TMS) as a measure of neurodegeneration (Dr Kelly Bertram). This study was designed in collaboration with the Movement Disorder team at the Sapienza University of Rome. There is evidence that neuronal dysfunction in PSP can be measured utilising TMS. Given different Parkinsonian syndromes are associated with different patterns of brain region involvement, diagnostic accuracy may be improved by the use of TMS.

The aims of this study are to measure responses to TMS paradigms in patients with PSP and compare these responses to patients with other forms of Parkinsonism, namely MSA and PD, and with healthy controls. This will determine if TMS can distinguish between these diagnostic entities. Secondly, we aim to determine if these responses correlate with clinical features of disease and change over time with disease progression. This will allow us to determine the potential utility of TMS in future treatment trials. Early results from this study have shown potentially useful differences between the disease types, and this will be further studied in 2016 through provision of a research grant from Parkinson's Victoria awarded to Dr Kelly Bertram.

Together with investigators from the largest clinical trial in PSP, we identified the minimal clinically significant change in disease measures of PSP severity, which will assist in future clinical trials of PSP (Dr Sarah Hewer). Analysis of data from a smartphone based assessment tool in PD has been collected, showing a useful measurement tool for remote patient based assessment. This work forms an important part of assessing symptom severity on waking from sleep, which we hope will give insights into the ways in which dopamine is handled in different patients with a dopamine deficit causing PD (Dr Will Lee). We have recently presented a new method for initiating levodopa intestinal gel treatment for people with advanced PD (Dr Niro Vijaratnam).



Professor Elsdon Storey (R), Head of The Department of Neurosciences, with Research Assistant (L) Volga Tarlac. Professor Storey, whose research spans a broad spectrum of neuroscience, from the laboratory to large clinical trials, will be retiring in mid-2016, but plans to continue his research interests via an Honorary/Adjunct appointment in the Monash Central Clinical School. His work covers the neurobiology of movement disorders and clinical aspects of cognitive disorders.

Postgraduate Students

1 PhD Student

Publications

11 Journal Articles
1 Book Chapter

Department of Surgery

Head: Professor Wendy Brown MBBS (Hons), PhD, FRACS, FACS

www.med.monash.edu.au/surgery/alfred/

The Monash University Department of Surgery (DoS) has active clinical, teaching and surgical programs. The research program incorporates a wide variety of areas including trauma, burns, cardiothoracic, colorectal, upper gastrointestinal (GI), orthopaedic, plastic, general surgery and neurosurgery.

Alfred urologist Associate Professor Jeremy Grummet, who is the lead investigator of an Australian and New Zealand Urogenital and Prostate (ANZUP) Cancer Trials Group team, is conducting a study looking at pain relief for prostate biopsy. ANZUP is the peak body for conducting clinical research on urological cancers in Australia and New Zealand and this multicentre trial is supported by almost \$600,000 of NHMRC funding.

Professor Wendy Brown was appointed Chair and Head of the Monash University DoS in October 2015. Professor Brown's areas of expertise include laparoscopic adjustable gastric banding procedures and upper GI surgery, including cancer and reflux disease. Her research, for which she receives funding from the Australian Department of Health, Monash University (Strategic Grant and Platform Grant), industry sources and the NHMRC, focuses on optimally managing the chronic disease of obesity and measuring the effects of weight loss on health, quality of life and survival.

Professor Brown is the Director of the Centre for Obesity Research and Education (CORE), based within the Monash CCS, as well as the Clinical Lead for the Bariatric Surgery Registry which resides within the Monash School of Public Health and Preventive Medicine (SPHPM). Professor Brown is the Deputy Chair of the steering committee for the Registry having led its development and obtained funding for the pilot and roll out studies. The Registry was established in partnership with the Obesity Society of Australia and New Zealand. The aim of the Registry is to capture all bariatric procedures across Australia and New Zealand and track the outcomes (weight, diabetes status and need for re-operation) longitudinally for 10 years. Whilst the main purpose of the Registry is Quality and Safety in Healthcare, it will become an invaluable tool for research once mature. The national roll out across Australia is one third of the way through and is anticipated to be completed in July 2016.



Professor Wendy Brown (back row, 3rd left), Head of the Department of Surgery and Director of the Centre for Obesity Research and Education (CORE), with members of CORE and the Bariatric Surgery Registry Team.

Postgraduate Researchers

Many surgeons and surgical trainees undertake higher academic degrees across the Monash campus. This year's report focuses on the work of general surgical trainee Dr Geraldine Ooi and vascular surgeon Mr Charles Milne.

Supported by an NHMRC Scholarship and supervised by Professor Brown, General Surgical Trainee Dr Geraldine Ooi is undertaking PhD research into non-alcoholic fatty liver disease (NAFLD) in obesity.

Dr Ooi's prospective study examines both the clinical and pathophysiological aspects of NAFLD, which has an 80-90% prevalence in those with a body mass index >30kg/m². A liver biopsy, which is the current gold standard for diagnosing NAFLD, will be collected during bariatric surgical procedures and one year after surgery, when patients have typically lost 40-50% of their excess weight. This will be used to examine the effects of substantial weight loss on NAFLD, and determine if this improves the disease. This study ultimately aims to increase our understanding of NAFLD, its interactions with obesity, and how we can better diagnose and treat this increasingly prevalent disease.

In 2015, vascular surgeon Mr Charles Milne commenced a Master of Surgery (by publication) supervised by Professor Brown. His research is based on work undertaken with Professor Haulon in France and looks at the suitability of inner-branched endografts for the treatment of aortic arch aneurysms in patients following ascending aortic replacement for acute dissection. This new technology is evolving as a treatment option for patients who are at high-risk for conventional open surgical treatment. Another aspect of his research is based on work performed by the vascular unit at The Alfred hospital. This examines the long-term follow up of patients following thoracic endovascular aortic repair (TEVAR) for traumatic aortic transection, with a particular focus on graft durability and aortic remodelling.

Dr Jeremy Ruben completed his Doctor of Medicine.

Postgraduate Students

5 PhD Students
4 Masters Students
2 MD Students

Publications

72 Journal Articles
4 Book Chapters

National Trauma Research Institute

Head: Professor Mark Fitzgerald, ASM, MBBS, MD, FACEM, AFRACMA, GCSRTcert

www.ntri.org.au

The National Trauma Research Institute (NTRI) was established in 2003 by partnership institutions Alfred Health and Monash University. Improving clinical care and outcomes is central to NTRI's work themes, to which end the Institute works with organisations nationally and internationally to prevent and reduce the impact of severe injury by integrating research, education, biotechnologies and trauma systems development.

Achievements for the department in 2015 included both Professor Mark Fitzgerald and Emma Tavender completing their PhDs.

Australia-India Collaboration

Commencing in 2013, the Australian and Indian Governments invested over \$2.6 million through their Australia-India Strategic Research Fund Grand Challenge Scheme, to find the best ways of delivering needed care to injured people. The Australia-India Trauma Systems Collaboration (AITSC) (www.aitsc.org) brings together governments, industry, clinicians and researchers to improve information and resources, and to pilot new systems of care. Led by the NTRI in Australia, and the JPN Apex Trauma Centre at the All India Institute of Medical Sciences in India, the program brings together some of the world's leaders in trauma care. The Australian investigator group consists of members from the NTRI, Ambulance Victoria, the Australian Centre for Health Innovation, The George Institute for Global Health and the WHO.

The collaboration has established, or in the next phase, will commence:

- A clinical data platform to lay foundations for an Indian national trauma registry. A pilot was performed in October 2014, and in 2015, a new dataset, reducing the numbers of data points from 134 to 80, commenced. This project is consistent with global initiatives led by the WHO.
- A pre-hospital notification system in four major trauma hospitals in Delhi, Mumbai and Ahmedabad, and three major ambulance service providers. An evaluation of the effect on trauma patients arriving at trauma centres by ambulance will be commencing soon.
- A real time, computer-aided decision and action support system (TR&R system) and studying the effect in reducing the incidence of management errors for severely injured patients in the first 30 minutes after admission to an adult Trauma Centre (JPNATC).
- A prospective observational study to evaluate the impact of introducing a structured Trauma Quality Improvement (TQI) meeting on the processes and outcomes in four Indian Trauma Centres.
- A trial to evaluate the effect of a rehabilitation prescription using a novel mobile application for trauma patients with lower limb fractures requiring fixation or stabilisation on functional outcomes, post-discharge complications and quality-of-life.

Long term, all projects will have application and impact within the context of Australia's own trauma care.



Professor Mark Fitzgerald (2nd left), Head of the National Trauma Research Institute (NTRI), speaks at an Australia-India Trauma Systems Collaboration forum hosted by NTRI.

Postgraduate Students

6 PhD Students

Publications

5 Journal Articles

Immunology and Pathology

Head: Professor David Tarlinton BSc(Hons), PhD



Associate Professor Margaret Hibbs, Head of The Leukocyte Signalling Laboratory, with her research group. L-R: Dr Mhairi Maxwell (Research Officer), Kyal Young (Honours student), Dr Maverick Lau (Research Officer), Associate Professor Margaret Hibbs, Tim Gottschalk (PhD student), Dr Evelyn Tsantikos (Research Officer).

Monash University's Department of Immunology and Pathology is a centre for world-leading basic research in the areas of: development and function of immune cells; the origin and amelioration of immune-mediated disease, including inflammatory and autoimmune conditions; and vaccine strategies for infectious diseases and cancer. The department's research comprises both stand alone projects and collaborative efforts with partners in the many centres of research excellence at The Alfred hospital and at AMREP. A significant aspect of research effort is reflected in the training of students in both Honours and post-graduate programs including the PhD degree, of which there were five completions in 2015.

Research is supported by grants from competitive external bodies including national and international sources such as the NHMRC and the Lupus Research Institute (USA). This support has allowed scientists in the department to carry out basic research into immune mechanisms, and to run clinical trials that are essential in order to translate basic research discoveries from the laboratory into new therapies for diseases that are poorly served by current approaches.

Professor David Tarlinton from the Walter and Eliza Hall Institute was appointed as the new Head of Department in February 2016 to replace Professor Fabienne Mackay, who relocated to the University of Melbourne. During 2015, Associate Professor Menno van Zelm from the Netherlands joined the Department to head the B-Cell differentiation Laboratory.

The Department's laboratories investigate the mechanisms of activation of natural killer cells; the formation and maintenance of immune responses to infectious agents and vaccine antigens; the functional basis of human immunodeficiency syndromes; the control of lymphocyte migration in response to antigen challenge and inflammatory signals; the causes underlying the chronic inflammation that predisposes to chronic obstructive pulmonary disease (COPD) and those that drive the debilitating side-effects of diabetes; the development of therapeutic approaches to allergy; and the use of nanotechnology approaches to develop vaccines for control of cancer and inflammation.

Research highlights

Chronic Obstructive Pulmonary Disease

The Leukocyte Signalling Laboratory, led by Associate Professor Margaret Hibbs, specialises in signal transduction in immune cells. In particular, the group studies one of Australia's and the world's most common and deadly lung diseases, COPD. The Laboratory has developed novel hereditary animal

models that spontaneously develop chronic lung inflammation resembling COPD, providing a unique opportunity for probing mechanisms underpinning lung and comorbid disease development. Using these models, as well as samples from patients with lung disease, the group has developed novel lung immuno-phenotyping methods and has recently shown that analogous inflammatory profiles exist in the lungs of both mice and humans, highlighting this approach as a translational avenue for lung disease endotyping. Associate Professor Hibbs secured an NHMRC Project Grant (starting in 2016) to use state-of-the-art functional lung imaging to study the temporal and spatial development and progression of COPD and its relationship with lung cancer development.

Regulation of Immune Cells by Tetraspanins

The Leukocyte Membrane Protein Laboratory, led by Associate Professor Mark Wright, is one of the world's leading centres of research into the function of a class of proteins called tetraspanins. Associate Professor Wright and colleagues have reported how one of these molecules, CD37, plays a crucial but previously unknown role in facilitating the movement of neutrophils into sites of inflammation. Using genetically modified mice that lack CD37 expression in all cells, the team showed impaired neutrophil recruitment in a peritonitis model. Intravital microscopic analysis, done in collaboration with colleagues at Monash Clayton, indicated that the absence of CD37 impaired the capacity of leukocytes to follow a CXCL1 chemotactic gradient accurately in the interstitium. Moreover, analysis of CXCL1-induced leukocyte-endothelial cell interactions in postcapillary venules revealed that CXCL1-induced neutrophil adhesion and transmigration were reduced in the absence of CD37, consistent with a reduced capacity to undergo β_2 integrin-dependent adhesion.

This result was supported by *in vitro* flow chamber experiments that demonstrated impairment in adhesion of CD37-deficient neutrophils to the β_2 integrin ligand, ICAM-1, despite the normal display of high-affinity β_2 integrins. Super-resolution microscopic assessment of localisation of CD37 and CD18 in ICAM-1-adherent neutrophils demonstrated that these molecules do not significantly co-cluster in the cell membrane, arguing against the possibility that CD37 regulates β_2 integrin function via a direct molecular interaction. Moreover, CD37 ablation did not affect β_2 integrin clustering. In contrast, the absence of CD37 in neutrophils impaired actin polymerisation, cell spreading and polarisation, dysregulated Rac-1 activation, and accelerated β_2 integrin internalisation. Together, these data indicate that CD37 promotes neutrophil adhesion and recruitment via the promotion of cytoskeletal function downstream of integrin-mediated adhesion.

Clinical Trial for Peanut Allergy

Professors Robyn O’Hehir and Jennifer Rolland have a longstanding interest and track record in researching the origin of allergic responses and in developing therapeutic approaches to ameliorate and potentially cure this often life-threatening condition. Peanut allergy, which is one of the most common food allergies, is a life-threatening condition globally without a current cure. The Allergy Research Laboratory is developing a Synthetic Peptide Immuno-Regulatory Epitope (SPIRE) therapy as a safe treatment for peanut allergy. With grants from the Medical Research Commercialisation Fund (MRCF), the NHMRC, The Alfred Research Trusts and the Ilhan Food Allergy Foundation, an optimal peptide selection comprising dominant T-cell epitopes of the major peanut allergens Ara h 1 and Ara h 2 (PeanutVax) has been identified and is now progressing through regulatory requirements to first-in-man clinical testing.

Achievements

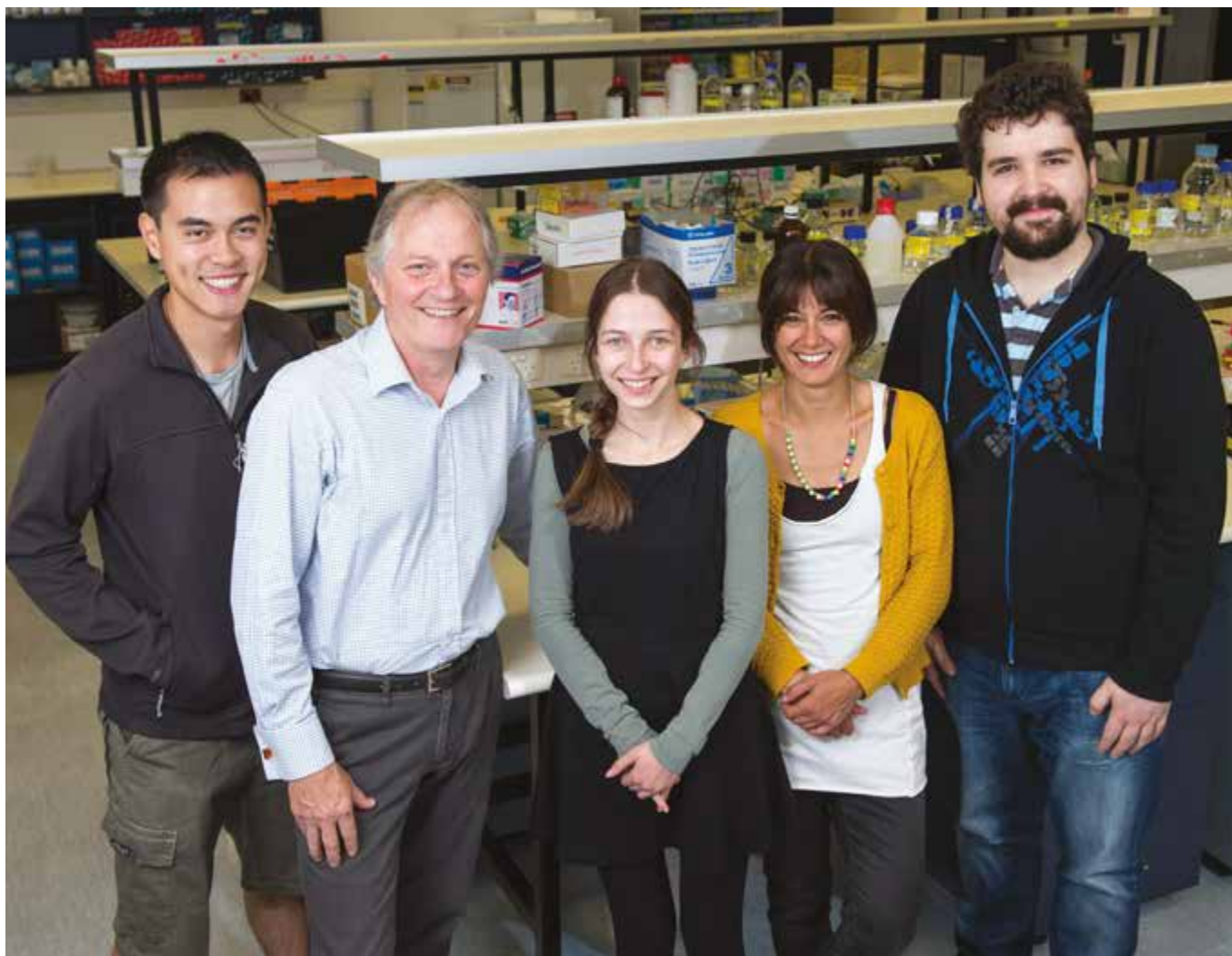
- Professor Robyn O’Hehir was elected a Foundation Fellow of the new Australian Academy of Health and Medical Sciences (FAHMS) and a Fellow of the Thoracic Society of Australia and New Zealand (FThorSoc).
- Professor O’Hehir attracted support from the NHMRC (\$1.44 million: 2016-2018) and the MRCF (\$2.85 million: 2015-2017) for development and clinical trials of a vaccine against peanut allergy.
- Associate Professor Margaret Hibbs (CIA) secured an NHMRC Project Grant of \$696,966 (2016-2018) with Professor Andreas Fouras (CIB) from the Monash Laboratory of Dynamic Imaging for the study ‘Characterisation of emerging new signalling networks that underlie COPD phenotypes’.

Postgraduate Students

28 PhD Students

Publications

54 Journal Articles



The Tarlinton Group: Immune Memory Laboratory.

L-R: Michael Low (PhD student), Professor David Tarlinton, Cathy Pitt (Research Assistant), Dr Simona Infantino (Research Officer), Nick Kocovski (PhD student). Absent: Kristy O’Donnell (Research Assistant), Dr Dimitra Zotos (Research Officer).



Staff and students of the Department of Infectious Diseases. Professor Anton Peleg, Head of Department (front row, 1st right) and Deputy Head, Associate Professor Denis Spelman (front row, 2nd right).

Infectious Diseases

Head: Professor Anton Peleg MBBS, PhD, MPH, FRACP

The Department of Infectious Diseases, Alfred Health and Monash University, incorporates a large clinical service with active research programs in the fields of HIV, viral hepatitis, infections in the immunosuppressed (e.g. solid organ and stem cell transplantation, oncology, intensive care and post-splenectomy patients), influenza, drug-resistant organisms, antibiotic use, infection prevention and hospital epidemiology.

Professor Anton Peleg commenced in 2015 as Director of the Department of Infectious Diseases. Professor Peleg holds an NHMRC Career Development Fellowship and leads a research program spanning clinical to basic research, with a focus on hospital-acquired infections, antimicrobial resistance, infections in immuno-compromised hosts and understanding mechanisms of diseases caused by hospital pathogens.

HIV

Research into HIV cure continued through 2015 with strong partnerships between The Alfred Department of Infectious Diseases (Dr James McMahon, Dr Julian Elliott, Professor Jennifer Hoy), the Doherty Institute, The University of Melbourne and international collaborators in the United States and Europe.

A collaborative study with the University of California, San Francisco, funded by the NIH and amFAR (American Foundation for AIDS Research), demonstrated that disulfiram, a drug used to treat alcohol addiction, can activate latent HIV (Elliott JH *et al.*, *Lancet HIV* 2015).

A collaboration with the Department of Haematology, at Alfred Health, will facilitate leukapheresis on participants with stably treated HIV to obtain large numbers of latently infected CD4 T-cells. This work will continue to inform new strategies to eliminate HIV latency and improve our understanding of HIV pathogenesis.

Dr James McMahon established a clinical network of providers of HIV care in Victoria to focus on treatment as prevention. This work established estimates of patient retention in HIV care, as well as tracing and re-engaging patients lost to care (McMahon JH *et al.*, *PLoS One* 2015). PhD student, Dr Nicholas Medland, also systematically reviewed the cascades of HIV diagnosis, care and treatment globally, making recommendations for optimal methods to assess the cascade (Medland NA *et al.*, *J Int AIDS Soc* 2015).

Dr Julian Elliott, head of the department's Clinical Research Unit, also led a collaboration of world-leading researchers to describe the opportunities of 'big data' in evidence-based medicine (Elliott JH *et al.*, *Nature* 2015).

Drug Resistance

Professor Anton Peleg continued research on resistance to last-line antibiotics in *Staphylococcus aureus* (*S. aureus*) species and Gram-negative bacteria. Professor Peleg's group uncovered the impact of daptomycin and vancomycin resistance on the ability of *S. aureus* to cause disease (Cameron DR *et al.*, *Virulence* 2015). His team applied the latest generation sequencing technologies to identify bacterial genetic mechanisms linked to virulence and antibiotic resistance (Baek KT *et al.*, *Antimicrob Agents Chemother* 2015, Cameron DR *et al.*, *Front Microbiol* 2015).

In collaboration with Alfred Diagnostic Microbiology (Associate Professor Spelman and Dr Adam Jenney), surveillance of multi-drug resistant (MDR) Gram-negative bacteria in the Alfred Intensive Care Unit (ICU) was undertaken (Abbott IJ *et al.*, *Pathology* 2015) and reviews on the most challenging bacteria - *Acinetobacter*, *Stenotrophomonas* and *Burkholderia* - were published (Langan KM *et al.*, *Curr Opin Infect Dis* 2015, Doi Y *et al.*, *Semin Respir Crit Care Med* 2015; Abbott IJ and Peleg AY, *Semin Respir Crit Care Med* 2015). Collaboration with the Monash Institute of Pharmaceutical Sciences led to several papers on the use of fosfomycin to treat resistant *Pseudomonas* infections (Wals CC *et al.*, *J Antimicrob Chemother* 2015).

Antimicrobial Prescribing

The Antimicrobial Stewardship Team's research informs policies to improve the quality of antimicrobial prescribing. The team examined the impact of 'allergy labels' on prescribing (Trubiano JA *et al.*, *BMC Infect Dis* 2015) and conducted a multidisciplinary team review on the timeliness of antibiotic administration.

Infection Prevention

The Infection Prevention and Healthcare Epidemiology Unit initiated a number of projects to reduce healthcare associated infection, with notable sustained reductions in the incidence of central line associated bloodstream infection and *S. aureus* bacteraemia related to peripheral intravenous cannulas. Recent research prompted a reconsideration of control methods for antibiotic resistant organisms (Karki S *et al.*, *Med J Aust* 2015) and prosecuted a case for a national surveillance program for healthcare associated infections (Russo PL *et al.*, *Aust Health Rev* 2015; Russo PL *et al.*, *Am J Infect Control* 2015, Russo PL *et al.*, *BMJ Open* 2016). Other research examined risk factors for sepsis following transrectal biopsy (Anderson E *et al.*, *BMC Infect Dis* 2015; Roth H *et al.*, *BJU Int* 2015), and the national epidemiology of *Clostridium difficile* (Cheng AC *et al.*, *Pathology* 2016).

General Infectious Diseases and Clinical Microbiology

The General Infectious Diseases and Clinical Microbiology teams did an important study assessing the *in vitro* activity of a newer cephalosporin antibiotic known as Ceftaroline (Abbott *IJ et al., Antimicrob Agents Chemother* 2015) and showed higher rates of resistance than expected. The Unit's interest in travel medicine and immuno-compromised patients led to an excellent review of travel risks in this patient population (Aung *AK et al., Travel Med Infect Dis* 2015).

Immunocompromised Host Service

In the Immunocompromised Host Service, a number of projects were initiated by Dr Orla Morrissey, including one examining the immune recovery post-allogeneic stem cell transplantation. Funded by an unrestricted grant from MSD Australia, the preliminary results will be presented at the International Congress of Immunology in 2016.

A study (funded by a grant from the Scobie and Claire McKinnon Trust of \$145,000; 2014-2016) examining immune responses to *Aspergillus* in the airways of lung transplant recipients has been initiated. This study seeks to understand the pathogenesis of *Aspergillus* infections in lung transplant recipients and its role in the development of chronic rejection.

Dr Michelle Ananda-Rajah was awarded \$50,000 in seed funding (from the Monash Institute of Medical Engineering; MIME) to continue research into electronic surveillance strategies in collaboration with the Department of Pharmacy at Alfred Health and Peter MacCallum Cancer Centre.

Dr Jason Trubiano has spearheaded research into antibiotics allergies (Trubiano *JA et al., Intern Med J* 2016), fungal diagnostics (*Med Mycol* 2016) and the clinical characteristics and outcomes of mucormycosis (Langford *S et al., Mycoses* 2016).

Dr Michelle Yong continues her PhD research into immune responses to cytomegalovirus (CMV) infection in allogeneic stem cell transplant recipients. Professor Peleg studied CMV responses in lung transplant recipients in collaboration with Associate Professor Westall. The results of the study are very exciting indicating return of CMV immune control can be readily detected, which will allow us to better target anti-viral therapies minimising toxicity and optimising efficacy.

Viral Hepatitis Service

In 2015 the Viral Hepatitis Group undertook a number of world first studies using the new direct acting antiviral agents (DAAs) to treat hepatitis C. Led by Professor Margaret Hellard (The Alfred hospital and Burnet Institute) in collaboration with Professor Alex Thompson (St Vincent's Hospital) and Dr Joseph Doyle (Alfred and St Vincent's Hospitals, Burnet

Institute), with the support of Dr David Iser, Janine Roney and Melissa Bryant (The Alfred hospital), these studies are informing the elimination of hepatitis C in Australia and globally by identifying models of care to increase hepatitis C treatment uptake in the community, particularly in people who inject drugs. The Prime Study is a randomised controlled trial comparing DAA treatment uptake and outcome in people who receive all of their care and treatment in the community with people receiving their care and treatment in a tertiary hospital.

Clinical Research Unit

The Clinical Research Unit (CRU) has over 40 active protocols and is the largest Infectious Diseases CRU in Australia. These clinical trials have included international multi-site phase 3/4 trials in HIV medicine as well as studies on severe influenza, respiratory syncytial virus infection, resistant gram negative sepsis and hepatitis C. The CRU is also involved in multiple observational studies in HIV medicine and other infectious diseases such as influenza where the CRU acts as the coordinating centre for a national multi-site study of influenza surveillance.

Achievements

- Professor Margaret Hellard was awarded an NHMRC Senior Principal Research Fellowship (2016-2020) for her research program 'Reducing the impact of blood borne viruses and sexually transmitted infections in young people'.
- Dr James McMahon and Dr Janine Trevillyan were awarded NHMRC Early Career Fellowships to commence in 2016 for their respective projects on prevention of HIV with antiretroviral therapy and eliminating excess cardiovascular risk in people living with HIV.
- Dr Julian Elliott was awarded an NHMRC Partnership Project Grant (2016-2018) of \$928,417 to study new approaches to evidence synthesis: 'Evidence Innovation: transforming the efficiency of systematic review'.
- Professor Allen Cheng is part of the team (CIC), led by University of Sydney's Professor Tania Sorrell (CIA), awarded a \$2.5 million NHMRC Centre of Research Excellence (CRE) in Population Health Research (2016-2021). The CRE is entitled 'Protecting the public from emerging infectious diseases'.
- Professor Jennifer Hoy (CIB), Professor Suzanne Crowe (CIC) and Dr Julian Elliot (CID) were awarded an NHMRC Project Grant (2016-2018) of \$632,037 led by Burnet Institute's Associate Professor Anthony Jaworowski (CIA) and with Doctor Anna Hearps (CIE) of Burnet Institute (CIE) entitled 'A new monocyte atherogenic phenotype in chronic HIV disease'.

Postgraduate Students

27 PhD Students

Publications

37 Journal Articles



Professor Jenny Hoy (far right) looks at radiology results with other HIV researchers and a radiologist.

Psychiatry

Director: Professor Jayashri Kulkarni MBBS, MPM, FRANZCP, PhD

The Monash Alfred Psychiatry research centre (MAPrc) is one of Australia's largest clinical research centres in psychiatry. The key goal of MAPrc is to conduct clinical research aimed at developing new treatments with direct, effective, and immediate applications. Our research covers many different mental illnesses and all age groups, with over 100 clinically focused projects currently being conducted. MAPrc research is integrated with clinical practice in The Alfred hospital, in affiliation with Monash University. Our research agenda meets clinical and social needs and has a short one to five year timeline to real clinical impact.

Our five key streams of research are Women's Mental Health, Psychiatric Neurotechnology, Psychopharmacology, Cognitive Psychiatry and Service Evaluation Research. Our multidisciplinary team of 170 staff includes postgraduate students and affiliated researchers drawn from medicine, nursing, psychology, allied health, science, engineering and health information services. We have around 60 staff and students on site daily. This rich mix of skills and expertise drives cross-pollination of ideas and problem solving, positioning MAPrc to play a leading role in innovative mental health research.

Women's Mental Health Borderline Personality Disorder: Memantine

Principal Investigator: Professor Jayashri Kulkarni

Borderline Personality Disorder (BPD) is a severe mental illness related to trauma experienced in early life, including abuse, neglect and family violence. It has a high mortality and morbidity rate and affects up to 12% of Australians, the majority of whom are women. Sufferers struggle to maintain jobs, friendships and relationships. Symptoms of BPD include suicidality, self-harm, rage, low self-esteem, dissociation and mood swings. BPD is poorly understood in Australia and current treatment options for the condition are inadequate. Hospital emergency departments, the legal system, disability and housing sectors struggle with this patient population.

Studies suggest that early life trauma can lead to alterations in the immune system, brain chemistry and hormone levels that underpin BPD symptoms. We are conducting a world first clinical trial to better understand this prevalent and debilitating disorder. We are also evaluating the role of memantine, a cognitive enhancing agent, in improving symptoms of BPD. Memantine is a moderately selective non-competitive NMDA (N-methyl-D-aspartate) antagonist that has recently been shown to be effective in improving emotional dysregulation and cognitive performance. Given that these processes are



Professor Jayashri Kulkarni (front row, first right) with members of the MAPrc team.

impaired in BPD, this research project will investigate the effectiveness of memantine in the treatment of symptoms. Specifically, we aim to develop evidence-based guidelines to help reduce the symptoms of BPD and complex post-traumatic stress in order to better manage and treat symptoms of BPD.

Psychiatric Neurotechnology Schizophrenia and Cognition: tDCS

Principal Investigator: Associate Professor Kate Hoy

Difficulties in cognitive abilities, such as attention and working memory, are core symptoms of schizophrenia. Impairments in these areas can have a significant impact on an individuals' ability to engage in daily activities including employment, using public transport and engaging in conversation. Current treatments incorporating various therapies and medication do not significantly improve cognitive impairments. Transcranial Direct Current Stimulation (tDCS) is a mild form of non-invasive brain stimulation that has been shown to increase brain activity in areas important for cognition. Our Cognitive Therapeutics Research Group conducted an initial investigation of the use of tDCS for improving working memory in individuals with a diagnosis of schizophrenia. A single 20-minute session of stimulation showed improvements in working memory for up to 40 minutes post stimulation. A current research trial is extending this work, investigating the effect of repeated stimulation sessions on cognition.

Psychopharmacology Team

In 2015 our Psychopharmacology Team was the top recruiting site in Australia and the top global recruiting site for an international phase 3 trial of the compound ASC-01 (Otsuka Pharmaceutical Co., Ltd.) in patients with major depressive disorder (MDD). We also randomised the first subject in Australia for the Social Anxiety Study, an international phase 2a trial with the compound JNJ-42165279 (Janssen-Cilag Pty Ltd), as well as the ALK5461-205 study, a phase 3 trial with the compound ALKS 5461 (Alkermes Inc.) for the adjunctive treatment of MDD. The ALK5461-205 study is now coming into the last few subject visits, with many of the subjects rolling over into the follow-on ALK5461-208 study, a long-term phase 3 trial with ALKS 5461 in adults with MDD, who have inadequate response to anti-depressant therapy. We are also planning recruitment into AMARANTH, a worldwide study looking at a treatment into early Alzheimer's and in early 2016, an additional trial investigating the safety and efficacy of intranasal Esketamine (Janssen Research and Development, LLC) for depression. A few of the team recently travelled to Taiwan, where they were trained on the Esketamine study protocol and procedures.

Cognitive Neuropsychiatry Team

Professor Susan Rossell gave multiple presentations at the 2015 17th Annual Conference of the International Society for Bipolar Disorders, including a symposium on 'Socio-emotional cognition in bipolar disorder'. Professor Rossell also gave multiple presentations at the 2015 13th World Congress of Biological Psychiatry, including Dr Rachel Batty's work on psychosis following traumatic brain injury.

Dr Eric Tan completed his PhD on 'Neurocognition and language in the causes and consequences of formal thought disorder in schizophrenia' at Monash University and Dr Peter Goodin completed his PhD 'Immunological responses in depression and psychophysiological correlates' at Swinburne University. Both students were supervised by Professor Rossell.

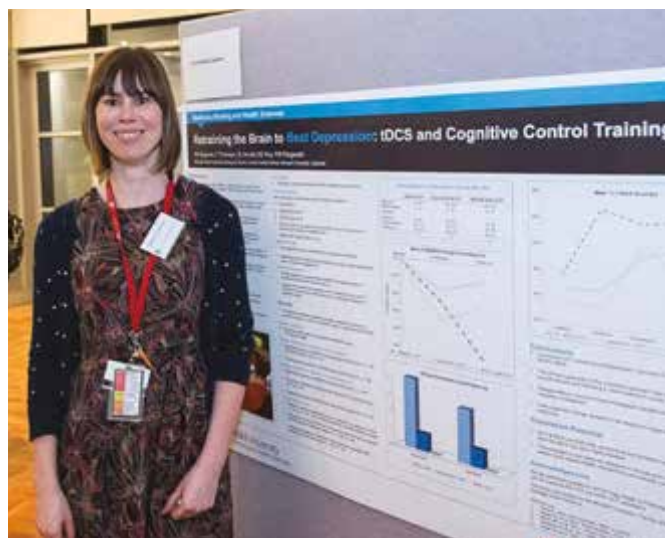
The Cognitive Neuropsychiatry team hosted the 3rd bi-annual meeting of the International Consortium of Hallucination Research at Swinburne University and St Vincent's Hospital. Dr Neil Thomas presented as an invited speaker at numerous seminars, including but not limited to, the Australian National University Psychology Colloquium, Black Dog Institute eMental Health in Practice Webinar Series, VICSERV/Mind Australia Colloquium, and Mind Australia Community Conference. Dr Caroline Gurvich hosted the research topic for *Frontiers in Psychiatry* that was turned into an e-book, 'Cognition across the psychiatric disorder spectrum: From mental health to clinical diagnosis'.

Achievements

- In 2015 Professor Paul Fitzgerald secured major project funding from the Monash University Interdisciplinary Research (IDR) Support Program for the project 'Design and testing of a highly novel implantable magnetic nerve and brain stimulation device'. In addition to an NHMRC Practitioner Fellowship and CIA Project Grant, which commenced in 2015, Professor Fitzgerald is CID on a \$2.07M NHMRC Project Grant (2016-2018) for a study led by Professor Colleen Loo of University of New South Wales entitled 'Ketamine therapy among patients with treatment-resistant depression: a randomised, double-blind, placebo-controlled trial'.
- Dr Kate Hoy was promoted to Associate Professor (effective 1 January 2016). Associate Professor Hoy received an NHMRC Research Excellence Award for the top ranked Biomedical Level 1 Career Development Fellowship (2015-2018), which explores restoring cognitive function using brain stimulation in schizophrenia. She was also awarded a Mason Foundation National Medical Program Grant for the project 'A randomised controlled trial of Theta Burst Stimulation for the treatment of mild to moderate Alzheimer's disease' and allocated NHMRC Equipment Grant funds for a Brain Stimulation Suite.
- Dr Bernadette Fitzgibbon is the Founding Vice President of the Australasian Society for Social and Affective Neuroscience (AS4SAN), which was officially recognised as an incorporated association in 2015. Dr Fitzgibbon received

a \$10,000 Arthritis Australia 2015 Grant-in Aid, funded by the Australian Rheumatology Association, for her project 'Interventional repetitive transcranial magnetic stimulation treatment for fibromyalgia' and an \$11,000 Advancing Women's Research Grant from Monash University.

- Dr Rebecca Segrave won the Young Investigator Poster competition at the 2015 Monash Central Clinical School Translational Research Symposium for her presentation entitled 'Retraining the brain to beat depression: tDCS and cognitive control training'.
- Professor Susan Rossell received the International Women's Day Award and was selected as Swinburne's Significant Woman.
- Dr Tamsyn Van Rheenen, Early Career Researcher and ex-student of Professor Rossell, was awarded a 2015 Victorian Young Tall Poppy Science Award for her research on understanding the characteristics of bipolar disorder.
- Dr Stuart Lee was awarded an NHMRC Early Career Fellowship (2016-2019) to undertake research on 'Skill building interventions to address barriers to social inclusion for people with schizophrenia'.
- The Alfred Police and Clinical Early Response (A-PACER), for which Dr Lee led the conduct of an evaluation, won 'theMHS' 2015 Award in the category of Assessment and/or Treatment Program or Service.
- The Psychopharmacology Team was awarded a \$200,000 VicHealth grant with the aim of decreasing cigarette smoking in people with severe persistent mental illness. The study will investigate the use of vaporised nicotine replacement products, including nicotine e-cigarettes, as a harm reduction intervention and starts recruitment in early 2016.



Dr Rebecca Segrave stands with her winning poster at the 2015 Monash Central Clinical School Translational Research Symposium.

Postgraduate Students

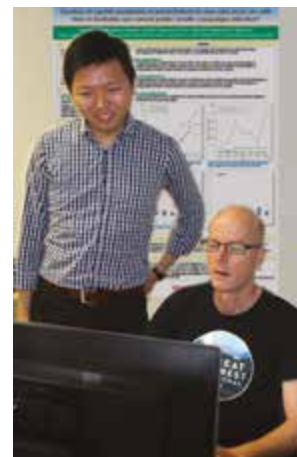
29 PhD Students
7 Doctor of Psychology Students

Publications

76 Journal Articles
1 Book Chapter

Sexual Health

Director: Professor Christopher Fairley MBBS, PhD, FRACP, FAFPHM, FACSHP, FACHSHM



Sexual Health Physician and NHMRC Early Career Fellow, Dr Tim Read (R) with NHMRC Early Career Fellow, Dr Eric Chow (L).

The Melbourne Sexual Health Centre (MSHC) is a specialised unit for the diagnosis and treatment of sexually transmissible infections (STIs) including HIV, and is a principal centre for training sexual health professionals in Victoria. The Centre conducts epidemiological, public health and clinical research, primarily aimed at improving the services for those with or at risk of STIs.

Gonorrhoea

This study examined the presence of *Neisseria gonorrhoeae* DNA following treatment for throat and rectal gonorrhoea in men who had sex with men (MSM). Throat or rectal swabs taken seven and 14 days post treatment were subjected to repeat testing for *gonorrhoeae* DNA using two different polymerase chain reaction (PCR) tests. One hundred throat and 100 rectal *gonorrhoeae* infections in 190 men were included. In the throat, *gonorrhoeae* DNA was found in 13% of men at day seven and 8% of men at day 14 for both PCR tests. Rectal *gonorrhoeae* DNA was present in 6% of men at day seven and 8% of men at day 14 for both PCR tests. Throat and rectal *gonorrhoeae* DNA was found in 8% of men 14 days after treatment. Persistent gonorrhoea DNA may be more common in settings where infections with *gonorrhoeae* are resistant to treatment or may reflect re-infection. Tests of cure after treatment should be kept using culture.

Chlamydia

A repeat test for *chlamydia* three months after treatment is recommended to find re-infection; however, retesting rates are typically low. This study compared sending a mobile phone delivered SMS reminder to retest and a postal home collection kit (HCK) three months after treatment of *chlamydia* to only sending an SMS reminder to return to the clinic for retesting. The study included 200 women, 200 heterosexual men and 200 MSM with half the participants in each group receiving an SMS reminder and the other half a postal HCK and SMS reminder.

The number who retested within one to four months of their *chlamydia* diagnosis was much higher in the HCK retest group (61%: 184/302) versus those who received an SMS only to return to the clinic for retesting (39%: 117/298). The higher rates of retesting in those sent the HCK versus SMS reminder only was reflected across the subgroups of women (64%: 66/103 versus 39%: 38/97), heterosexual men (56%: 57/101 versus 34%: 34/99) and MSM (62%: 61/98 versus 44%: 45/102).

The HCK retest group with repeat positive tests was higher than the clinic retest group (10%: 31/302 versus 4%: 12/298) and among MSM (16%: 16/98) versus 5%: 5/102). The addition

of a postal HCK to routine SMS reminders resulted in large improvements in *chlamydia* retesting rates in all three test groups and detection of more repeat positive tests, compared with SMS alone.

Anal Cancer

A study in 327 HIV-positive MSM (aged 35 and over) assessed annually performed digital ano-rectal examination (DARE) as a method to detect early anal cancer. Responses from patient questionnaires about their anal and sexual health, adverse effects from the anal examination, cancer worry, and quality-of-life revealed that 82% of men felt relaxed during the DARE with only 1% who complained of pain, and 1% who reported bleeding after the examination. Nearly all men (99%) were willing to continue with an annual DARE.

An anal abnormality was detected in 27% of men and the majority of abnormalities were dealt with by their HIV physicians. There were 17 men (5%) referred to a specialist with an uncertain diagnosis of which one had anal cancer confirmed. Recruitment rates for the study varied depending on the clinical setting (Sexual Health Centre: 78%; General Practice: 13%; Hospital: 14%) and the clinician's speciality (Sexual Health Physician: 67%; General Practitioner: 20%; Infectious Disease Physician: 14%). Annual DARE to detect anal cancer in HIV-positive MSM was acceptable for patients, with minimal side effects or quality-of-life effects. Strategies to increase patient recruitment from HIV physicians would be needed if DARE were to be implemented in anal cancer screening.

Achievements

- Dr Eric Chow received Seed Funding from Monash Institute of Medical Engineering in the 2015 round to develop an 'app' or website to assist with self-diagnosis of STIs, a Sexual Health Society of Victoria Educational Support Grant and Travel Awards from the International Papillomavirus Society (HPV 2015 Travel Award), the Australasian Epidemiological Association (Early Career Researcher Travel Award) and Monash University Central Clinical School.
- Dr Nick Medland was awarded the Australasian Chapter of Sexual Health Medicine Research Entry Scholarship.
- Dr Jade Bilardi received a Monash University Central Clinical School Travel Grant.

Postgraduate Students

11 PhD Students

Publications

76 Journal Articles

Alfred Health Departments Conducting Research

Chief Executive Alfred Health: Professor Andrew Way
Director of Research: Professor Stephen Jane



*Medical and Surgical Departments

Allergy, Immunology and Respiratory Medicine
Head: Prof. Robyn O’Hehir

Burns (Victorian Adult Burns Service)
Head: Dr Heather Cleland

Cardiothoracic Surgery
Head: Prof. David McGiffin

Cardiovascular Medicine
Head: Prof. Anthony Dart

Emergency and Trauma Centre
Head: Dr De Villiers Smit

Endocrinology and Diabetes
Head: Prof. Duncan Topliss

Gastroenterology
Head: Prof. Peter Gibson

General Surgery
Head: Prof. Jonathan Serpell

Intensive Care & Hyperbaric Medicine
Interim Head: Prof. Jamie Cooper

Medical Oncology
Head: Prof. Max Schwarz

Melanoma (Victorian Melanoma Service)
Head: Assoc. Prof. John Kelly

Neurosurgery
Head: Mr Martin Hunn

Orthopaedic Surgery
Head: Assoc. Prof. Susan Liew

Radiation Oncology
Head: Assoc. Prof. Jeremy Millar

Rehabilitation, Aged and Community Care
Head: Assoc. Prof. Peter Hunter

Renal Medicine
Head: Prof. Rowan Walker

Medical Services

Anatomical Pathology
Head: Prof. Catriona McLean

Diagnostic and Interventional Radiology
Head: Assoc. Prof. Dinesh Varma

Nuclear Medicine
Head: Dr Kenneth Yap

Pathology Services
Head: Prof Hans Schneider

Pharmacy
Head: Prof. Michael Dooley

Nursing

Nursing Services
Executive Director:
Janet Weir-Phyland
Research Director:
Prof. Tracey Bucknall

Allied Health

Head: Lisa Somerville

Nutrition and Dietetics
Head: Assoc. Prof. Ibolya Nyulasi

Occupational Therapy
Head: Jane Feurtrill

Social Work
Head: Bridget Wall

Physiotherapy:
Head: James Sayer

Psychology
Head: Lynda Katona

Speech Pathology
Head: Janine Mahoney

*The Anaesthesia and Perioperative Medicine Department, the Infectious Diseases Department and Sexual Health are included in the Monash Central Clinical School section of this report.

Allergy, Immunology and Respiratory Medicine

Director: Professor Robyn O'Hehir AO, BSc, MBBS, FRACP, PhD, FRCP, FRCPath, FAHMS, FThorSoc



Adjunct Clinical Associate Professor Ian Glaspole, Head of The Alfred Hospital Interstitial Lung Disease team.

The Department of Allergy, Immunology and Respiratory Medicine (AIRmed) has a unique and comprehensive spectrum of expertise in Australia across clinical and basic allergy, clinical immunology and advanced adult lung diseases. Specific disciplines include severe asthma, allergic diseases, non-HIV primary and acquired immune deficiencies, chronic obstructive pulmonary disease (COPD), interstitial lung diseases, sleep apnoea and sleep disordered breathing, the Cystic Fibrosis State Centre of Excellence, bronchiectasis, pulmonary vascular disease and adult and paediatric lung transplantation.

AIRmed integrates clinical services with extensive human and experimental research programs, linking senior clinician scientists, bench scientists, allied health professionals, primary care physicians and the community. Clinically driven hypotheses direct the laboratory-based human research and subsequent translation into changes in current best practice for improved health outcomes. The clinical and academic base of AIRmed is located at The Alfred hospital, with experimental and clinical research laboratories located within the hospital and Monash University at AMREP.

Our researchers have had considerable success in obtaining competitive NHMRC, ARC and other research grant funding, and the high international and national profiles of our senior personnel are reflected in numerous peer review publications and speaking invitations. AIRmed is committed to delivering outstanding best practice clinical care, outcome driven professional education and community outreach as well as translational research of international acclaim.

Interstitial Lung Disease

The Alfred has been at the centre of research driving change in the treatment of interstitial lung disease. The clearest example of this has been in the approach to idiopathic pulmonary fibrosis, the commonest and one of the most devastating of presentations seen in The Alfred's Interstitial Lung Disease Clinic. Previously, there was no evidence based therapy for this condition and it carried a prognosis of approximately three years survival from the time of diagnosis. The Monash-Alfred team contributed to the authorship of studies published in *The New England Journal of Medicine* demonstrating that two molecules were able to halve the rate of progression of idiopathic pulmonary fibrosis, in addition to demonstrating a number of other benefits associated with efficacy.

The Alfred's interstitial lung disease team, headed by Adjunct Clinical Associate Professor Ian Glaspole, carries out research that has been both nationally and internationally recognised. These include being the Victorian centre for the Australian Idiopathic Pulmonary Fibrosis Registry, the home of a tissue biobank for interstitial lung disease and Australia's longest running interstitial lung disease clinic. Numerous basic, translational and clinical science projects are based upon these efforts and have spawned three successful NHMRC-funded research projects in the last few years.

Bronchiectasis Toolbox

The Bronchiectasis Toolbox (www.bronchiectasis.com.au) is an educational website developed by physiotherapist Caroline Nicolson with the support of Alfred hospital specialists from Physiotherapy, AIRMed, Radiology, Lung Function, and Nutrition and Dietetics. It was developed at The Alfred in 2015 to provide information on the management of people with bronchiectasis. Although it is chiefly targeted to health professionals, it will also be beneficial for patients, particularly to reinforce management strategies that have been prescribed for them. It is hoped that this website will assist in closing the gap in healthcare for Aboriginal and Torres Strait Islanders, who have a very high incidence of this condition and do not always have access to evidence based up-to-date treatment that is more widely available in the non-Indigenous community.

Asthma: New Treatment Approach

Exciting research has led to new thinking about the causes and treatment of asthma, a condition that affects one in ten Australians. The Alfred's Head of Physiology Services, Professor Bruce Thompson, who is part of the investigator team of an NHMRC-funded National Clinical Centre of Research Excellence in Severe Asthma, will trial a new approach to the treatment of asthma. Professor Thompson views asthma as an umbrella term for a condition that may be caused by different mechanisms yet result in the same dysfunction.

About 40 per cent of people with severe asthma do not have eosinophils in the sputum and do not respond well to inhaled corticosteroids, which is the mainstay of treatment. Along with a co-investigator in Sydney, Professor Thompson is working on targeting treatment to this so called steroid resistant

asthma with a new approach that will involve patients inhaling a nebulised form of a commonly used antibiotic with anti-inflammatory properties. Up to 60 participants will be involved in this four-year study at The Alfred. The study has huge potential to result in life-changing treatment for asthma sufferers who do not respond well to other existing treatments.

Achievements and Awards

- Professor Robyn O'Hehir was elected a Foundation Fellow of the newly established Australian Academy of Health and Medical Sciences and endorsed as a Fellow of the Thoracic Society of Australia and New Zealand.
- Professor Matthew Naughton received the 2015 Australasian Sleep Association Distinguished Achievement Award in recognition of exceptional achievements in the fields of sleep health and sleep science.
- Dr Glen Westall and Dr Ian Glaspole were appointed as Adjunct Clinical Associate Professors.
- Dr Anne Holland was appointed Adjunct Professor of Physiotherapy, La Trobe University.

Grants

New NHMRC Project Grants Commencing 2016

- Associate Professor Glen Westall is part of an investigator team (CID), led by Associate Professor Daniel Chambers (University of Queensland) (CIA), awarded a five-year \$1.88

million Project Grant entitled 'Conquering the final frontier in lung transplantation: mesenchymal stromal cell therapy for chronic lung allograft dysfunction'.

- Professor Robyn O'Hehir was awarded a \$1.44 million three-year Project Grant for the study 'Phase I/IIa trials of a novel T-cell epitope-based peptide therapy for peanut allergy'.
- Associate Professor Glen Westall is part of an investigator team (CIC), led by Professor Daryl Knight (University of Newcastle), awarded a four-year Project Grant of \$845,611 for a study entitled 'Fibroblast Senescence as a driver of pulmonary fibrosis'.
- Professor Anne Holland is the lead investigator of a team awarded a four-year Project Grant of \$697,942 for the study entitled 'Tele-rehabilitation for chronic obstructive pulmonary disease'.
- Professor Michael Abramson is the lead investigator of a team awarded a one-year Project Grant of \$282,760 to investigate 'Occupational and environmental exposures associated with idiopathic pulmonary fibrosis in Australia'.

Postgraduate Students

2 PhD Students

Publications

94 Journal Articles
2 Book Chapters



The Bronchiectasis Toolbox is an educational website developed by Alfred Hospital specialists to provide information on the management of this condition. Aboriginal and Torres Strait Islanders have a very high incidence of bronchiectasis and it is hoped they will benefit from access to the site.



Allied Health

Head: Lisa Somerville BSc(OT), MPH(Health Management)

Nutrition

Head: Associate Professor Ibolya Nyulasi BSc(Nut & Diet), MSc, GradDipBusMgt

The Nutrition Department provides acute and chronic disease management services across a range of clinical areas. We study the impact of disease and the outcome of disease treatment on nutritional status, body composition and energy expenditure to guide nutritional assessment and management practices. Current areas of research include the critically ill, respiratory medicine such as cystic fibrosis (CF), stem cell transplant and surgical oncology. We also investigate novel dietary interventions for disease, such as looking at the effect of the Mediterranean diet on non-alcoholic fatty liver disease led by Dr Audrey Tierney and PhD student Elena Papamiltiadous.

Nutrition in the ICU

The Alfred Nutrition Department is a lead Australian site for a multicentre, randomised, controlled trial (RCT) investigating the role of supplemental parenteral nutrition in critically ill adults hospitalised in the Intensive Care Unit (ICU). The study aims to assess whether supplemental parenteral nutrition delivers increased amounts of energy to ICU patients with either a confirmed or a high likelihood of enteral nutrition insufficiency (without significant adverse effects) compared to a standard enteral nutrition strategy. Secondary outcomes include clinical and functional outcomes. Recruitment was completed in January 2016 and data analysis is under way.

In 2015, Emily Dynon commenced recruitment for a study investigating energy requirements in critically ill obese patients hospitalised in the ICU. Patients enrolled in the study (n = 16) were randomised to either standard nutrition care or goal-directed nutrition management using indirect calorimetry to guide nutrition therapy. Recruitment will continue in 2016.

Dr Audrey Tierney and Oana Tatucu are investigating the degree and location of intestinal permeability changes in critically ill adult patients in comparison to healthy controls. A prospective case control pilot study measuring intestinal permeability has recruited 16 patients with the aim of completing the recruitment of 20-30 participants by June 2016.

Pregnancy and Nutrition

Dr Audrey Tierney, Rachele Opie and Madeleine Neff completed a study examining the impact of dietary interventions on pregnancy outcomes. A controlled trial investigating the impact of early nutritional intervention and ongoing antenatal dietetic support in obese pregnant women was completed, with a total of 92 women in the intervention group and 125 women in the control group. The trial showed

Senior Dietitian Dr Susannah King measures a patient's body composition utilising bioelectrical impedance analysis, as a part of a study to understand body composition alterations prior to and following stem cell transplant.



that the novel dietary intervention, individually tailored for obese pregnant women, significantly improved diet quality. We are currently investigating mechanisms for translating these findings into clinical practice.

Nutrition and Stem Cell Transplantation

Dr Susannah King and Sarah Fagan completed a pilot study investigating body composition and energy expenditure in stem cell transplant (SCT) patients with the use of indirect calorimetry. Body mass index and fat-free mass stores decreased significantly between baseline (prior to SCT conditioning treatment) and day 100 post SCT, indicating that even three months post-transplant, nutritional recovery has not begun. Resting energy expenditure was significantly elevated at baseline but fell by day 100, possibly related to the reduction in fat-free mass stores. A larger study is planned to extend these investigations to include autologous SCT recipients.

Impact of Surgery for Gastric Carcinoma

In collaboration with the Department of Radiology and Upper Gastrointestinal Surgery, Lisa Murnane conducted a retrospective cohort study using pre-operative CT (computed tomography) scans to investigate whether low skeletal muscle mass (sarcopenia) or nutritional status is associated with postoperative outcomes after resection of gastric carcinoma. Results show that although the majority of patients were within or above the healthy weight range, 46% met ICD-10 (the international statistical classification of disease) criteria for malnutrition. The finding that 63% were sarcopenic underscored the high prevalence of skeletal muscle depletion in this population; this is not evident using traditional weight-based assessments. This study showed that sarcopenia is more common in gastrectomy patients than other patient groups.

Achievements

- Madeleine Neff won the 2015 Henrietta Law Memorial Prize for Allied Health for her poster presentation on ethnicity and gestational diabetes at Alfred Health Week.
- Dr Susannah King, Sarah Fagan, Emily Dynon, Associate Professor Ibolya Nyulasi, together with haematologist Dr Sharon Avery were awarded an Australasian Society for Parenteral and Enteral Nutrition grant to research energy expenditure and body composition in SCT in 2016.

Postgraduate Students

4 PhD Students
2 Masters Students

Publications

14 Journal Articles
1 Book

Occupational Therapy

Head: Jane Feurtrill BOccThy, MBA, MHealthSc (Stroke Specialisation)

Research activities of the Occupational Therapy (OT) Service focus on the evaluation of quality, efficacy, and safety of OT assessments and interventions in the four key areas of neurotrauma, rehabilitation, ageing and musculoskeletal injuries. Research output has maintained momentum, with 72 oral presentations at national and international conferences. The team has had an extremely successful year in attracting \$573,588 in internal and external grant funding to support our work.

Post Traumatic Amnesia

Associate Professor Natasha Lannin led a study to develop and test a standardised re-orientation program for people suffering post-traumatic amnesia. The goal was to remind patients with acute brain injuries of who they were, and why they were in hospital. Patients' families were asked to bring in photos and items of significance from home while clocks, calendars and written cues were brought to the patient's room to counteract the disorienting effect of being hospitalised. Encouraging results have prompted plans for a much larger, multicentre trial. The project was funded by an RACV Sir Edmund Herring Scholarship.

Training Bangladeshi Health Professionals

Dr Lisa O'Brien and colleagues undertook a qualitative case study to determine whether an eight-week online training program for developing skills in short-course development and delivery was effective in establishing locally driven, sustainable, evidence-based training for Bangladeshi occupational or physical therapists working with upper limb disorders. Online distance education was found to be effective in producing sustainable change in practitioner skills; however, it was thought that future programs targeted at developing countries would benefit from a blended learning approach incorporating face-to-face instructor contact (O'Brien L *et al.*, *J Contin Educ Health Prof* 2015).

Achievements

Associate Professor Natasha Lannin was awarded an NHMRC Translating Research into Practice Fellowship (2016-2017) for her research program entitled 'Pushing and pulling evidence into practice: implementing best practices in upper limb movement therapy after acquired brain injury'.

In addition, Associate Professor Lannin's \$1.06 million NHMRC Project Grant to investigate the effectiveness of botulinum toxin-A in upper limb recovery following stroke commenced.



Associate Professor Natasha Lannin (R) demonstrates the re-orientation program to a patient with post-traumatic amnesia.

Postgraduate Students

3 PhD Students
5 Masters Students
1 Doctor of Clinical Science

Publications

16 Journal Articles
1 Book Chapters

Physiotherapy

Head: James Sayer BAppSc(Physio), GradDipExercise & Sports Sc, MHLthSc(ManipPhysio), MBA

The Physiotherapy Department investigates the benefits of physical activity and rehabilitation for hospitalised patients and people with chronic illness. Our research programs explore new models of rehabilitation for respiratory disorder patients, physical activity in chronic disease, and physiotherapy in intensive care.

Advanced Practice Musculoskeletal Physiotherapy

Physiotherapist Dr Paula Harding, together with Kerrie Walter, successfully led the Victorian Department of Health Advanced Musculoskeletal Physiotherapy (AMP) implementation program. This project aimed to provide an alternative and cost effective pathway of care for patients with musculoskeletal complaints, while improving patient access and care, managing demand for medical staff and ensuring evidence based practice. Alfred Health led a consortium with St Vincent's Hospital and Melbourne Health. Dr Harding worked to oversee, support and mentor 13 metropolitan, regional and rural health services across 12 Victorian healthcare networks in integrating the model into emergency, orthopaedic and neurosurgery services.

Cost effectiveness, efficiency, safety and quality of the AMP clinics were demonstrated. Significantly, 96% of patients were satisfied with their experience and 85% of the workforce expressed that they were very satisfied or satisfied in understanding the scope of practice for the role. Other key outcomes were the introduction of functional outcome measures as part of routine care. The Alfred's AMP Operational Framework and AMP Clinical Education Framework that includes a comprehensive work-based competency training and assessment program was utilised for this state-wide project. As a result, there are more AMP services in operation in Victoria than any other state in Australia. Victoria's collaborative effort has strengthened capacity and the evidence base for further expansion in physiotherapy-led clinics, with the aim of embedding AMP as part of routine service delivery.

The Bronchiectasis Toolbox

In 2015 physiotherapist Caroline Nicolson and a team of clinicians and researchers developed the Bronchiectasis Toolbox website (www.bronchiectasis.com.au), an interactive educational resource for healthcare professionals. It is designed to assist with the assessment and management of people with non-cystic fibrosis bronchiectasis. Development of the website was funded by a competitive grant from the Australian Physiotherapy Association Pat Cosh Trust and by an Educational Grant from the Institute for Breathing and Sleep. The Toolbox is based on best research evidence, as well as the current national and international guidelines for bronchiectasis management. The website, which includes instructional videos for physiotherapy techniques, was launched in December 2015 after extensive peer review by clinicians and students.

Tele-rehabilitation

In 2015 Professor Anne Holland was awarded an NHMRC Project Grant (\$707,713; 2016-2018) to investigate the effects of tele-rehabilitation (TR) in people with chronic obstructive pulmonary disease (COPD). Pulmonary rehabilitation is a well-established treatment for COPD; however, it is currently delivered to less than 10% of those who will benefit. TR, which involves the delivery of rehabilitation directly into a patient's home using the internet, has the potential to improve access and uptake for this important treatment. Professor Holland's team will test whether TR is equally as effective as traditional centre-based pulmonary rehabilitation for people with COPD. The trial, which will run over four years, will recruit participants from Alfred Health, Austin Health and the Wimmera region.



Professor Anne Holland was awarded an NHMRC Project Grant to investigate the potential of tele-rehabilitation for people with chronic lung disease.

Postgraduate Students

10 PhD Students
9 Masters Students

Publications

44 Journal Articles
1 Book Chapter

Psychology

Head: Lynda Katona BA(Hons), MA(ClinPsych)

The Psychology Department (Clinical and Neuropsychology) provides best practice evidence-based services to improve the quality-of-life of patients and their carers. In the acute hospital setting, clinical psychologists provide psychological assessment and treatment to patients with problems such as depression, anxiety and adjustment issues and are attached to the Cystic Fibrosis, Oncology, HIV, Heart Transplant and Burns Services as well as the Hospital Admission Risk Program.

In The Alfred Psychiatry Department, clinical psychologists take a leading role in the treatment of clients with personality disorder. Neuropsychology assessment and treatment services are provided to patients of all psychiatry programs and all medical and surgical units of the hospital, in particular Neurology, Neurosurgery, Trauma and HIV services.

In 2015 research activities focused on outcomes for individuals with mild traumatic brain injury, the assessment of HIV-associated neurocognitive disorder in culturally and linguistically diverse individuals, research into the long-term wellbeing of burns patients and the evaluation of a therapeutic group program for young people with emerging personality disorder.

Burn Injury

Dr Birgit Pfitzer, Clinical Psychologist in the Burns Service, is part of a research team with researchers from the University of Melbourne and the Australian Centre for Post-Traumatic Mental Health investigating how a range of physical, psychological and social factors may influence long-term disability in burn injury patients. Participants were asked to complete self-report questionnaires assessing feelings of anger, perceptions of social support, appearance perceptions, pain and sleeping habits. They also completed a clinical interview assessing symptoms of depression, post-traumatic stress disorder, anxiety and other psychiatric problems.

Participants were followed up at three and six months post-injury, at which time they completed the same telephone clinical interview and online self-report questionnaires. Data collection is complete and the project is now in data analysis phase. It is hoped that the findings from the study will provide useful information to guide psychosocial assessment and intervention that will lead to a reduction in long-term disability for burns patients.

Publications

1 Journal Article

Speech Pathology

Head: Janine Mahoney BAppSc(SpPath)

Very Early Rehabilitation in Speech Trial

The Speech Pathology Department is participating in an NHMRC-funded Australia-wide project, led by Professor Beth Armstrong at Western Australia's Edith Cowan University, evaluating the efficacy of early intervention in aphasia rehabilitation after stroke. Work has been undertaken within the Stroke Unit with Alfred Health Speech Pathologists participating in the study across acute, subacute and community services.

Known as the VERSE project (Very Early Rehabilitation in SpEEch), the study investigates whether intensive, early aphasia therapy results in better communication outcomes for stroke patients and aims to accurately cost intensive aphasia therapy. Participants with aphasia are recruited within 14 days post stroke and are randomised to one of three groups: patients having usual care; patients having usual care plus additional therapy sessions; or, patients receiving a standardised aphasia therapy program from independent speech pathologists. Patients are given five weeks of early aphasia therapy and evaluated at 12 and 26 weeks post stroke. Alfred Health have recruited eight participants to this ongoing study.

Triage, Treatment, Transfer Trial

The Speech Pathology Department has been involved in planning The Alfred's participation in the 'T3 Trial': Triage, Treatment and Transfer of patients with stroke in the emergency department. The study is led by the Nursing Research Institute and Australian Catholic University. The Speech Pathology Department is responsible for the training of nursing and medical staff in the use of the ASSIST (acute screening of swallow in stroke/TIA) screening tool.

Social Work

Head: Bridget Wall MSW, BSW, GradDipEval, GradDip WorkPlace Leadership, Cert Psychotherapy, Cert Trauma Counselling

Acute Social Work promotes research and best practice across a spectrum of clinical areas.

In 2015 The Alfred Social Work Department hosted the annual Australian Association of Social Workers (AASW) Health Social Work Directors Group Research Symposium.

Data collection is under way in the following projects:

- Identifying the psychosocial issues of burns patients presenting to a level one trauma centre: the psychosocial determinants of healthcare outcomes;
- HeLP (Health Legal Partnership): Measuring the impact on the social work role following the introduction of the HeLP clinic at The Alfred;
- Evidencing social work in health and mental health care: a state-wide practice research collaboration.

Projects in write up stage include:

- Beyond the key performance indicators in the multidisciplinary team in the Emergency Department.

Completed research includes:

- The psychosocial factors impacting on renal patients' decisions to change treatment modalities;
- Engaging patients with a moderate to severe brain injury in goal setting – a collaborative project with Occupational Therapy and La Trobe University.

HeLP Legal Clinic

Launched in March 2014, the HeLP Patient Legal Clinic is a partnership between The Alfred, Maurice Blackburn, Monash University and Justice Connect. The clinic is an integrated service model involving legal advisors working with social workers and clinicians, to support patients in ways that improve their access to justice, maximise their health outcomes, and support stronger social connection and inclusion.

Bridget Wall and Lorraine Xavier-Ambrosius were awarded \$5,000 from the AASW Lyra Taylor fund to undertake an evaluation of the role for Acute Social Workers as part of HeLP. An evaluation is under way to determine the impact of the program on benefiting patients and supporting better delivery of health services.

Preliminary results are derived from clinical data, interviews with patients and next of kin, and two focus groups with social workers. HeLP clients ranged in age from 26 to 81, with most aged between 50 and 70 years. The majority derived income from a pension or benefit. In its first year HeLP assisted 238 patients with around 350 separate legal matters. Patients were assisted with an extensive range of legal matters and

almost all hospital departments referred patients to HeLP. Advice most frequently requested includes: end of life legal planning including medical and legal powers of attorney, wills and superannuation; financially-related legal issues, such as Centrelink debts and outstanding fines, housing and property; criminal charges; family law and immigration problems.

The program strongly represents the commitment of all partners to inclusiveness and holistic patient care, and demonstrates how public health services can better support and protect its most vulnerable patients and communities.

Gathering a Social Work Evidence Base in Health and Mental Health Care

Social workers in health and mental health settings are increasingly being asked to provide an evidence base for their practice and contribution to the patient experience and patient focused outcomes. A practice-research initiative was undertaken by Professor Lynette Joubert at The University of Melbourne in conjunction with 18 health and mental health social work departments across the state including The Alfred.

The observational study comprised a prospective audit of usual hospital-based social work practice with data collected in five-minute intervals over a 24-hour timespan. The findings to date point to both generic and discipline-specific competencies for hospital social workers and have relevance for the development of integrated healthcare policies.

Issues potentially impacting on client-centred care have been highlighted for consideration by managers and educators in the field of healthcare, including mode of intervention, client-centred issues impacting on intervention and community links managed by hospital social workers.



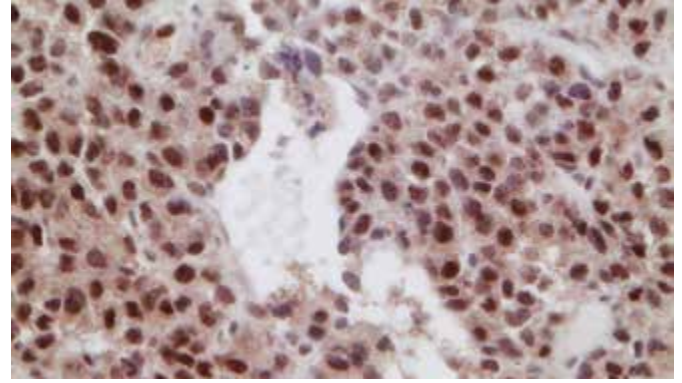
The HeLP (Health Legal Partnership) is a program aimed at improving patient access to justice. Gabrielle Feery (L) (Solicitor-Maurice Blackburn) and Lorraine Xavier-Ambrosius (R) (Acute Social Work-The Alfred) engage with a client of the HeLP program.

Students

1 Masters Student

Anatomical Pathology

Head: Professor Catriona McLean, BSc, MBBS, FRCPA, MD, FFSc(RCPA)



Histological staining of tissue from a cancerous liver shows up-regulation of a specific nuclear protein (magnification x 200).

The Department of Anatomical Pathology's main research areas involve collaborative projects on breast cancer, liver cancer, prostate cancer, melanoma, muscle disease and neurodegenerative diseases. Highlights for Anatomical Pathology research in 2015 were studies that resulted in publications in *Nature Communications*, *American Journal of Human Genetics* and *Cancer Cell*.

Neurodegenerative Disease

The *Nature Communications* paper (Kouri N *et al.*, *Nat Commun* 2015) resulted from international collaboration with colleagues from the Mayo Clinic College of Medicine, USA. The paper reports on a genome wide study (GWAS) of the rare neurodegenerative disease corticobasal degeneration (CBD), which is a neurodegenerative disorder affecting movement and cognition that can only be definitively diagnosed at autopsy. The study showed that CBD shared genetic risk factors with the neurodegenerative disease, progressive supranuclear palsy.

Breast Cancer

The *American Journal of Human Genetics* paper resulted from a multinational collaboration through the University of Cambridge on breast cancer in which genetic mapping identified a new risk locus for the disease (Darabi H *et al.*, *Am J Hum Genet* 2015).

The paper in *Cancer Cell* (Ooms L *et al.*, *Cancer Cell* 2015) resulted from a local collaboration with Professor Christina Mitchell's Laboratory at Monash University. The study highlighted a protein involved in breast cancer growth and spread, identifying phosphoinositide 3-kinase (PI3K) generated PtdIns(3,4,5)P3 as a suppressor of oncogenic PI3K/AKT signalling in breast cancer. Professor Mitchell and Dr Lisa Ooms have been working with Professor McLean and PhD students and postdoctoral researchers from Monash School of Biomedical sciences for many years now, looking at pathways associated with growth of breast tumour cells. The work highlights the benefits of crossing disciplines and confirming findings from models of disease in the laboratory with actual clinical specimens.

Prostate Cancer

During 2015, Anatomical Pathology also collaborated with The Alfred departments of Urology, Radiology and Radiation Oncology to study of the effect of irreversible electroporation (IRE) on prostate tissue. This project involved systematically studying prostate glands resected following IRE therapy for prostate carcinoma. The histological findings and statistical analysis have yielded fascinating results, many of which have not previously been reported in this emerging field. The study will continue in 2016.

Achievements

Prizes

- Dr Colleen D'Arcy won the 2015 Quality Assurance Program Trainee Poster Prize at the National Update in Pathology, a Royal College of Pathologists of Australia meeting.

Grants

- Professor Catriona McLean is an investigator (CIB) on a \$1.18 million (2016-2020) NHMRC Project Grant awarded to Professor Christina Mitchell (CIA) for the study 'Characterisation of a novel oncogene in breast cancer'. The group has identified an oncogene that controls breast cancer metastases and the proposal aims to elucidate mechanisms by which this occurs.
- Professor McLean was named in a philanthropic grant from The Fred Liuzzi Foundation to support a PhD Student in studying rare neuromuscular disorders, working with colleagues at the Harry Perkins Institute of Medical Research in Western Australia.
- Professor McLean was a Chief Investigator on a Monash Interdisciplinary Research Seed Grant to investigate Atomic Force Microscopy with researchers from the Faculties of Engineering and Information Technology.

Publications

39 Journal Articles

Burns

Head: Dr Heather Cleland MBBS, FRACS



Megan Gregory, Burns Unit research nurse.

The Victorian Adult Burns Service at The Alfred provides the state-wide service for adult patients with severe burn injuries. Clinical research topics in 2015 have included gender differences in cytokine response to burn injury, troponin levels in patients with burns and the early microbiological profile of the burn wound. A prospective trial is under way to test the validity of a predictive equation for dressing requirements, which will contribute to state disaster response preparation and planning. Laboratory research is focused on techniques for keratinocyte culture and tissue engineering for skin substitutes.

Cytokine Response to Burn Injury

We previously demonstrated a gender dimorphism in risk of death in patients with burn injury, which supports data from other published reports. To follow up, we undertook a prospective study of the acute systemic cytokine response in patients with severe burns in collaboration with Texas Tech University Health Sciences Centre's Burn Centre. The completed pilot study identified relevant cytokines and time-point for measurement, as well as establishing an appropriate method of cytokine analysis with clinical plausibility. Analysis of the results from both sites is under way. This will inform design of a prospective multi-site study designed to identify prognostic factors in the inflammatory response to burn injury and provide further information on its relationship with gender, adiposity and burn injury outcomes.

Synthetic Dermal Substitute Trial

We have commenced recruitment as the only Australian site for a multi-site clinical trial of a novel fully synthetic dermal substitute for treatment of severe deep burns. We have previously completed experiments characterising vascularisation and the inflammatory response to this material in a mouse model, and the report of this work has been

accepted for publication. If proven to be clinically successful, this product will provide the first reliable rapidly vascularised dermal matrix for the treatment of burn injury that is resistant to infection and fully synthetic.

Burns Registry

Alfred Burns Unit clinicians are involved in leadership roles in the ongoing development and governance of the Burns Registry of Australia and New Zealand (BRANZ), an initiative of the Australian and New Zealand Burn Association (ANZBA), which is managed by Monash University's Department of Epidemiology and Preventive Medicine. The BRANZ provides data to support burns research projects and quality improvement initiatives. In 2015, all eligible specialist paediatric and adult burns units across Australia and New Zealand (17 units) had received ethics approval to contribute and 16 units contributed data. Two papers using BRANZ data were published in 2015.

A review of quality indicators embedded in the registry has been completed, preparatory to implementation of the Burns Quality Improvement Program (BQIP). The first four years of data relating to adult burns patients has been subjected to risk-adjusted analysis. Significant variation in treatments and outcomes (including mortality) between burns units has been demonstrated. These results demonstrate the feasibility of collecting data, as well as the need for such data, given the evidence of variation in practice and outcomes that has been identified.

In 2015 we hosted the 39th Annual Scientific Meeting of ANZBA in Melbourne.

Postgraduate Students

3 PhD Students
3 Masters Students

Publications

8 Journal Articles



The Alfred Skin Tissue Culture Laboratory: L to R: Dion Martinus (Quality Consultant), Dr Heather Cleland (Director of Victorian Burns Service) and Dr Shiva Akbarzadeh (Senior Research Fellow).



Associate Professor Silvana Marasco has received Victorian Government funding of over \$1.5 million with Professor Frank Rosenfeldt to develop a novel cardiac preservation system and a further \$1.5 million towards developing a new femoral artery cannula.

Cardiothoracic Surgery

Director: Professor David McGiffin MD, FRACS

The Cardiothoracic Surgery Unit performs a full spectrum of adult cardiac and thoracic surgery, which includes fitting mechanical assist devices for heart failure patients, as well as being the busiest heart and lung transplantation unit in the country. The research directions of the department focus on new surgical innovations and devices, organ preservation for transplantation and chest trauma.

Centre of Research Excellence

Cardiorespiratory Therapy and Organ Support

Artificial hearts and lungs are increasingly used to support our most critically ill patients. A greater understanding of patient-machine interaction is needed to maximise their life-preserving potential. Professor John Fraser (CIA) of Prince Charles Hospital, Queensland, and Professor David McGiffin (CIB) were awarded a \$2.5 million NHMRC grant (December 2014 - November 2019) for the Centre of Research Excellence (CRE) in Advanced Cardio-respiratory Therapies Improving OrgaN Support (ACTIONS). The ACTIONS CRE will research device-related complications, improve device components, develop clinical practice guidelines, train clinical and engineering researchers and explore the cost benefits of this technology ensuring all Australians can access state-of-the-art mechanical life support. The CRE has investigators from

Victoria, Queensland and New South Wales with Associate Professor Vincent Pellegrino (CIF) from The Alfred Intensive Care Unit also part of the team.

The ACTIONS CRE will also be involved in validating the 'Organ Perfusion' research, for which researchers in the Cardiothoracic Unit (Professor Frank Rosenfeldt and Associate Professor Silvana Marasco) received a Victorian Government grant of over \$1.5 million from the Department of State Development, Business and Innovation. The project is developing a novel cardiac preservation system that improves on the traditional cold ice transport for donor hearts.

Cannulation System Development

Associate Professor Marasco also received a Victorian Government grant of over \$1.5 million for the development of a new femoral arterial cannula. The new device perfuses the leg while providing retrograde perfusion to the rest of the body, thus avoiding the complication of lower limb ischaemia that can occur with current standard perfusion cannulae.

Postgraduate Students

1 PhD Student

Publications

25 Journal Articles



Burns care has been highly developed at The Alfred.

Cardiovascular Medicine

Director: Professor Anthony Dart BA, BMBCh, DPhil, FRCP, FRACP, FAHA, MRCP



Coronary and Structural Interventional Cardiologist, Dr Dion Stub, commenced a co-funded NHMRC-Heart Foundation Early Career Fellowship in 2015 to undertake research into assessment of remote ischemic conditioning on post-cardiac arrest myocardial dysfunction.

The Department of Cardiovascular Medicine provides a full range of clinical investigation and therapies for all forms of adult cardiac disease, from risk factor management to cardiac transplantation and mechanical cardiac support. Staff of the Department have full or part-time Alfred appointments or joint appointments with Baker IDI Heart and Diabetes Institute and/or Monash University. The majority of our senior medical staff have completed a higher research degree and we host a number of clinical PhD students as well as Fellows of the Royal Australasian College of Physicians (FRACPs). There are extensive research collaborations with other Alfred Departments as well as with Baker IDI and the Burnet Institute. Research is supported by grants from the NHMRC, Heart Foundation, the US National Institutes of Health (NIH) and commercial entities.

Research is undertaken widely throughout the department. In addition to fully equipped catheter laboratories and imaging suites, we have a number of procedural and investigations rooms dedicated to research. Research within the cardiac catheter laboratory is performed in relation to electrophysiology, particularly atrial fibrillation (AF), coronary disease, renal denervation and structural heart disease. The majority of these studies are investigator-led; however, we also conduct company sponsored trials, particularly of new devices. We study heart failure found in patients with normal systolic function, and many studies require combined exercise and haemodynamic measurements. The other major area of focus for the department is on cardiac imaging, particularly in relation to cardiac magnetic resonance imaging (MRI).

Cardiac Biomarkers

Previous studies led by Professor Anthony Dart have demonstrated that the inflammatory cytokine macrophage migration inhibitory factor (MIF) is released very early following myocardial infarction. Experimental studies by Professor Dart and Associate Professor Xiao-Jun Du established that MIF release also occurred in the absence of infarction during the course of the ischaemia. Further studies conducted in collaboration with the Department of Nuclear Medicine (Dr Thomas Barber) have now examined whether such release could also be found in clinical settings. This was examined by obtaining blood samples before and after diagnostic stress testing. In subjects with no evidence of ischaemia there was no change in the MIF level post exercise. The same study found that exercise-induced ischaemia was not associated with any change in the circulatory level of troponin or C-reactive protein.

In contrast, those with objective evidence of ischaemia did show an elevation in their plasma MIF levels. This finding suggests that the mechanism of MIF release differs from that of other well-known cardiac biomarkers such as troponin, which require irreversible myocyte damage. Furthermore

it raises the possibility that measurement of this biomarker might assist in the evaluation of the exercise test. Further studies are required to demonstrate whether MIF will also indicate the extent of the associated ischaemia. In related studies the research group is also testing the predictive potential of plasma microRNAs released during exercise.

Vitamin D and Coronary Artery Disease

The role of vitamin D in the pathophysiology of coronary artery disease (CAD) is controversial. Some epidemiological studies suggest that low vitamin D levels are associated with an increased risk of cardiac disease. This is an important issue as low vitamin D levels are common and can be treated easily with oral replacement therapy. We prospectively studied patients presenting for coronary angiography and measured their vitamin D level at the time of angiography.

The main findings of the study were that patients with angiographic CAD had a significantly lower vitamin D level than those without disease. Furthermore the levels were lower in patients with more significant disease and those patients with triple vessel coronary artery disease had lower levels than those with single vessel disease. When the data were analysed to look for predictors of the presence and extent of CAD, including traditional risk factors, vitamin D was the most powerful predictor.

These data support the hypothesis that vitamin D is important in the pathophysiology underlying CAD. Further studies are needed to assess whether vitamin D supplementation reduces a patient's risk of developing CAD or reduces their risk of cardiovascular events. In contrast to the positive associations found between CAD and vitamin D levels, there was no difference between those whose aortic valve disease progressed rapidly or slowly. Further studies are under way to try to identify biomarkers that do discriminate between rapid and slow progressors in this rapidly increasing patient cohort.

Fibrosis Detection with MRI

Studies by Associate Professor Andrew Taylor and his team have further established the role of cardiac MRI in detecting and quantifying both diffuse and localised cardiac fibrosis. Associate Professor Taylor and his collaborators have been leaders in the establishment of specific methods for the detection of diffuse interstitial fibrosis, which is a feature of many myocardial diseases including hypertrophic cardiomyopathy. Now that an accepted and quantifiable assessment of fibrosis can be made noninvasively, the team is able to undertake clinical trials of both existing (e.g. eplerenone) and novel agents as potentially able to reverse this pathology. The demonstration of effective therapies for cardiac fibrosis would have widespread clinical benefit in a number of cardiac conditions.

Structural Heart Program

The Structural Heart program, headed by Associate Professor Antony Walton, has participated in a wide range of both multicentre and investigator initiated studies. These have included novel devices for the treatment of both aortic and mitral valve disease. The department played a large role in earlier studies with renal denervation for persistent hypertension and, although a subsequent trial failed to show benefit, there are a number of important questions that still need to be addressed. These include the evaluation of the newer generation of denervation catheters and these will be important studies to decide whether this form of therapy has a future role for this patient group. Evaluation of percutaneous treatments for valvular heart disease have immediate implications for the management of patients with valve disease, enabling patients to be treated without the need for open heart procedures.

Drug Therapy for Heart Failure

The Heart Failure team, in partnership with the Heart Failure Research Group at Baker IDI, investigate the causes of heart failure with the aim of developing new treatments. Many patients with advanced heart failure are admitted frequently to hospital and have a poor quality-of-life. Unfortunately, in some cases it is not possible to offer heart transplant or artificial heart device surgery because of concomitant illnesses. Professor David Kaye has investigated a novel oral formulation of milrinone, with over 20 patients treated. Early evidence of improvements in symptoms and end-organ function is emerging. In parallel studies, the potential utility of the drug is being investigated in other forms of heart failure.

Devices to Treat Heart Failure

The basis of the symptoms in heart failure is complex, with current drug therapies not necessarily able to adequately target the main defects. In these situations, medical devices are increasingly used. For example, Associate Professor Antony Walton and Professor David Kaye have been key investigators in a multicentre international trial of a device designed to reduce elevated intra-cardiac pressures in patients with heart failure due to increased cardiac stiffness (so called HFPEF - heart failure with preserved ejection fraction). This device is placed into the heart without surgery. A recent study of over 60 patients was published in *The Lancet* (Hasenfuss G *et al.*, *Lancet* 2016).

Electrophysiology

The relationship between AF, heart failure and cardiac imaging is the focus of research in the Electrophysiology department headed by Professor Peter Kistler. A large multicentre international study (MINIMAX), led from The Alfred, investigated optimal techniques for catheter ablation in AF. This study involved sites in Australia, UK and New Zealand and compared two commonly performed ablation strategies to complete pulmonary vein isolation for patients with paroxysmal atrial fibrillation. It demonstrated an increase in success if the pulmonary veins can be isolated as a pair and that routine individual isolation does not confer any additional advantage. This is a significant advance in refining an increasingly used therapeutic approach.

Achievements

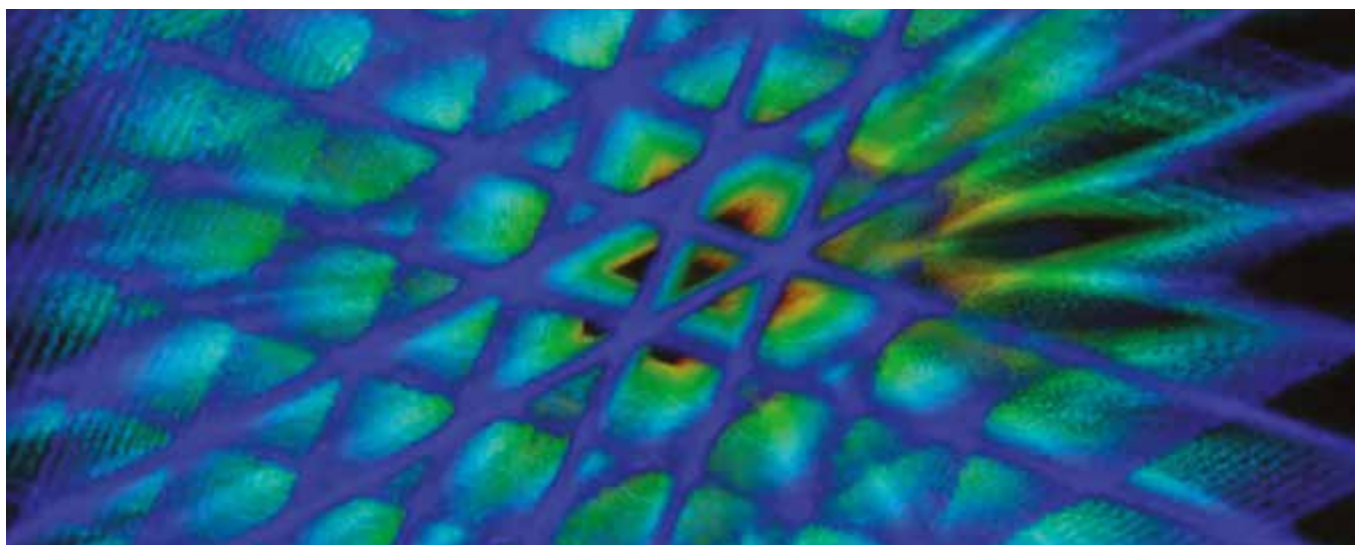
- Dr Ingrid Hopper was awarded an NHMRC Early Career Fellowship and an RACP Vincent Fairfax Research Fellowship to conduct her research 'Polypharmacy in elderly Australians - can de-prescribing improve health related outcomes and reduce costs?'
- Dr Stephen Duffy (CIH) was part of a team of investigators, led by Professor Christopher Reid of Curtin University of Technology, awarded a five-year \$2.5 million NHMRC Centre of Research Excellence in Cardiovascular Outcome Improvement that commenced in December 2015.
- Dr Alex McLellan was awarded the 2015 Arrhythmias and Cardiac Pacing Fellowship from the European Heart Rhythm Association for further training at St Bartholomew's Hospital in London and a 2016 Australian Government Endeavour Research Fellowship.
- Dr Dion Stub was awarded a 2016 RACP/JDRF Research Establishment Fellowship to conduct the project 'Assessment of remote ischemic conditioning on post-cardiac arrest myocardial dysfunction by magnetic resonance imaging, invasive coronary hemodynamic measurements and markers of inflammation'. Dr Stub was also part of a team (CIG), led by Professor Stephen Bernard from Alfred ICU, awarded a \$1.89 million NHMRC Project Grant (2016-2020) to conduct The EXACT trial: a multicentre study examining oxygen use in cardiac arrest.

Postgraduate Students

10 PhD Students
1 MD Student

Publications

73 Journal Articles
1 Book Chapter



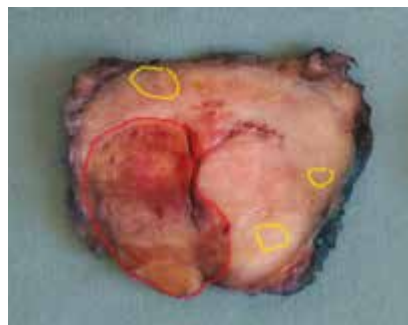
Alfred Health's Radiation Oncology Department have advanced the potential for future clinical trials at the Australian Synchrotron using microbeam radiotherapy. Intersecting arrays of x-ray beams (0.025 mm wide) imaged in 3D using laser fluorescence confocal microscopy. For Radiation Oncology report, see page 64.



theAlfred

Diagnostic and Interventional Radiology

Director: Associate Professor Dinesh Varma MBBS, MD, FRANZCR



Macroscopic specimen of resected human prostate gland tissue six weeks after the patient received irreversible electroporation (IRE). The area demarcated with red ink shows the IRE ablation zone. The areas marked in yellow are cancerous tissue that were not detected with MRI imaging.

The Radiology Department delivers diagnostic services and interventional procedures using state-of-the-art facilities. Our research focuses on improving patient care through evidence-based medicine and working with industry to facilitate innovation into clinical practice. Radiology has an essential role for diagnosis, monitoring of therapy and for performing minimally invasive procedures. Consequently a broad range of internal, collaborative and commercially sponsored research is conducted in the department.

At the end of 2015 Professor Ken Thomson retired from the Directorship of the Radiology Department. Professor Thomson was internationally renowned and a pioneer of interventional radiology, establishing the Radiology Research Unit at The Alfred at the beginning of his tenure in 2001.

Main areas of research in 2015 included:

Internal Studies

- Focal ablation of prostate and kidney cancer with irreversible electroporation (IRE).
- Balloon angioplasty for the treatment of extra-cranial venous insufficiency in multiple sclerosis patients.
- Patient controlled sedation during placement of central venous lines.
- The incidence and treatment of clinical significant dysphagia amongst patients treated in halo-thoracic orthoses for cervical spine injury.
- The utility of health informatics in medical research.

Commercially Sponsored Studies

- Novel endovascular access system for percutaneous arteriovenous fistula creation in haemodialysis patients.
- The treatment of obstructive superficial femoral artery and/or popliteal lesions with paclitaxel-coated percutaneous angioplasty balloon.

Tumour Ablation with IRE

IRE delivers brief electric pulses to attain non-thermal focal ablation that spares blood vessels, connective tissue and other sensitive organs. We have investigated IRE as means of tumour ablation in prostate and kidney cancer.

Prostate Cancer

Under Professor Ken Thomson's leadership, an NHMRC Project Grant (2015-2017) was secured to study IRE for the treatment of prostate cancer. Phase 1 of the study is complete. Six patients agreed to have the IRE procedure a few weeks prior to scheduled prostatectomy. Microscopic examination of the prostates showed that IRE ablation destroyed cancer cells without complications or side effects. In the second half of 2016 we will undertake phase 2 of the project.

Kidney Cancer

Since IRE destroys cancer cells without damaging vital structures in the kidney, it offers an alternative treatment especially for inoperable tumours. In some cases it may avoid removal of the kidney or part of the kidney. In 2015 we analysed our long- and medium-term data on the treatment of kidney cancer with IRE. Although the total number of patients treated is still low (19), the findings are very promising and may be of significant benefit to patients with only one kidney.

We treated 19 patients (10 males, 9 females), aged between 43 and 85, with solitary or multiple tumours. Seven of the patients only had one kidney with their tumour/s located in this single kidney. Twenty-seven tumours ranging in size from 1.6 cm to 6.2 cm were treated with IRE. In one case the treatment failed and the patient went on to have a part of their kidney removed. Four patients that have been followed up for over five years have been successfully treated and have not had recurrent disease. Five patients followed up for two to four years have also been successfully treated and have not had a recurrence. A patient with von Hippel-Lindau syndrome has been successfully managed with IRE.

Overall complete ablation for tumours 3 cm or less was 88% and for tumours larger than 3 cm, it was 63%. Procedures were complication free in 67% of cases; 31% of cases had minor grade 1 and 2 complications and 7% had major grade 3 complications, consisting of brachial plexus neuropraxia and a pneumothorax.

Achievements

- In 2015 Dr Helen Kavnoudias received support from The Annette Funicello Research Fund for Neurological Diseases, CCSVI Australia and State Trustees for studies involving percutaneous transluminal angioplasty for chronic cerebrospinal venous insufficiency.
- Dr Warren Clements won the prize for best research presentation from a registrar at the 2015 Interventional Radiology Society of Australia (IRSA) Annual Scientific Meeting for his presentation on patient controlled sedation during tunnelled central line insertion.
- Dr Su-Ling Lai was awarded third prize at the 2015 Royal Australian and New Zealand College of Radiologists (RANZCR) Victorian Branch Annual Trainee Research Presentation Event for her presentation on hypogastric nerve blockade for post-operative pain management following uterine artery embolisation for uterine fibroids.

Postgraduate Students

2 PhD Students
9 Masters Students

Publications

9 Journal Articles
1 Book Chapter

Emergency and Trauma

Director: Dr De Villiers Smit MBChB, FACEM



Professor Peter Cameron, who holds his Professorship with the Monash School of Public Health and Preventive Medicine, is a Chief Investigator on several NHMRC grants and clinical trials.

The Alfred Emergency and Trauma Centre (ETC) is a tertiary referral centre for Victoria and provides a statewide emergency medical service for adult trauma, hyperbaric medicine, burns, HIV medicine, cystic fibrosis, haemophilia, haematological malignancies, heart and lung transplant and critical neurosurgery. Research is concentrated on pre-hospital care, emergency medicine (EM) and trauma resuscitation and focuses on improving safety, satisfaction and quality. There is an emphasis on research methods education, evidence-based medicine and international development of EM.

We work with national research networks including the Australian and New Zealand Intensive Care Society (ANZICS) Clinical Trials Group, the Australian and New Zealand College of Anaesthetists Clinical Trials Group, the National Trauma Research Institute, the Australasian Cochrane Centre and Monash University School of Epidemiology and Preventive Medicine (SPHPM).

Research Highlights

- The PATCH, RESPOND and POLAR studies all continued enrollment of patients. PATCH (Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage) is an NHMRC funded, world first, pre-hospital trial in the use of tranexamic acid for patients with acute traumatic coagulopathy. RESPOND is a multicenter, randomised controlled trial (RCT) to prevent secondary falls in older people presenting to the ED with a fall. POLAR is an RCT investigating if early therapeutic cooling of patients with severe traumatic brain injury is associated with better outcomes at six months.
- A pragmatic RCT evaluating emergency nurse practitioner (NP) service effectiveness on achieving timely analgesia demonstrated that NP service delivered timely analgesia within recommended national clinical targets more often than standard ED care (Jennings N *et al.*, *Acad Emerg Med* 2015).
- The BioBIT study, examining novel biomarkers in brain injury, funded by The Alfred, completed enrolment and samples were sent for analysis to the University of Montana, USA.
- We hosted the 4th Annual International Emergency Care Conference in August 2015. The meeting has expanded to a three-day event with the addition of the highly successful International Emergency Care Workshop. A grant from The

Alfred Whole Time Medical Specialists Private Practice Trust Fund enabled us to host the international keynote speaker, Professor Lee Wallis, Head of Emergency Medicine, University of Cape Town and Stellenbosch University.

Achievements

- Dr Gerard O'Reilly was successful in examination of his doctoral thesis on 'A global approach to improving trauma care: facilitating the establishment of trauma registries in developing (and developed) countries'.
- Natasha Jennings (with co-authors Glenn Gardner, Dr Gerard O'Reilly and Dr Biswadev Mitra) won the College of Emergency Nursing Australasia sponsored Phillipa Moore publication prize and the Alfred Health Kathleen A B Smith Memorial Award in Nursing for their study entitled 'Evaluating emergency nurse practitioner service effectiveness on achieving timely analgesia: a pragmatic randomised controlled trial' published in *Academic Emergency Medicine* in 2015. The authors of the study presented the research at 2015 Alfred Health Week, for which they won the Janet A Secatore Research Prize for the best Nursing research poster.
- Kelly Decker (with co-authors Dr Sharyn Ireland, Lorna O'Sullivan, Sue Boucher, Lauren Kite, Deb Rhodes and Dr Biswadev Mitra) won the 2015 Australasian Society of Emergency Medicine (ASEM) Best Scientific Paper (metropolitan) for the presentation 'Peripheral intravenous catheter insertion in the Emergency Department'.
- Medical Student Alexander Olaussen (BMedSci 2013) won the 2015 Hatem Salem Award for Medical Research Excellence for the research impact of his thesis entitled 'The utility of clinical prediction scores in identifying life-threatening evolving bleeding and the need for a resuscitative blood transfusion following trauma'.
- Three Monash University research students (Kate Charters, Jeremy Abetz and Gabriel Paykin) completed BMedSci(Hons) degrees with first class honours.

Postgraduate Students

7 PhD Students
10 Masters Students
1 MD Student

Publications

55 Journal Articles
1 Book Chapter



Professor Leon Bach, Deputy Director of the Department of Endocrinology and Diabetes, is also a 'Theme Leader' for the Metabolic Medicine stream of the Monash Partners Academic Health Science Centre.

Endocrinology and Diabetes

Head: Professor Duncan Topliss MBBS, MD, FRACP

The Department of Endocrinology and Diabetes performs clinical research in the areas of diabetes and thyroid cancer as well as basic research into the regulation of growth factor activity.

Regulation of Growth Factor Activity

Professor Leon Bach

Insulin-like growth factors (IGFs) are important for normal growth and development, and the IGF system is perturbed in many diseases, including diabetic complications and cancer. A family of six IGF binding proteins (IGFBPs) regulates their actions. For many years, the laboratory has studied the biological role of IGFBP-6, particularly as an IGF-II inhibitor in cancer. These studies may lead to a new class of therapies. In 2015, the group published a paper showing that IGFBP-6 has different effects in two ovarian cancer cell lines, which may lead to novel insights into its actions (Yang Z and Bach LA., *Front Endocrinol (Lausanne)* 2015).

New Technologies for Diabetes Treatment

Professor Leon Bach and Dr Kavita Kumareswaran

The pancreas normally senses glucose levels in the blood and produces insulin to keep levels normal. In type 1 diabetes, the pancreas is damaged and insulin secretion is lost. We continued a collaborative project sponsored by the Juvenile Diabetes Research Foundation with colleagues at St Vincent's, Royal Melbourne and Royal Perth Hospitals to study an artificial pancreas, which utilises glucose sensors and insulin pumps.

Clinical Trials in Diabetes and Thyroid Care

Professors Duncan Topliss and Leon Bach

- **SELECT** was a phase 3, randomised, placebo-controlled trial of lenvatinib in advanced radioiodine-refractory thyroid cancer, which recruited 392 patients worldwide, including 17 in Australia with 7 of those at The Alfred. Patients receiving the therapy had a marked benefit in progression-free survival (Schlumberger M *et al.*, *N Engl J Med* 2015). Lenvatinib has been registered by the FDA and registration is being pursued in Australia.
- **TECOS** was a randomised, placebo-controlled, international clinical trial conducted across 673 sites in 38 countries designed to assess the long-term cardiovascular safety of adding sitagliptin to usual care, as compared with usual

care alone, in patients with type 2 diabetes and established cardiovascular disease. Sitagliptin is an orally administered dipeptidyl peptidase 4 (DPP-4) inhibitor, which improves glycemic control in patients with type 2 diabetes. Previous cardiovascular outcome trials with other drugs in the same class as sitagliptin (i.e. DPP-4 inhibitors) raised concerns about an elevated risk of hospitalisation for heart failure. Outcomes from TECOS showed adding sitagliptin to usual care did not appear to increase the risk of major adverse cardiovascular events, hospitalisation for heart failure, or other adverse events. Trial results demonstrating the safety of this drug were published in *The New England Journal of Medicine* in 2015 (Green JB *et al.*, *N Engl J Med* 2015).

- **CANVAS** is a randomised, placebo-controlled, international study of the effects of canagliflozin, a sodium-glucose co-transporter-2 (SGLT2) inhibitor, on cardiovascular outcomes in type 2 diabetes. Our participation continues.
- **ADJUNCT-ONE** is a 12 month, randomised, placebo-controlled trial of liraglutide, a GLP-1 (glucagon-like peptide-1) analogue, as an adjunct to insulin in type 1 diabetes. Results of the trial will be discussed with investigators in June 2016.
- **DECLARE** is a randomised, placebo-controlled, international study of the effects of dapagliflozin, a SGLT2 inhibitor, on cardiovascular outcomes in type 2 diabetes. We commenced participation in this study in 2014.

Diabetes in Lung Transplant Recipients

Dr Kathryn Hackman and Professor Leon Bach

In collaboration with Professor Greg Snell (Lung Transplant Unit), we have studied the association between blood glucose control and lung transplant (LT) outcomes. Blood glucose control measurements were collected from 210 patients who underwent LT at The Alfred from August 2010 to November 2013 at various time points with an average follow-up of three years. Our analysis showed that poor glycemic control is associated with decreased survival in these patients. The association between worsening glycemic control and increased mortality was observed in 84 patients who did not have diabetes at any stage during their follow up and in 90 patients who had persistent diabetes after LT.

Publications

14 Journal Articles

Gastroenterology

Director: Professor Peter Gibson MBBS(Hons), MD, FRACP



Professor Peter Gibson (back row, 3rd left) with members of the Department of Gastroenterology at the GastroDiet 2015 international meeting in Prato, Italy.

The Gastroenterology department conducts research in the areas of hepatology, endoscopy, Inflammatory Bowel Disease (IBD), functional gastrointestinal disorders; and translational nutritional science.

Hepatology research spans the clinical management of viral hepatitis (particularly type C, HCV), epidemiology, hepatocellular cancer therapeutics, non-invasive staging and prognostic markers of liver disease, and management of portal hypertension.

Endoscopy focuses on improving the safety and quality of colonoscopic practice, including improvement of bowel preparation as well as the safety and quality in polypectomy.

Inflammatory bowel disease (IBD) research includes studies on optimising thiopurine and anti-TNF therapy, on the clinical utility of intestinal ultrasound and on the cognitive effects of intestinal inflammation.

Functional gastrointestinal disorders research includes examination of the value of new neuromodulatory therapies for constipation (such as trans-abdominal electrical stimulation and biofeedback), or the efficacy of gut-directed hypnotherapy.

The Translational Nutritional Science Group studies the utilisation of diet as a therapy, targeting FODMAPs (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols), gluten and food chemicals, in chronic intestinal disorders and for promotion of gut health. In 2015, the group ran Gastrodiet 2015, an international meeting on diet and gastrointestinal disorders, in Prato, Italy, with registrants from across the world. The meeting mainly addressed issues associated with FODMAPs and gluten.

Major Findings

Alfred Hepatology researchers have utilised 'big data' from multiple Australian centres to show that the outcome of patients with cirrhosis who are admitted to an Intensive Care Unit (ICU) is almost as favourable as those without known liver disease, dispelling traditional impressions that such outcomes are generally dismal. The results of this study will widely impact ICU admission policies and clinical practice.

In endoscopy research, a randomised controlled trial has shown that a new, friendlier way of approaching dietary restrictions

during colonoscopy preparation known as the 'White Diet' gives similar results to a standard liquid diet, while being greatly preferred by participants. This study has had wide influence on protocols used across Australia and overseas.

The Alfred IBD Service has provided the first prospective data on efficacy and safety of the combined use of allopurinol and thiopurines to improve the delivery of metabolites that confer efficacy, a combination that was considered dangerous in the past. The study showed that a low dose of 50 or 100 mg per day of allopurinol, added to a reduced dose of thiopurine, was sufficient to achieve efficacy in those failing monotherapy in more than 50% of cases. This study will provide the evidence for widespread change of practice in the management of patients with IBD and other chronic inflammatory disorders.

The Alfred Functional Gastrointestinal Disorders and Translational Nutrition Science groups carried out a randomised clinical trial in patients with irritable bowel syndrome (IBS). They concluded that gut-directed hypnotherapy is as effective in the longer term as a low FODMAP diet, the current best therapy for IBS, but with an additional advantage of alleviating anxiety and depression. This study has considerable impact in widening the choice of therapy for this patient group.

Achievements

- The Monash Translational Nutrition Science group have won the Rome Foundation's Ken Heaton Award for the most cited paper on Functional Gastrointestinal and Motility Disorders three times in the last four years. Dr Jessica Biesiekierski's 2013 and Dr Emma Halmos's 2014 *Gastroenterology* publications on low-FODMAP in patients with IBS won the 2015 and 2016 awards, respectively.
- Caroline Tuck won the Best Poster Prize and the Best Student Presentation at the Nutrition Society of Australia's 2015 Annual Scientific Meeting, held jointly with the Nutrition Society of New Zealand in Wellington, for her work on the interaction of glucose with fructose absorption and its clinical relevance.

Postgraduate Students

14 PhD Students
1 MD Student

Publications

54 Journal Articles

General Surgery

Head: Professor Jonathan Serpell MBBS, MD, MEd, FRACS, FACS



Alfred Hospital Upper Gastrointestinal surgeons undertake major resectional surgery for oesophageal cancer.

The General Surgery Department is committed to clinical and translational research, clinical trials and the development and maintenance of databases and clinical registries, including cancer-related registries.

Endocrine Unit

The Breast and Endocrine Surgery Unit undertakes research in endocrine surgery including thyroid, parathyroid and adrenal surgery as well as maintaining a thyroid cancer registry. A major research focus is the anatomy and pathophysiology of the recurrent laryngeal nerve (RLN). A retrospective and prospective study of intralaryngeal causes of RLN palsy in association with Monash Institute of Medical Engineering and the Anaesthesia department has commenced.

A Monash University wide thyroid cancer registry has been established. The registry is providing data for a study detailing a platform for detecting somatic mutation in epithelial thyroid cancer in association with Monash Comprehensive Cancer Consortium.

Upper Gastrointestinal Surgical Unit

Our clinical workload encompasses oesophageal, gastric, pancreatic and liver surgery, with a particular interest in complex and malignant disease as well as developing new and improved surgical techniques. The unit also serves as the state centre for bariatric (obesity and metabolic) surgery. Research includes surgical quality measures, feasibility and economics of bariatric surgery, the role of inflammation in surgery and metabolic disease and the physiology of upper gastrointestinal surgery.

Oesophageal adenocarcinoma: This type of cancer has increased in incidence by 400% over the past four decades and carries high mortality risk and significant treatment related morbidity. Optimal outcomes require correct use of increasingly complex treatment pathways tailored for individual patients. A detailed comparison was conducted between 314 consecutive patients with oesophago-gastric carcinomas treated at The Alfred hospital and 17,000 patients in the United Kingdom national audit. We demonstrated the effective use of optimal treatment, diagnostic and treatments pathways, as well as excellent long-term survival and quality-of-life in Alfred patients, when compared across a range of quality domains.

Predicting liver fibrosis: Liver fibrosis is increasingly implicated as a major factor in obesity and metabolic disease pathophysiology as well as carrying significant independent morbidity. The diagnosis remains difficult to quantify without surgical liver biopsy. As part of her PhD studies, surgical trainee Dr Geraldine Ooi collaborated with

Alfred hepatologists to conduct an analysis of 180 patients with suspected liver fibrosis. This study was able to establish more accurate predictors of liver fibrosis in the obese than the currently used risk scores, providing a valuable, immediately available clinical tool for surgeons and hepatologists.

Colorectal Surgical Department

Our unit's broad research interests have a focus on cancer. Activities in 2015 included involvement in a completed multicentre study comparing open and laparoscopic surgery for rectal cancer; acting as a primary site for a multicentre study assessing dietary exclusion on obese rectal cancer patient outcomes; and assessing the impact of a diverting ileostomy on colonic transit.

Diverting loop ileostomy: Treatment for rectal cancer may require low or ultralow anterior resection (LAR or ULAR) and diverting loop ileostomy (DLI) is used following resection to reduce anastomotic leak (AL). Preoperative mechanical bowel preparation (MBP) is traditionally used with DLI; however, clearance of the left colon can be achieved with a fleet enema without the physiological compromise of MBP. We performed a prospective observational study in 10 patients undergoing resection to assess colonic transit following DLI using fleet enema rather than MBP. Our results suggested colonic motility is abolished in this setting and that use of a fleet enema without MBP may be sufficient prior to rectal resection surgery when DLI is employed. Larger studies are warranted (Huang S *et al.*, *ANZ J Surg* 2015).

Botulinum toxin therapy for chronic anal fissure: Botulinum toxin (Botox) injection for chronic anal fissure (CAF) is commonly performed, yet there remains no consensus on optimal dosage or frequency of injections required to achieve complete resolution of anal fissure. We performed a retrospective study in patients who underwent Botox injection for CAF between 2010 and 2014 (n = 101) in order to determine the effectiveness and side-effect profile of Botox in the management of CAF. The majority of patients were given a low-dose of Botox (33 IU) and we observed a recurrence rate of 32%. The best predictor of recurrence was the presence of pain at the first post-procedure visit. We concluded that Botox is an effective strategy to treat CAF and that low doses can be given with good efficacy and have potential for great cost saving (Dat A *et al.*, *ANZ J Surg* 2015).

Postgraduate Students

3 PhD Students
2 Masters Students

Publications

16 Journal articles
2 Book Chapters

Intensive Care and Hyperbaric Medicine

Interim Director and Head of Research: Professor D Jamie Cooper BMBS, MD, FRACP, FCICM, FAHMS



Professor Jamie Cooper (L) with Infectious Disease Physician Professor Allen Cheng (R), Head of The Alfred's Infection Prevention and Healthcare Epidemiology Unit.

The Alfred Department of Intensive Care and Hyperbaric Medicine is linked with the Australian and New Zealand Intensive Care Research Centre (ANZIC-RC) within the Monash School of Public Health and Preventive Medicine (SPHPM) and with the Monash Central Clinical School through Monash Partners Academic Health Science Centre. All Alfred Intensive Care Unit (ICU) consultants hold academic appointments with SPHPM. Research areas include traumatic brain injury (TBI), trauma, sepsis, resuscitation, acute lung injury, transfusion, sedation, nutrition, renal failure, extracorporeal membrane oxygenation (ECMO) and ICU outcomes.

Sepsis Criteria Study

A retrospective study on ICU patient admissions (2000-2013) examined the validity of the currently used criteria to define sepsis. The consensus definition of severe sepsis requires suspected or proven infection, organ failure, and signs that meet two or more criteria for the systemic inflammatory response syndrome (SIRS). Using the ANZIC Society (ANZICS) Adult Patient Database, which includes data from more than 90% of ICU admissions in Australia and New Zealand, our study concluded that the SIRS-criteria rule missed one patient in eight with severe sepsis.

Kaukonen KM, Bailey M, Pilcher D, Cooper DJ, Bellomo R. N Engl J Med 2015;372(17):1629-38.

Erythropoietin in Traumatic Brain Injury

The Erythropoietin in Traumatic Brain Injury (EPO-TBI) trial, a collaboration of the ANZICS Clinical Trials Group and the ANZIC-RC was a double-blind, placebo-controlled trial conducted across seven countries, investigating the effect of EPO on neurological recovery, mortality, and venous thrombotic events in patients with TBI. The study provided evidence that after TBI, EPO does not improve functional outcome at 6 months nor increase the incidence of deep venous thrombosis of the lower limbs. There was some suggestion that EPO might reduce mortality, although this requires rigorous future investigation in this patient population.

Nichol A, French C, Little L, Haddad S, Presneill J, Arabi Y, Bailey M, Cooper DJ, Duranteau J, Huet O, Mak A, McArthur C, Pettilä V, Skrifvars M, Vallance S, Varma D, Wills J, Bellomo R; EPO-TBI Investigators; ANZICS Clinical Trials Group. Lancet 2015;386(10012):2499-506.

ICU Discharge Study

A multicentre, binational observational study examined timing of discharge from an ICU and subsequent mortality using data from 40 ICUs across Australia and New Zealand. Results showed that patient status at ICU discharge, particularly the presence of limitations of medical therapy orders, was the chief predictor

of hospital survival. In contrast to previous studies, the timing of discharge did not have an independent association with mortality.

Santamaria JD, Duke GJ, Pilcher DV, Cooper DJ, Moran J, Bellomo R; Discharge and Readmission Evaluation (DARE) Study. Am J Respir Crit Care Med. 2015;191(9):1033-9.

Awards

- Alfred ICU received the Best of the Best Critical Care Nutrition Award and won a 2015 Australian Business Award (ABA100) for Service Excellence.
- An ICU/IT prediction model proposal was a winner in the Alfred Health top 100 leadership innovation competition.
- Associate Professor Stephen Bernard ASM received an Ambulance Service Medal as part of the 2015 Australia Day Honours.
- Professor Jamie Cooper was elected a Foundation Fellow of the Australian Academy of Health and Medical Sciences.
- At Alfred Health Week Associate Professor Andrew Udy received the 2015 Senior Medical Staff Prize for Clinical Research for a poster presentation and Yen Hing Ng received the inaugural Greg Barclay Award for Nursing Research.
- Dr Carol Hodgson received a Monash University 2015 Early Career Researcher Fellows Publication Prize for a paper in the journal *Critical Care*.
- Nat Adams was presented a 2015 Alfred Health Excellence Award for outstanding achievement in Fostering Education.

Selected Grants

- Dr Carol Hodgson received an Intensive Care Foundation inaugural Malcolm Fisher Grant of \$35,000 to study 'Next generation assessments of physical function in ICU survivors (E Skinner, T Iwashyna, A Higgins, C Hodgson).
- Associate Professor Vincent Pellegrino is an Investigator (CIF) on the \$2.5 million NHMRC Centre of Research Excellence (2015-2019) in 'Advanced Cardio-respiratory Therapies Improving Organ Support' awarded to CIA Professor John Fraser (Prince Charles Hospital, Queensland) and Professor David McGiffin (Alfred Cardiothoracic Surgery).
- Professor Jamie Cooper received a grant of \$118,271 from the Institute for Safety Compensation and Recovery Research for the project 'Australian-European NeuroTrauma Effectiveness Research, TBI (OzENTER-TBI) Collaboration: A Prospective Longitudinal Observation Study'.

Postgraduate Students

11 PhD Students

Publications

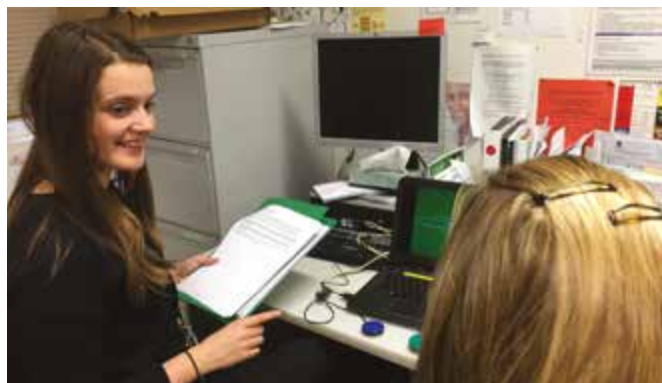
107 Journal Articles
10 Book Chapters



theAlfred

Medical Oncology

Head: Professor Max Schwarz AM MBBS(Hons), FRACP, FACP, FACHPM



Medical Oncology Research Assistant Katie Stanhope (L) administers a neuro-cognitive testing program via a laptop to a brain tumour patient.

The Medical Oncology Unit is a clinical service that provides coordinated multidisciplinary care for adult patients with a wide range of malignancies, as well as incorporating an active clinical research program. The unit works closely with the Palliative Care Unit to ensure optimal supportive care for patients at all stages of their treatment.

The Medical Oncology Unit participates in national and international clinical trials, focusing on malignant melanoma, thereby facilitating patient early access to evolving successful therapies. The unit also participates in national and international phase 1, 2 and 3 trials in other malignancies, including gastrointestinal, head and neck, and the central nervous system. A formal research collaboration was established with Nucleus Network, with joint appointments, to further enhance clinical research endeavours, particularly in phase 1 and 2 clinical trials.

Melanoma Clinical Trials

We have been a major contributor to check point inhibitor trials, which examine therapies that work by targeting molecules that serve as checks and balances on immune responses. Specifically, we investigated anti CTLA 4 (cytotoxic T-lymphocyte-associated antigen-4) and anti PD-L1 (programmed cell death protein-1 ligand) monoclonal antibody therapies. The successful development of these therapies has resulted in a very significant paradigm shift in the management of metastatic malignant melanoma, with

previously unparalleled clinical benefit, including significant survival improvement in a number of patients.

Having established a clear benefit in advanced melanoma, immunotherapies are now being tested in earlier stage disease. The Alfred has been involved in two large international adjuvant immunotherapy studies designed to address the role of PD-1 (programmed cell death protein-1) antibodies in resected stage III melanoma. In these studies, patients are treated for 12 months with a PD-1 antibody or standard care following complete nodal clearance. If these studies are positive they will significantly change the management for many Australians.

In advanced melanoma, we are collaborating with the Radiotherapy Department to investigate combining immunotherapies with radiotherapy. We have opened a phase 1 study to explore this concept further. It is thought that radiotherapy may enhance the response to immunotherapy by causing local cell death and release of antigens into the circulation. These antigens can then be presented to T-cells that are primed by the immunotherapy and cause responses outside of the radiotherapy field.

Publications

5 Journal Articles

1 Book Chapter

Alfred Intensive Care Unit (ICU) Deputy Director and Head of Research, Professor Jamie Cooper (1st left) and Director of Alfred Nutrition, Associate Professor Ibolya Nyulasi (4th right) with the ICU team.



Dr Daren Heyland, Director (centre, holding plaque), Clinical Evaluation Research Unit, Kingston General Hospital and Director, Critical Care Nutrition presents the Critical Care Nutrition Best of the Best Award to The Alfred ICU team for first place in the International Nutrition Survey. The survey results demonstrate achievement of gold standard practices in nutrition delivery to critically ill patients. For the ICU report, see page 55.

Melanoma

Head: Associate Professor John Kelly MBBS, MD, FACD



Dermatologist, Dr Yan Pan plays a key role in mentoring young researchers within the Victorian Melanoma Service.

The Victorian Melanoma Service (VMS) is a multidisciplinary consultative clinic for the management of melanoma and is one of the largest such clinics in Australia. Our research focuses on understanding primary melanoma, particularly to enhance detection and prevent deaths.

Melanoma Diagnosis

In 2015 we explored the key reasons why certain aggressive melanoma subtypes elude diagnosis compared with more recognised subtypes. We also published a study on population based trends of tumour thickness at diagnosis for nodular versus non-nodular primary cutaneous melanoma (Smithson S *et al.*, *MJA* 2015). Earlier diagnosis when lesions are thinner gives a better chance of survival. Our retrospective review of cases reported to the Victorian Cancer Registry during 1989, 1994, 1999 and 2004 indicated that the thickness at diagnosis for non-nodular melanoma has decreased over time, whereas thickness at diagnosis for nodular melanoma has not changed over the years. While patients with non-nodular melanoma are being diagnosed when lesions are thinner and survival outcomes are better, this is not the case for patients with nodular melanoma. Therefore, greater awareness of the clinical features of non-nodular melanoma, which often differs from the 'asymmetry', 'border', 'colour', 'diameter' visual diagnostic criteria is needed to reduce overall melanoma mortality.

Predictors of Prognosis

A series of three publications reported studies investigating the prognosis associated with melanomas. A retrospective study using the VMS database examined the influence of various primary tumour characteristics in advanced metastatic melanoma (Luen S *et al.*, *Am J Clin Oncol*). A second prospective cohort study looked at the role of BRAF mutations (Mar V *et al.*, *Br J Dermatol* 2015) and a third prospective study using the VMS database examined prognosis for patients with cutaneous (skin) metastases (Pan Y *et al.*, *Australas J Dermatol* 2015).

The retrospective study looking at the influence of various primary tumour characteristics in patients diagnosed with stage IV melanoma between 2003 and 2012, who had a

median follow-up of five years, found that primary tumour thickness was the most significant prognostic factor in stage IV melanoma. In the second study, the presence of a BRAF mutation in patients with primary stage I-III cutaneous melanomas did not necessarily drive more rapid tumour growth but was associated with poorer melanoma-specific survival in patients with early-stage disease. In the third study, it was found that patients presenting with regional cutaneous metastases have a much better prognosis than those with distant cutaneous metastases.

Melbourne Melanoma Project

Our collaborative effort as part of the Peter MacCallum Cancer Centre-led Melbourne Melanoma Project, funded by the Victorian Cancer Agency, has resulted in the identification of a new melanoma mutation (Wong SQ *et al.*, *Oncotarget* 2015). Identified using whole exome sequencing, the mutation is consistent with the molecular profile of a UV-induced alteration. The functional significance that the mutation plays in tumour biology is worthy of further exploration, as is its potential as a target for immunotherapy.

Achievements

- Dr Victoria Mar received an Award for Thesis Excellence from the Monash School of Public Health and Preventive Medicine for her doctoral thesis 'Clinical and molecular analyses of aggressive melanoma.'
- Dr Charles Xie was awarded the 2015 Monash Comprehensive Cancer Consortium Prize for Best Poster in Cancer Research at Alfred Health Week for his poster entitled 'Scalp melanoma - distinctive high risk clinical and histological features'. Dr Xie also won Best Poster prize at the 2015 Australasian College of Dermatologists Annual Scientific Meeting.
- Dr Diana Norris and Dr Charles Xie received World Congress of Dermatology Trainee Scholarships to attend the 23rd World Congress of Dermatology in Vancouver, Canada in 2015.

Publications

7 Journal Articles



Neurosurgery

Head: Mr Martin Hunn MBChB, PhD, FRACS



Our orthotist applies and adjusts the halo-thoracic vest for a patient with cervical spine trauma.

The Neurosurgery Department provides a comprehensive in-patient and out-patient neurosurgical service, treating the full range of intracranial, spinal and peripheral nerve disorders. Sub-specialty interests are in cerebrovascular surgery, spinal surgery, skull base surgery, pituitary surgery and neurotrauma.

Ongoing research collaborations with internal and external researchers across surgical, preclinical and multidisciplinary / medical device projects include:

- The Monash Bionic Vision Project;
- Early interventions to improve outcomes after traumatic brain injury (TBI) in conjunction with the Intensive Care Unit (EPO-TBI and POLAR);
- Randomised controlled trial (RCT) of antibiotic impregnated external ventricular drains;
- Monitoring of cerebral pressure reactivity in paediatric TBI;
- Immediate cooling and emergency decompression for the treatment of spinal cord injury: pilot, safety and feasibility studies;
- Incidence and treatment of clinically significant dysphagia amongst patients treated in halo-thoracic orthoses for traumatic cervical spine injury;
- A mechanistic approach to therapy development for chronic traumatic encephalopathy using small and large animal models of concussion.

Bionic Vision Project

The Monash Bionic Vision Project continues into the preclinical trial phase and first-in-human implantation is planned for 2016. The multi-electrode prosthesis device has now been manufactured into a prototype and all aspects of its functionality and bio-compatibility are being investigated prior to the human trial.

Paediatric Traumatic Brain Injury

A study conducted in collaboration with The Royal Children's Hospital Melbourne, examining the relationship between disturbed cerebrovascular pressure reactivity and outcome after TBI, was published (Lewis PM *et al*, *Pediatr Crit Care Med* 2015). This study was the first to demonstrate an association between 'optimal cerebral perfusion pressure' and age in paediatric patients, suggesting that individualised blood pressure and intracranial pressure management targets may improve outcomes.

Achievements

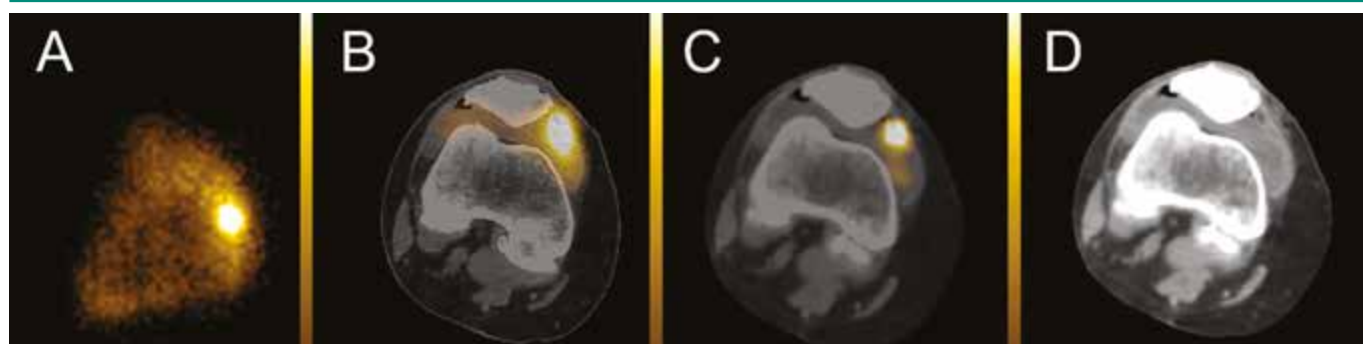
Professor Jeffrey Rosenfeld AM OBE was elected an inaugural Fellow of the Australian Academy of Health and Medical Sciences (FAHMS) in March 2015. In May 2015, Professor Rosenfeld won the International Abstract Award at the 2015 American Association of Neurological Surgeons (AANS) Annual Scientific Meeting for his Bionic Vision, Plenary platform presentation. In July 2015, Professor Rosenfeld was presented the 2015 ANZAC of the Year Award of the Returned & Services League (RSL) for exceptional service to the Australian community demonstrating compassion, endurance and dedication.

Grants

Dr Philip Lewis was part of a team awarded a 2015 Monash University Major Interdisciplinary Research Grant of \$125,000 for the project 'Design and testing of a highly novel implantable magnetic nerve and brain stimulation device'. The team consisted of researchers from the Monash Faculties of Medicine, Nursing and Health Sciences; Engineering; Science; and Art, Design and Architecture (Fitzgerald P, Premaratne M, Harrison M, Benci A, Armstrong M, Rajan R, Lewis P).

Publications

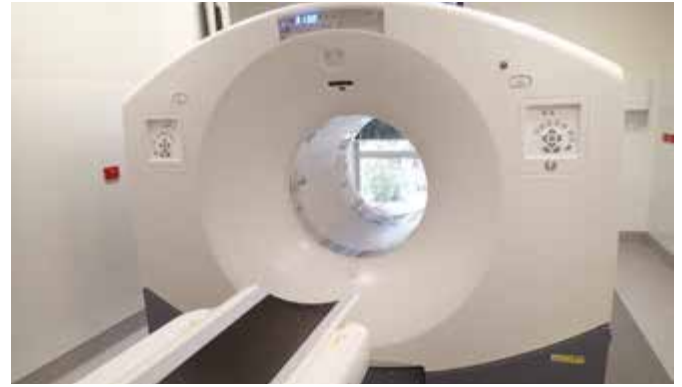
22 Journal Articles



Dr Thomas Barber, Department of Nuclear Medicine, led a study that showed Y-90 PET/CT imaging may be a means to identify patients who are unlikely to respond to Y-90 radiosynovectomy treatment (a specialised type of radiation that targets unhealthy tissue and destroys it) for inflammation of the joint lining of the knee. Planar (A), SPECT/CT (B), PET/CT (C) and CT (D) images of the knee following Y-90 radiation synovectomy. Extra-articular activity was only able to be localised on Y-90 PET/CT.

Nuclear Medicine

Head: Dr Kenneth Yap MBBS, FRACP, FAANMS



Nuclear Medicine's state-of-art PET/CT system (GEHC Discovery 710) minimises radiation doses that patients receive.

The Department of Nuclear Medicine and PET (Positron Emission Tomography) Centre at The Alfred hospital is a leading centre for the provision of state-of-the-art molecular imaging in Australia. Provision of a high quality and timely service are at the forefront of our goals to deliver the best possible patient care. In 2015 we implemented several novel PET radiotracers including ⁶⁸Gallium-labelled DOTA-octreotate (Ga-68 DOTA-TATE), Ga-68-labelled prostate-specific membrane antigen (PSMA) and ¹⁸F-fluoro-ethyl-tyrosine (18F-FET) imaging. These exciting new tracers represent a major advance in cancer imaging and have the potential to significantly improve patient outcomes.

A focus on clinical research remains an important part of our practice with recent major areas including investigation of ⁹⁰yttrium (Y-90) PET/CT (computed tomography) imaging in patients treated with Y-90 synovectomy and characterisation of pancreatic lesions with novel PET and SPECT (single-photon emission CT) techniques. In addition, we continue to be involved in a number of collaborative research projects with other clinical units.

Imaging Techniques for Synovitis

Dr Thomas Barber led the first prospective study evaluating the role of Y-90 PET/CT and bremsstrahlung imaging in patients with refractory synovitis treated with Y-90 radiosynovectomy (Barber T *et al.*, *EJNMMI Res* 2016). The study demonstrated that Y-90 PET/CT plays an important role in detecting extra-articular activity and therefore may possibly identify patients who are unlikely to respond to treatment. This is in contrast to traditional planar imaging, which is unable to predict treatment response. The research has translated into a change in patient imaging with Y-90 PET/CT being the preferred technique to investigate equivocal findings on traditional planar imaging. The study was selected as part of the poster walk session at the 2015 European Association of Nuclear Medicine and Molecular Imaging Conference.

Intra-pancreatic Accessory Spleen Imaging

The introduction of Ga-68 DOTA-TATE PET/CT has resulted in our centre seeing an increasing number of patients referred for characterisation of pancreatic lesions with suspected neuroendocrine tumours. By adding state-of-the-art SPECT/CT heat-denatured red blood cell imaging to the assessment of these lesions, our centre has been able to fully characterise

several intra-pancreatic lesions as benign accessory spleens. This combination of imaging techniques has led to an important change in management by avoiding unnecessary invasive biopsies and surgery. Our investigations have led to the first case report of an intra-pancreatic accessory spleen imaged with both of these PET/CT and SPECT/CT techniques (Barber T *et al.*, *J Med Imaging Radiat Oncol* 2016).

Collaborative Projects

Our department continues to be involved in multiple collaborative research projects with other specialty units. Current collaborations include:

- Chronic ephedrine administration decreases brown adipose tissue activity in a randomised controlled human trial: implications for obesity (Dr Martin Cherk).
- A comparison of the predictive performance of different methods of kidney function estimation in a lung transplant population compared to Tc-99m DTPA (^{99m}Technetium-labelled diethylenetriamine-pentaacetic acid) glomerular filtration rate assessment (Dr Thomas Barber).
- Investigation of plasma macrophage migration inhibitor factor elevation in response to myocardial ischemia as detected on myocardial perfusion imaging (Dr Thomas Barber).
- Assessing the prevalence of symptomatic significant gastroparesis on nuclear gastric emptying study in the post-lung transplantation population (Dr Kenneth Yap).
- Early assessment of response to chemotherapy / tumour targeted therapy in metastatic breast cancer using sequential ¹⁸F-fluorodeoxyglucose (FDG) PET (Dr Martin Cherk).
- Pilot study of non-invasive assessment of acute graft-versus-host disease of the gastrointestinal tract following allogeneic hematopoietic stem cell transplantation using ¹⁸F-FDG PET (Dr Martin Cherk).
- An open label pilot trial of multi-coil repetitive transcranial magnetic stimulation (rTMS) for autism with ¹⁸F-FDG PET brain assessment (Dr Martin Cherk, Dr Kenneth Yap).

Publications

1 Journal Article



Project facilitators for the PRONTO (Prioritising Responses Of Nurses To deteriorating patient Observations) trial: Clinical Nurse Specialist Jemima Dixon (L) and Clinical Support and Development Nurse Antoinette David (R).

Nursing Services

Executive Director: Adjunct Professor Janet Weir-Phyland RN, BScN, MBA

Director of Nursing Research: Professor Tracey Bucknall BN, GradDipAdvN, PhD

In 2015, Nursing Services continued with the four objectives of their strategic plan for research: to conduct high quality research that improves patient and organisational outcomes; to strengthen research training and support for nursing staff within Alfred Health; to integrate research evidence into clinical practice; and to develop partnerships between consumers, staff and researchers to strengthen research, education and health service delivery.

Research programs are focused on improving clinical decision-making and patient care in the areas of health service evaluation; symptom management, and knowledge translation. Research programs are aligned with the National Safety and Quality Health Service (NSQHS) Standards, either establishing research evidence or assisting clinicians in using evidence in clinical practice to improve patient outcomes.

Patient Participation in Patient Safety

A collaborative ARC supported study (\$278,000; 2013-2015) led by Professor Wendy Chaboyer (CIA: Griffith University) with Associate Professor Jennifer Whitty (CIB: The University of Queensland) and Professor Tracey Bucknall (CIC) described and compared the preferences of patients and nurses for the implementation of bedside handover in hospitals. The study, which involved a discrete choice experiment of patients' and nurses' preferences in two Australian hospitals, demonstrated that patients strongly supported being involved in bedside handover with family members being present. Differences were found between nurses' and patients' preferences that would impact on the patient experience while in hospital. By understanding these preferences, the group developed recommendations for improving patients' hospital experience and the consistent implementation of bedside handover as a safety initiative. These results and recommendations will provide the foundations for health policy, education and practice to promote patient participation.

Reporting Patient Vital Signs

Early detection of vital signs and escalation to appropriate clinicians is crucial to prevent adverse events in patients; however, this does not always occur. Activation responses range from 3 to 53% despite the release of national guidelines and the prioritisation of Standard 9 (recognition and response to clinical deterioration in acute health care) as one of ten NSQHS Standards required for hospital accreditation from 2011. Professor Tracey Bucknall was awarded an NHMRC

Partnership Project Grant (2016–2018: \$459,688) to conduct a study termed 'PRONTO – Prioritising Responses of Nurses To deteriorating Patient Observations'. This randomised controlled trial (RCT), which builds on pilot work conducted at Alfred Health, will measure the effectiveness of an intervention to improve nurses' vital signs measurement, treatment and escalation of patients with abnormal vital signs.

Care Bundle to Prevent Pressure Injury

In Australia, hospital acquired pressure injuries range from 7.4 to 17.4% and prevention is listed as an NSQHS Standard and reviewed for hospital accreditation. Professors Tracey Bucknall (CIB) and Wendy Chaboyer (CIA), together with other researchers from Griffith University, Australian Catholic University and University of the Sunshine Coast, were awarded a \$1.09 million NHMRC Project Grant (2014-2016) to carry out a cluster RCT to evaluate the effectiveness of a patient-centred care bundle to prevent pressure injuries in 'at-risk' patients (INTACT trial). Professor Bucknall leads the study at three Victorian sites including Alfred Health. The care bundle consists of a patient video, a brochure and a bedside poster reminding patients of what they need to do to prevent pressure injuries while in hospital. The incidence of pressure injuries has been found to be lower in hospitals where the care bundle has been implemented; however, closer nurse-patient interaction is needed to remind patients to keep moving, look after their skin and to eat and drink well.

Achievements

Yen Ng, an Alfred hospital peritoneal dialysis nurse, was awarded the Best Bachelor of Nursing (Honours) Thesis 2015 at Deakin University's School of Nursing and Midwifery. Yen Ng's project developed a predictive model that identified patients at risk of deterioration after discharge from the intensive care unit (ICU). The project underpinned an ICU team project 'Creation of automatic alerts to identify patients at risk of deterioration after discharge from the ICU', which won an Alfred Health top 100 leadership innovation competition and received \$100,000 to implement the plan.

Postgraduate Students

7 PhD Students
20 Masters Students

Publications

26 Journal Articles
3 Book Chapters
1 Commissioned Report

Orthopaedic Surgery

Head: Clinical Associate Professor Susan Liew
MBBS(Hons), FRACS (Orth)



Research Assistant Zoe Murdoch, who was involved in data management for the FLOW trial, attended the 2015 Orthopaedic Trauma Association Meeting in San Diego, where the results of the trial were presented.

The Department of Orthopaedic Surgery provides the full range of general and sub-specialised orthopaedic clinical services across the breadth of the specialty. The Alfred is a level 1 Trauma Centre and, as such, the department has a strong research interest in orthopaedic trauma. We contribute to the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) overseen by Monash University. Collaborations across the participating centres have led to several clinical projects. The department also participates in a number of international, multicentre, randomised, controlled trials (RCTs) focused on neck of femur fractures.

In 2015 we published results of the FLOW (Fluid Lavage of Open Wounds) trial. The results of this McMaster University-led study were unveiled at the 2015 Orthopaedic Trauma Association meeting in San Diego in October, simultaneously with the 2015 publication of the paper in *The New England Journal of Medicine*. Zoe Murdoch and Claire Sage, who did the bulk of the data management, and Associate Professor Susan Liew were fortunate to attend this important occasion. The Alfred was the lead recruiting hospital for the study.

The outcome of the FLOW trial showed that gravity-feed delivery is just as effective as low pressure or high pressure lavage and that saline alone is all that is needed (no soap). This evidence-based answer has significant implications for clinical practice around the world in all situations.

The next outcome awaited by our group is that of the FAITH (Fixation using Alternative Implants for the Treatment of Hip fractures) trial. The trial involves treatment of undisplaced femoral neck fractures by a sliding hip screw versus three cancellous screws. Recruitment is complete and there are only about 30 fractures left to adjudicate before analysis can commence.

Final ethics approvals for the FAITH2 trial (adding vitamin D or placebo) and HipATTACK (randomising hip fracture patients to a rapid care within 6 hours or a standard care pathway) are in progress.

The Victorian Orthopaedic Trauma Outcomes Registry (VOTOR) continues to accrue data and a number of projects across four different research streams (upper limb, lower limb, spine, outcomes) are under way. There has been one spine BMedSci project (culminating in a podium presentation accepted for the Spine Society Association Annual Scientific Meeting, April 2016) and two registrar publications completed via a VOTOR project.

Publications

13 Journal Articles



Yen Ng, peritoneal dialysis nurse, won the Greg Barclay Award for Nursing Research, which recognises a registered nurse at Alfred Health who exemplifies outstanding leadership in patient care and has contributed to nursing research that aims to improve access, equity, quality and outcomes in healthcare. Yen Ng (R) and the award donor Greg Barclay (L) stand next to Yen Ng's poster presentation on the award winning research.



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Pathology Services

Director: Professor Hans Schneider MD, FRACP, FRCPA, FFSC, FACB



Dr Mandy Davis (L) (Transfusion Medicine Specialist) and Christine Akers (Transfusion Nurse Specialist) (middle) meet with a colleague as part of the National Patient Blood Management Collaborative.

Alfred Health Pathology Services incorporates Laboratory Haematology, Microbiology and Clinical Biochemistry and Anatomical Pathology. This year's report focuses on Haematology. Anatomical Pathology, headed by Professor Catriona McLean, is reported on page 45.

Laboratory Haematology

Head: Dr Sue Morgan MBBS, FRACP, FRCPA

Laboratory Haematology is primarily a diagnostic and consultative service providing expertise in blood banking, laboratory-based general haematology, including morphology, coagulation and flow cytometry, immunology tests and diagnostic bone marrow biopsies. The unit incorporates a specialist multidisciplinary transfusion medicine team, which audits transfusion safety and practice.

Research collaborations involve identifying and supplying material for various registries of the Transfusion Outcomes Research Collaborative, such as the Massive Transfusion Registry, the Myeloma Registry, the TTP (Thrombotic Thrombocytopenic Purpura) Registry and the Aplastic Anaemia Registry; Australia and New Zealand Intensive Care Society's TRANSFUSE trial; Clinical Haematology and Trauma Unit clinical trials; Australian Centre for Blood Diseases (ACBD), Australasian Leukaemia and Lymphoma Group; and Nucleus Network.

Current research includes:

- Laboratory monitoring of apixaban: a multicentre study;
- Inter-laboratory correlation of von Willebrand disease testing;
- Utility of factor inhibitor assays in inherited and acquired haemophilia;
- Post-transplant lymphoproliferative disorder: Alfred Health case review;
- Tranexamic acid as surgical prophylaxis in haemophilia;
- Dapsone-related methaemoglobinaemia and oxidative haemolysis;
- Role of morphology in prognostication in acute myeloid leukaemia (AML) with multi-lineage dysplasia;
- Minimal residual disease monitoring by flow cytometry in AML.

Patient Blood Management Collaborative

The Alfred was one of twelve hospitals selected in 2015 to participate in the Australia-wide National Patient Blood Management Collaborative established by the Australian Commission on Safety and Quality in Health Care. The Collaborative focuses on reducing the incidence of pre-

operative anaemia in elective surgery patients. Its aims are to reduce exposure of patients to unnecessary blood transfusions, and to improve morbidity, mortality and length of stay by correcting pre-operative anaemia. The focus is on meeting in teams to develop individual hospital quality improvement strategies. Our team has included membership from Transfusion Medicine, Anaesthetics and Surgery. Data contributed so far to the Collaborative includes audits of transfusion in General Surgery and Orthopaedics. Ultimately any practice changes identified at improving surgical outcomes and reducing unnecessary transfusion will be shared with health services nationally and implemented at Alfred Health.

Blood Ordering Technology

The institution of a new laboratory information technology system in 2014 enabled a number of changes to be made to the system of ordering blood products at The Alfred, previously relying entirely on time-consuming and disruptive phone calls. Two interventions have rendered this system entirely electronic: electronic orders for all transfusions and a new 'Transfusion Summary' page on the intranet allowing clinical staff to determine when products are available. Audits have demonstrated widespread take-up and acceptance of the new system, and a marked reduction in unnecessary calls improving workplace productivity both in the Blood Bank and the wards.

Achievements

- Dr Shaun Fleming was awarded an Haematology Society of Australia and New Zealand New Investigator Scholarship for 2015.
- Christine Akers won the Australia and New Zealand Society of Blood Transfusion Poster Prize for best transfusion poster at the 2015 HAA Annual Scientific Meeting.
- Dr Anna Kalff won the 2015 Myeloma Foundation of Australia Prize for Clinical Research.
- The Victorian branch of the Australian Institute of Medical Scientists presented April Haberfield with the Cliff Francis Memorial Award for her poster presentation at the 2015 International Society of Blood Transfusion Regional Congress in London.

Publications

25 Journal Articles
1 Book Chapter

Pharmacy

Director: Professor Michael Dooley BPharm, PhD,
GradDipHospPharm, FSHPA, FISOPP, FAAQHC



Clinical Pharmacist Alex Madden discusses medication adherence with a patient in the lung transplant outpatient clinic.

The Alfred Health Pharmacy Department is involved in a range of medication and practice-related research activities. The department provides a research focus on acute health and medication use that contributes to the research activities of the Centre for Medication Use and Safety (CMUS), one of the key research units within the Faculty of Pharmacy and Pharmaceutical Sciences of Monash University.

Research activities come under the broad banner of evaluating the Quality Use of Medicines with the following themes: medication safety; therapeutics; pharmacy practice research; and health-outcomes research. The department is involved in a wide range of studies, from NHMRC and ARC funded multicentre collaborations through to industry partnerships and investigator-initiated practice evaluation programs. Here we report on two key projects completed in 2015.

Medication Adherence for Lung Transplant Patients

Solid organ transplantation is a complex medical intervention that requires strict adherence to medication regimens post-transplant. Non-adherence to immunosuppressant medicines is associated with graft rejection, post-transplant mortality, poorer health-related quality of life and increased healthcare costs. We conducted a study in 51 patients over six months to assess non-adherence rates and medication knowledge, and to inform the development of targeted pharmacist interventions in ambulatory patients.

Our findings revealed immunosuppression non-adherence in a significant number (61%) of patients. Of concern, 45% of patients could not identify their immunosuppressant medication, despite the importance of a requirement for lifelong immunosuppression post-solid organ transplant. The study identified numerous barriers to optimal medication adherence, such as forgetfulness, disorganisation and schedule interruptions, with 71% of patients identifying at least one barrier to medication adherence. A range of interventions were implemented, with the intervention selection based on patient knowledge and adherence. The most common were medication education and instructions (98%), medication reminders (53%) and calendars (51%).

It is anticipated that the implementation of interventions directly targeting an individual's barriers to medication adherence using a multi-modal approach may significantly improve self-reported medication adherence. A post-intervention study to assess the effects of these targeted interventions is under way.

Study authors: Madden A, Ivulich S, Paraskeva M, Snell G, Poole S, Dooley MJ.

Nicotine Replacement Therapy

Active smokers are prevalent within the intensive care setting, and nicotine withdrawal due to forced abstinence on Intensive Care Unit (ICU) admission may contribute to the development of delirium or agitation. In 2012, a nicotine replacement therapy (NRT) prescribing protocol was introduced at Alfred Health to allow provision of NRT products to inpatient smokers. However, NRT use in ICU remained at the clinician's discretion, until the introduction of protocol-directed NRT prescribing by ICU pharmacists in May 2014.

Our single-centre retrospective cohort study assessed delirium and agitation in smokers admitted to ICU before and after the implementation of a pharmacist-led prescribing intervention. We found significantly greater adherence to the NRT protocol in the intervention group than the control group (68.4% versus 54.4%, $P = 0.02$) and fewer days were spent with agitation ($P = 0.01$) and delirium ($P = 0.02$) in the intervention group. Fewer patients had episodes of severe agitation in the intervention group (7.9% versus 16.9%, $P = 0.03$); however, there was no statistical difference in the number of patients with an episode of delirium.

Improved adherence to an NRT prescribing protocol was associated with a reduction in ICU days spent with agitation or delirium and episodes of severe agitation. These results support the continuation of protocol-directed assessment and pharmacist prescribing of NRT within the ICU.

Study authors: Kowalski M, Bui T, Udy A, Poole S, Dean E, Housianx D, Corben K, McRobbie H, Levkovich B, Dooley MJ.

Awards

- Suzie Olding (Clinical Pharmacist) won 'Chairwoman of the Board Award' at Alfred Health Week 2015 for the poster entitled 'Use of a Pharmacist Deprescribing Tool in a Chronic Disease Ambulatory Service for Elderly Patients' (Olding S, Dooley MJ, Roman C, Tong E, Yip G, Newnham H.)
- Erica Tong (Senior Clinical Pharmacist - General Medicine) was awarded the William Mercer Young Achiever Award by the Victorian Branch of The Society of Hospital Pharmacists of Australia.
- The title of Advanced Practice Pharmacist was conferred by the Australian Pharmacy Council to Professor Michael Dooley, Linda Graudins (Senior Clinical Pharmacist, Medication Safety) and Rochelle Gellatly (Senior Clinical Pharmacist, Cardiology).

Postgraduate Students

10 PhD Students
7 Masters Students

Publications

40 Journal Articles
1 Book Chapter
1 Commissioned Report

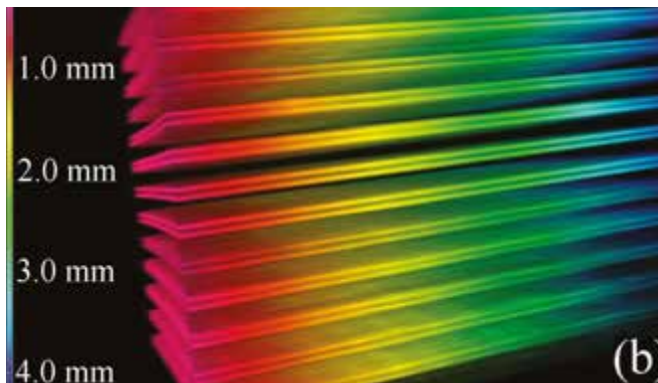


theAlfred

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Radiation Oncology

Head: Associate Professor Jeremy Millar BMedSc, MBChB, FRANZCR, FACHPM, CertHlthEc, CertBio-stat



High resolution 3D images of synchrotron x-ray beams (0.025 mm wide) imaged using laser fluorescence confocal microscopy to assist research of experimental radiotherapy techniques.

Alfred Health Radiation Oncology (AHRO) comprises radiation treatment facilities at The Alfred and the Gippsland regional centre in Traralgon. AHRO is the busiest cancer unit in Alfred Health, seeing almost 2000 new cases each year, with ten specialist radiation oncologists, a research fellow, and a total staff of almost 150 across two campuses. The Unit engages in undergraduate and postgraduate teaching in a number of cancer-related disciplines with a research program across the spectrum of radiation oncology related areas. External competitive grant funding sources include Cancer Australia, NHMRC, RANZCR (The Royal Australian and New Zealand College of Radiologists), Cancer Council Victoria and the Victorian Cancer Agency.

In 2015 the prostate cancer registry effort expanded nationally and internationally with AHRO contributing to the leadership at Monash. The stereotactic (ST) radiotherapy projects grew with new competitive grant funding, a PhD project, and new clinical trials. Dr Sasha Senthil was awarded a Victorian Cancer Agency Clinical Research Fellowship. In brachytherapy (BT), world-leading physics quality assurance continues to be translated into routine clinical care. In treatment advances, volumetric modulated arc therapy was introduced at the Traralgon site.

Radiation Therapy Trials

During 2015 we participated in 12 co-operative group clinical trials.

Our research program included:

- A phase 1b/2 dose-finding, pharmacokinetic and pharmacodynamics study of NVX-108 combined with radiation and temozolomide in patients with newly-diagnosed glioblastoma multiforme. We treated the first patient in the world in collaboration with the Nucleus Network clinical trials unit.
- Evaluation of neurocognition and quality-of-life (QoL) in patients receiving ST radiotherapy for brain metastases (StereoQ).
- Double-blinded randomised trial of prophylactic dexamethasone versus placebo in ST radiotherapy to 1-3 brain metastases (StereoDex).
- Randomised trial of adjuvant versus delayed ST radiotherapy to resection cavity of brain metastases and QoL outcomes (StereoCav).
- Determining the feasibility of oesophageal-sparing radiotherapy for locally advanced lung cancer: a radiotherapy planning study.
- Patterns of recurrence for receptor positive breast cancer and implications for ST radiotherapy.
- Validation of a predictive algorithm for detection of malignant pulmonary nodules.
- Feasibility study using deformable image registration to quantify changes in treatment targets during radiotherapy for lung cancer.

- A comparison of initial treatment setup accuracy in external beam radiation therapy (EBRT) using temporary ink skin marks with and without tattoos.
- EBRT in the management of thyroid carcinoma.
- Integration of Cancer Council Support Services into usual care: a pilot study.
- Cancers in HIV-positive population: presentation, pattern of care and outcomes.
- A pilot study of the mindful self-compassion program for people who have been diagnosed with cancer or a haematological malignancy.
- Outcomes of patients with nodal squamous cell carcinoma of unknown mucosal primary site within the head and neck.
- Impact of opioids on cancer outcome.
- Treatment information needs of individuals diagnosed with early-stage non-small cell lung cancer.
- The safety and efficacy of irreversible electroporation (IRE) for the ablation of prostate cancer assessed by procedural related side effects and post prostatectomy histology: a pilot study.
- IRE study employing transrectal ultrasonography (TRUS)-guided electrode placement. (in collaboration with Alfred Health Radiology).
- Patterns of practice of lung cancer treatment in Australia and New Zealand.
- Effect of delay from diagnosis to treatment on prognosis of non-small cell lung cancer.

Achievements

- Ryan Smith won the Elekta Brachytherapy Award for the most innovative abstract at the 2015 European Society of Radiation Oncology (ESTRO) Annual Meeting for his research 'Clinical implementation of *in vivo* source position verification in high dose rate prostate BT.'
- Frank Gagliardi received two equal third place awards at the Photography in Medical Physics awards in the category of 'Other Exciting Aspects of Medical Physics' and had one of his images chosen for the front cover of *Medical Physics* for his PhD work on ways of treating cancer using synchrotron radiation.
- Associate Professor Jeremy Millar was awarded a Movember and Monash Research Grant to enable a part-time secondment to the Centre of Research Excellence in Patient Safety at the Monash University School of Public Health and Preventive Medicine.

Postgraduate Students

3 PhD Students
2 Masters Students
1 MD Student

Publications

19 Journal Articles

Rehabilitation, Aged and Community Care

Head: Associate Professor Peter Hunter MBBS, FRACP, MBL, FANZSGM



Alfred Health Podiatrists' Nalini Natesan (left) and Naomi Rowlings (right) discuss the role of end stage kidney disease as an independent risk factor for foot ulceration.

Research activity across Rehabilitation, Aged and Community Care (RACC) remained strong throughout 2015, building on the 2014-2016 research strategy to focus on program areas that best represent the local clinical environment. The clinical and research environment within RACC addresses a complex patient population and, as such, interdisciplinary collaboration is essential. In support of research across the hospital, RACC awarded \$45,000 during 2015 through the internal Research Grants Program. In addition, Caulfield Hospital hosted a mini oral poster presentation session as part of Alfred Health Week. The session delivered 17 rapid fire presentations to an audience of over 100 staff and provided an excellent example of the collaborative and diverse research environment that exists on site.

External Collaboration

In 2015, RACC clinicians collaborated with the Department of Audiology and Speech Pathology at The University of Melbourne to investigate the prevalence of hearing impairment in rehabilitation and aged care in-patients. Findings showed that the majority of in-patients demonstrated a degree of hearing loss, as assessed by audiological assessment; however, a sizeable proportion failed to recognise this subjectively when a self-reporting questionnaire was administered. The study highlighted the importance of clinician awareness that patients do not always recognise their hearing impairments and that those with hearing loss may remain undiagnosed.

Allied Health

In other areas, the Occupational Therapy Department at Caulfield Hospital maintained a research focus in the areas of patient-directed rehabilitation, acquired brain injury (ABI) rehabilitation and aged care assessment and management. The Physiotherapy Department continued a number of research studies aimed at improving physical and functional outcomes across a broad range of patient groups in sub-acute care and neuro-rehabilitation. Physiotherapy projects also covered research investigating spasticity, dystonia, physical activity and strength training in a variety of populations, including stroke and hospitalised elderly populations.

Aged Care Services

Aged Care Services has an active role in clinical research in the older population. A focus within the service is the Advanced Trainee Program, which involves trainees working closely with consultant geriatricians in developing and implementing a research project with support from RACC's Research Support Coordinator, Dr Nicole Austin.

The following projects were completed and presented at the 2015 Annual Scientific Meeting of the Australian and New Zealand Society for Geriatric Medicine:

- Weight bearing status and clinical outcomes in a sub-acute population (Dr Gillian Mason);
- Quality-of-life and functional state in older patients receiving haemodialysis and association with treatment duration (Dr Rachel Aitken);
- Management of lower respiratory tract infections at residential care facilities by a mobile assessment and treatment service (Dr Sumitha Bhaskaran).

Advanced Trainees also continued their projects in other areas such as frailty in the geriatric sub-acute and intensive care unit (ICU) populations, insomnia and rehabilitation participation, and discharge outcomes of patients admitted to the Alfred Emergency and Trauma Centre Short Stay Unit.

Community and Ambulatory Services

The Cognitive Dementia and Memory Service (CDAMS), in conjunction with Monash University's Department of General Practice, commenced recruitment for a study investigating the effects of mindfulness on people with mild cognitive impairment. It is anticipated that the study will conclude in 2016. CDAMS also published two studies relating to research on advance care planning in mild cognitive impairment and the role of prospective memory in the assessment of mild cognitive impairment.

Caulfield Community Health Service presented a range of work across clinical and health promotion fields at domestic and international conferences. In 2015 the study 'Managing the load: the impact of redesign principles on community health occupational therapy waiting times' was presented at the Occupational Therapy Australia National Conference (Melbourne), the National Allied Health Conference (Melbourne) and APAC Forum (Auckland). The health promotion study 'Success in the absence of dedicated funding: recognising the importance of schools and early learning settings as drivers and flexible engagement strategies for Health Promoting Settings' was presented at the 2015 Population Health Congress in Hobart.

The Community Rehabilitation Services program focused on evaluation of health literacy profiles, outcome measurement and falls prevention in a Community Rehabilitation population. The program published an article on its study into the benefits of a men's wood-working group in the *Australian Occupational Therapy Journal*.

The Caulfield Pain Management and Research Centre continued a program of applied clinical research. Major areas of current activity include: studies on the risks and benefits of long-term opioid therapy; the utility of simple analgesics to reduce pain-related agitation and aggression in persons

with dementia living in residential aged care facilities; and an ARC-funded Linkage Project, in partnership with the Transport Accident Commission, investigating the role of compensation status and experience in chronic pain and function after traumatic injury, with a focus on psychological factors (attention, beliefs and attitudes, emotional responses, post-traumatic stress disorder).

Another major stream of research involves the development of better outcome measures for the assessment of chronic pain conditions. The service was one of the first Victorian sites to commence participating in the electronic Persistent Pain Outcomes Collaboration (ePPOC). The development of new measures for the assessment of chronic pain and its impacts continues to be a priority area.

Nursing

In 2015, the Nursing Services team completed data collection for their study investigating the role of sub-acute nurses in a changing healthcare context. Themes emerging from the analysis of the observation as well as interview and focus group data will be utilised to develop recommendations for workforce planning, nursing education and nurses' training aimed at addressing the changing roles of nurses and increasing medical acuity.

Rehabilitation

The Acquired Brain Injury (ABI) Unit research program involves multidisciplinary groups across Caulfield and Alfred Health collaborating together to improve the outcomes of rehabilitation for patients with an ABI. Evidence-based rehabilitation methods and adherence to clinical practice guidelines following intervention have increased.

The Cardiac Rehabilitation Unit (CRU) continued research for the SCAR project, a randomised, controlled trial evaluating the routine application of silicone sheeting to newly-healed median sternotomy scars. Other ongoing research projects include: outcomes following cardiac rehabilitation in regard to return to work; eating behaviours, fat loss and changes

in muscle mass; evaluation of prospective memory training to improve heart failure self-care; and understanding health literacy needs of cardiac rehabilitation attendees and non-completers.

The Spinal Rehabilitation Unit has participated in internal, local, national and international research activities in 2015. International activities included: involvement with the International Spinal Cord Society; a World Health Organisation publication on Spinal Cord Injury; being a lead investigator in a multicentre rehabilitation outcomes collaboration; and participation in a working party with the National Institute of Neurological Disorders and Stroke (NINDS) on spinal cord injury common data elements.

Caulfield Hospital Research Grants Awarded in 2015

- Dr Sze-Ee Soh was awarded a Major Research Grant of \$25,000 for the project 'Improving patient safety program implementation and outcomes' (Investigator Team: Sze-Ee Soh, Peter Hunter, Andrew Perta, Anna Barker, Darshini Ayton).
- Sophe Kimonides was awarded a Small Project Research Grant of \$10,000 for the project 'Long-term community integration among home-dwelling stroke survivors: the influence of subjective cognitive difficulties' (Investigator Team: Sophe Kimonides, Glynda Kinsella).
- Delwyne Stephens and Martin Checklin were awarded a Small Project Research Grant of \$10,000 for the project 'The lived experience of the primary caregiver of a person with severe-catastrophic ABI in the early stages of admission to sub-acute rehabilitation and prior to discharge' (Investigator Team: Delwyne Stephens, Martin Checklin, Julia Soumilas, Deanne Fernon).

Postgraduate Students

19 PhD Students
21 Masters Students
1 Doctor of Clinical Science Student

Publications

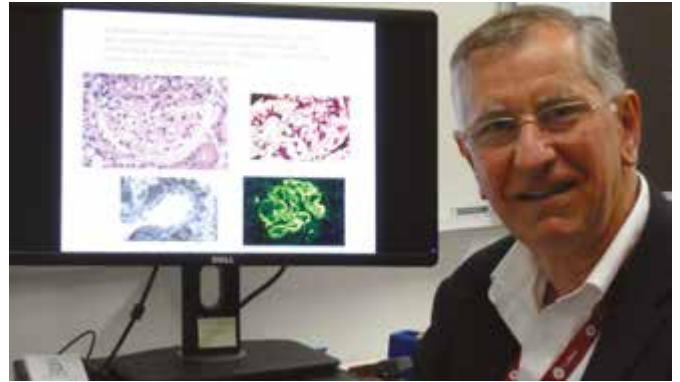
39 Journal Articles
4 Book Chapters
1 Book



The Caulfield Pain Management and Research Centre Team. (L-R) Katherine Baker, Thomas Watson, Associate Professor Carolyn Arnold, Dr Melitta Giummarra, Professor Stephen Gibson. Absent: Lincoln Tracy.

Renal Medicine

Head: Professor Rowan Walker MBBS, MD, FRACP, MPH



Professor Rowan Walker, Head of Renal Medicine.

Renal Medicine provides clinical services across the full spectrum of kidney disease including: acute and maintenance dialysis; acute kidney injury (AKI); supportive care and kidney transplantation. There is a strong emphasis on the provision of home-based therapies and continuity of care across the trajectory of kidney disease.

Research focuses on several key themes including: longitudinal measures of service quality across chronic kidney disease (CKD) progression monitored via collaborative registries; multicentre trials of therapeutic agents to slow the progression of CKD and management CKD-associated anaemia; the assessment of cardiovascular physiology and symptom burdens in response to dialysis treatments and renal denervation (in collaboration with Baker IDI); novel monitoring techniques for electrolyte and drug clearances during dialysis; and population level profiling of tubulopathy and proteinuric syndromes in HIV positive patients.

The unit is primarily engaged in eight multicentre clinical trials and has internal collaborative research projects across allied health, nursing and medical domains, in addition to an undergraduate honours program. Collaborative links exist across local and national renal units, Monash University, The University of Melbourne, Baker IDI Heart and Diabetes Institute and the Australian Kidney Trials Network. We combine patient-centred quality care outcomes with hypothesis-driven clinical research to fill specific knowledge gaps in the specialty.

Cross-Specialty Collaboration

Commenced in 2015, a cross-specialty collaboration continues across the Renal Service, Alfred Health Psychiatry and Baker IDI's Neuropharmacology Research Laboratory in a quality-of-care / research overlap objectively assessing the longitudinal changes in patient-centred domains of cognition, mental health, burnout, symptom burden and physical function. The first 'snapshot' report is expected across mid-2016 and represents an exciting area of work not previously undertaken in the dialysis population.

In addition, an NHMRC Development Grant (\$360,715: 2016-2018), led by Associate Professor Bing Wang (Monash University), will facilitate clinical collaboration between

the Renal Service and the Monash University Centre of Cardiovascular Research and Education in Therapeutics to undertake research into a novel bio-impedance based fluid monitoring device in patients on dialysis or who have decompensated cardiac failure.

Registry of Kidney Disease

The Alfred Renal Service continues to take a leadership role in the establishment of the Registry of Kidney Disease (ROKD) in collaboration with seven Victorian metropolitan renal units and the Monash University Department of Epidemiology and Preventive Medicine. The ROKD is a clinical quality registry with aims to identify patients at earlier stages of CKD to monitor their course of disease progression and assess the consistency and quality of care provided in view of evidence based practice through prospective data collection.

Anaemia Management in Renal Disease

Since the mid-1980s treatment for anaemia in renal disease has been restricted to blood transfusion or injectable erythropoietin analogues. The Alfred Renal Service has entered into two new phase 3 multicentre collaborative trials of novel molecules, which may be administered orally. These agents inhibit the degradation of native 'hypoxia inducible factor' (HIF) and, if clinically proven, have the potential to revolutionise the anaemia management in CKD and dialysis dependent patients.

On the Horizon

Much of the groundwork undertaken in 2014 and 2015 will come to fruition in early 2016 with the initiation of fully-funded projects in intradialytic cardiovascular and electrolyte clearance monitoring, therapeutic drug monitoring in end-stage renal disease and the opening of the BMedSci (Honours) undergraduate research program in the renal unit under the direction of Dr Scott Wilson and Professor Rowan Walker.

Publications

9 Journal Articles

Human Research Ethics

Professor John McNeil AM
Chair, Alfred Hospital Ethics Committee

Alfred Hospital Ethics Committee

In Australia, the role of Human Research Ethics Committees (HRECs) is to review research proposals that involve humans in accordance with the requirements of the *NHMRC National Statement on Ethical Conduct in Human Research* (the National Statement). HREC approval provides public assurance of ethically acceptable research that complies with endorsed standards and guidelines.

Applications

In 2015, the Alfred HREC received 223 research projects for review, comprising 92 health and social sciences applications, and 131 drugs and interventions applications. A further 357 'low risk' applications were received, which do not require review by the full HREC.

Multicentre Research

The streamlined processes* for a single ethical review of Australian multicenter projects have been in operation for a number of years. The majority of projects reviewed in this way are commercially sponsored clinical trials, although most types of human research are now eligible. In 2015, 30 applications were submitted to the Alfred HREC for review under a streamlined process. A further 50 projects were submitted to the Alfred HREC after review by another HREC and of those, 44 were authorised for commencement at Alfred Health.

**Victorian Streamlined Ethical Review Program (SERP) and the National Mutual Acceptance scheme (NMA).*

Ethics Research Administration

Launched in April 2014, the first phase of the online ethics application management system (ERA; Ethics Research Administration) has simplified communication between Ethics Committee members, administrators and researchers. The second phase has since been developed to manage post-approval documents, including project amendments, with monitoring functions such as the reporting of adverse events and submission of progress reports to be implemented in 2016.

Research Training Requirements

NHMRC guidelines, the National Statement and the *Australian Code for the Responsible Conduct of Research* (2007), require researchers undertaking human research to be appropriately trained and credentialed. Researchers at Alfred Health will be required to have and maintain accredited training by the end of July 2017. The requirement applies to Principal Investigators, Associate Investigators and Research Coordinators listed in the ethics and/or site authorisation application to Alfred Health, irrespective of their institutional base. A range of accredited face-to-face and online training courses will be available.

The General Ethical Issues Subcommittee

The General Ethical Issues Sub-committee considers general ethical matters of relevance to the main Ethics Committee, Alfred Health, AMREP partners, the research community and the general public. Membership includes members of the Alfred Hospital Ethics Committee, experts from within Alfred Health and AMREP, and external members with specific expertise (in particular legal, regulatory, ethical and community expertise). The Sub-committee provides a discussion forum, develops guidance documents to assist with ethical decision making and ethical research practice, and contributes to public consultations conducted by the NHMRC and others. Six meetings were held in 2015.

Discussion Topics in 2015

Consultations

- NSW Health Public Consultation (PC): Draft policy directive on consistent state-wide consent form for research biobanking.
- NHMRC PC: Principles for the translation of 'omics'-based tests from discovery to health care.
- NHMRC PC: Draft ethical guidelines for organ transplantation from deceased donors.
- NHMRC Stakeholder Consultation (SC): Updating arrangements for safety monitoring and reporting of clinical trials in Australia.
- NHMRC SC: Draft policy on misconduct related to NHMRC funding.
- NHMRC SC: HREC credentialing system.
- Parliament of Victoria: Inquiry into end-of life choices (Joint meeting with the Alfred Health End of Life Choices Working Group, who prepared the submission).
- National PICF Project: an initiative to develop a nationally consistent model for the communication of participant information, involving hospitals, health services, research organisations, sponsors and other relevant stakeholders.

Review of Ethics Committee Guidelines and Processes

- Review of Ethics Committee 'Guidelines to apply when researchers leave The Alfred' (evolved into the Alfred Health institutional guideline).
- Review of Ethics Committee Guideline: 'Requirements for studies involving participants with declining cognitive function.'

Discussion and Guidance on Research Ethics

- Use of social media platforms for research participant recruitment.
- Issues relating to human biospecimens usage in research.

Animal Ethics

Associate Professor David Curtis
Chair, AMREP Animal Ethics Committees A
Dr Alana Mitchell
Chair, AMREP Animal Ethics Committee B

AMREP Animal Ethics Committees

Two Animal Ethics Committees (AECs) are in operation at AMREP, with each committee meeting monthly. The AECs assess proposals for the use and breeding of animals for scientific purposes from Baker IDI Heart and Diabetes Institute, Monash University Central Clinical School, the Burnet Institute, The Alfred hospital, AMREP Animal Services and the Centre for Eye Research Australia. The AECs determine whether a proposal to use animals is justified on ethical grounds, and whether the welfare of the animals will be adequately protected.

AMREP Animal Ethics Training

All new staff who use animals in research are required to complete an introductory online training module. The module covers a variety of topics including legislation, role of the AEC, AEC application forms, post-approval monitoring, annual reporting, record keeping and adverse events. In 2015 the online training module was completed by 213 new and existing staff. New investigators who do not complete the training are unable to gain access to the animal facility or submit new applications to the AEC for review. In order to meet the institutions obligations with regard to ongoing education under the *Australian Code for the Care and Use of Animals for Scientific Purposes 8th edition (2013)* (The Code), the AEC office is also planning to adopt new training modules published by the National Centre for the Replacement, Refinement & Reduction of Animals in Research (NC3R) on 'Recognition and Prevention of Pain, Suffering and Distress in Laboratory Animals'.

AEC Applications in 2015

The AMREP AECs reviewed a total of 72 new experimental proposals in 2015. A summary of applications in all categories is shown in the table below.

SUMMARY OF APPLICATIONS REVIEWED BY THE AMREP AEC IN 2015						
	Baker IDI Heart and Diabetes Institute	Monash Central Clinical School	Burnet Institute	Alfred Health	AMREP Animal Services	Centre for Eye Research Australia
New experimental applications	45 (68)	22 (29)	3 (2)	0 (2)	1 (0)	1 (0)
Modifications to experimental applications	104 (92)	56 (71)	4 (5)	1 (4)	0 (0)	0 (0)
Tissue applications	5 (8)	6 (2)	1 (0)	0 (0)	0 (0)	2 (0)
Colony applications	54 (20)	54 (75)	0 (1)	0 (0)	0 (0)	1 (0)

In brackets: number of applications reviewed in 2014.

Governance and Policy Committee

The AMREP Animal Ethics Governance and Policy (GAP) Committee facilitates consistent operation across the two AMREP AECs in accordance with The Code and the relevant Victorian Legislation.

The main responsibilities of the GAP committee are to:

- Develop and approve policies for the operation of AMREP AECs A and B
- Oversee post-AEC approval monitoring of project compliance
- Monitor issues of compliance with governance and The Code
- Oversee education and training of AEC applicants and members
- Monitor the performance of the AECs
- Serve as the first point of contact for the resolution of disputes involving AEC members and/or AEC applicants that cannot be resolved at the AEC level.

Post-approval Monitoring

In 2015 the Animal Ethics Officer conducted post-approval monitoring of six randomly selected animal ethics approved projects and reports were prepared for both the AECs and the investigators. Overall the review process proved to be an effective method of ensuring that the institutions are meeting their requirements under The Code and the program will continue in 2016.

AMREP Committee Membership 2015/2016

AMREP Council

Membership

Professor Andrew Way, Alfred Health (Chair)
Professor Stephen Jane, Alfred Health
Professor Brendan Crabb / Geoff Drenkhahn, Burnet Institute
Professor Mark Hogarth, Burnet Institute
Professor Tom Marwick / David Lloyd, Baker IDI Heart and Diabetes Institute
Hilary Bolton, Baker IDI Heart and Diabetes Institute
Professor Christina Mitchell, Monash University
Professor David Tarlinton, Monash University
Professor Anne Holland, La Trobe University
Professor Tracey Bucknall, Deakin University
Dr Lee Hamley, Chief Medical Officer, Alfred Health
Janet Weir-Phyland, Chief Nursing Officer, Alfred Health
Professor John McNeil, Chair, The Alfred Ethics Committee
Professor Colin Johnston, Chair, AMREP Animal Ethics Governance & Policy Committee

In attendance

John Breguet, Director, Capital and Infrastructure, Alfred Health
Heather Gallichio General Manager, Alfred & Baker IDI Research Office (Secretary)

Alfred Hospital Ethics Committee

Professor John McNeil (Chair)
Professor Colin Johnston (Deputy Chair, Drugs and Interventions Group; member with knowledge of relevant research areas)
Roy Olliff (Chair, Health and Social Science Group; Deputy Chair, Ethics Committee)
Reverend Sam Goodes (Deputy Chair, Health and Social Science Group)

Lay-members

Annette Bennet
Dr Chris Booth
Elizabeth Burns
Aurel Dessewffy
Peter Gallagher
Ian Gaudion (from April 2015)
Jenny Martin
Stefanie Rizzo
Dr Andrew Ross (experience of analysing ethical decision-making)

Members with Knowledge of Professional Care and Treatment

Dr Catherine Cherry
Dr Judith Frayne
Dr Elizabeth Peach (from May 2015)
Dr Michael Ward (on LOA in 2015)

Lawyers

Donna Cooper (from Nov 2015)
Jim Mahoney
Linda Murdoch (non-sitting member)
John Myers (from May 2016)
Dr Arthur Rallis

Members with Knowledge of Relevant Research Areas

Professor Tracey Bucknall (Nursing representative)
Professor Richard Gerraty
Associate Professor David Hunt
Associate Professor Peter Hunter
Dr Natasha Jennings (from June 2016)
Professor David Kaye
Professor Henry Krum (passed away on 28 Nov 2015)
Maria McKenzie
Shefton Parker

Pastoral Care

Reverend Sam Goodes
Theo Richter (from July 2015)

Secretariat

Rowan Frew (Secretary and Senior Manager, Ethics and Research Governance)
Dr Angela Henjak (Co-Manager, Ethics and Research Governance; Drugs and Interventions Group)
Kordula Dunscombe (Health and Social Science Group; Secretary, General Ethical Issues Sub-committee; Secretary, Ethics Committee – from Feb 2016)
Katja Loewe (Drugs and Interventions Group)
Dr Penny Mayes (Ethics Officer)
Dr Kevin Mittelstaedt (Health and Social Science Group)

General Ethical Issues Sub-committee

Professor John McNeil (Chair)
Dr Dylan Barber
Dr Peter Douglas
Reverend Sam Goodes
Associate Professor Peter Hunter (Caulfield Hospital representative)
Peter Gallagher
Dr Cate Kelly (Medical Administration representative)
Dr Jeremy Kenner

Professor Paul Komesaroff

Lynda Katona (Caulfield Hospital representative)

Professor Catriona McLean (from May 2015)

Bob Milstein (from May 2016)

Roy Olliff

Janine Roney

Professor Julian Savulescu (from Aug 2015)

Dr Susan Sdrinis (Medical Administration representative – from March 2016)

Professor Michael Selgelid (from Aug 2015)

Kordula Dunscombe (Secretary)

Rowan Frew (Senior Manager, Ethics and Research Governance)

Dr Angela Henjak (Co-Manager, Ethics and Research Governance)

Research Review Committee

Professor Colin Johnston (Chair)

Professor Henry Krum (passed away on 28 Nov 2015)

Professor Leon Bach

Peta Bretag

Dr Catherine Cherry

Professor Flavia Cicuttini

Dr Amanda Davis

Dr Judith Frayne

Professor Richard Gerraty

Dr Ingrid Hopper (from Jun 2016)

Dr Enjarn Lin

Anne Mak

Professor John McNeil (ex-officio)

Associate Professor Jeremy Millar

Professor Matthew Naughton

Dr James Shaw

Marina Skiba

Dr Andrew Udy

Rowan Frew (Secretary)

Low Risk Sub-committee

Maria McKenzie (Chair)

AMREP Animal Ethics Governance and Policy (GAP) Committee

Professor Colin Johnston (Chair)

Associate Professor David Anderson

Dr Raffi Gugasyan

Dr Dylan Barber

Dr Fenella Long

Heather Gallichio

Associate Professor Julie McMullen

Associate Professor Margaret Hibbs

Dr Alana Mitchell

Debbie Ramsey

Robyn Sullivan

Jim Gigas

Judy Nash

Leia Demtschyna (Secretary)

AMREP Animal Ethics Committee

Associate Professor David Curtis (Chair, AEC A)

Dr Alana Mitchell (Chair, AEC B)

Dr Fenella Long (Animal Welfare Officer / Veterinarian)

Dr Kay Juliff (Veterinarian)

Dr Lucy Uren (Veterinarian)

Dr Paul Gregorevic (Scientist)

Dr Brian Drew (Scientist)

Associate Professor Margaret Hibbs (Scientist)

Dr Dan Andrews

Dr Ian Burns (Animal welfare)

Dr Alan Sherlock (Animal welfare)

Robyn Sullivan (Animal welfare)

Rebecca Irvine (Animal welfare)

Jim Gigas (Lay member)

Lance Collins (Lay member)

Simon Clarke (Lay member)

Kaye Fox (Lay member)

Debbie Ramsey (Animal Care / Facility Manager)

Leia Demtschyna (Secretary, AEC A)

Judy Nash (Secretary, AEC B)

AMREP Facilities and Infrastructure Management Committee

John Breguet (Alfred Health)

Mark Curtis (Alfred Health)

Hilary Bolton (Baker IDI)

Robert Trainor (Baker IDI)

Gavin Horrigan (Monash University)

Rachael Borg (Monash University)

Bruce Loveland (Burnet Institute)

Peter Spiller (Burnet Institute)

Debbie Ramsey (AMREP Animal Services)

David Spiteri (AMREP Animal Services)

Major Grants

Listed are the major national and international competitive, peer-reviewed research grants held by AMREP staff in 2015.

AUSTRALIAN GRANTS

National Health and Medical Research Council

Program Grants

Adams J, Gerondakis S, Bouillet P, Visvader J, Colman P, Strasser A, Cory S, Vaux D, Huang DC, Linderman G, Kluck RM. Apoptosis and stem cells in cancer development and therapy. 2012-2016: \$21,322,575. Administering institution: Walter and Eliza Hall Institute.

Goodnow C, MacKay C, MacKay-Fisson F, Tangye S, Sprent J, Cook M, Vinuesa C, Brink R. Molecular and cellular basis of inflammatory and immunodeficiency diseases. 2012-2016: \$4,375,965. Administering institution: Monash University.

Kaldor J, Garland S, Fairley C, Law M, Grulich A. New interventions to control sexually transmitted infections and their consequences. 2015-2019: \$10,657,441. Administering institution: University of New South Wales.

Kaye D, Jennings G, Esler M, Dart AM, Kingwell B, Chin-Dusting J, Sviridov D. 2013-2017: \$12,406,615. Administering institution: Baker IDI.

Krum H, Kelly D, Reid C. Prevention and treatment of chronic heart and kidney disease via epidemiological, pharmacological device and cell-based approaches. 2010-2015: \$5,390,000. Administering institution: Monash University.

Owen N, Bauman A, Brown W. Sitting less and moving more: Population health research to understand and influence sedentary behaviour. 2011-2015: \$3,773,000. Administering institution: Baker IDI.

Centres of Research Excellence

Abramson M, Sim M, Croff R, Benke G, Vermeulen R, Wiedemann P, Crozier S. Centre for Population Health Research on Electromagnetic Energy. 2013-2018: \$2,499,157. Administering institution: Monash University.

Anstey K, Lautenschlager N, Sachdev P, Cerin E, Shaw JE, Clare L. Centre for Research Excellence in promoting cognitive health and preventing cognitive decline. 2015-2020: \$2,534,014. Administering institution: Australian National University.

Cameron P, Jacobs I, Bernard S, Finn J, Smith K, Thompson P, Tonkin A. Australian Resuscitation Outcomes Consortium. 2011-2016: \$2,498,523. Administering institution: Monash University.

Carapetis J, Currie B, Maguire G, Bessarab D, McAullay D, D'Antoine H, Brown A, Edmond K, Steer A, de Klerk N. The END RHD CRE: Development an endgame for rheumatic heart disease in Australia. 2014-2019: \$2,496,815. Administering institution: University of Western Australia.

Carlin J, Forbes A, Gurrin L. The Victorian Centre for Applied Biostatistics (VCAB): Building core methodological capacity for population health. 2011-2016: \$2,497,184. Administering institution: Murdoch Children's Research Institute.

Cooper DJ, Phillips L, Bellomo R, Cameron P, Reade M, Isbister J, French C, Myles P, Webb S, McNeil J. Centre of Excellence for Patient Blood Management in Critical Illness and Trauma. 2012-2017: \$2,498,407. Administering institution: Monash University.

Cooper ME, Thomas M, El-Osta A, Jandeleit-Dahm K, Groop P-H, Bach L. JDRF/NHMRC Diabetes Complications Centre of Research Excellence. 2014-2018: \$2,500,000. Administering institution: Baker IDI.

Dart A, Jennings G, Kaye D, Peter K, Kingwell B, Chin-Dusting J. Centre of Excellence for Clinical Research Training in Translational Cardiology. 2010-2015: \$2,500,000. Administering institution: Baker IDI.

Fraser J, McGiffin D, Lovell N, Bannon P, Tansley G, Pellegrino V, Roberts J, Barnett A, Gregory S. Centre for Research Excellence in Advanced Cardio-respiratory Therapies Improving Organ Support (ACTIONS). 2014-2018: \$2,491,450. Administering institution: University of Queensland.

Golledge J, Kingwell B, Norman P, Tonkin A, Fitridge R, Reid C, Walker P, Hankey G, Fletcher J, Nelson M. National Centre of Research Excellence to improve management of peripheral arterial disease. 2010-2015: \$2,499,250. Administering institution: James Cook University.

Hellard M, Dietze P, Ritter A, Lubman D, Kinner S, Dore G, Maher L, Williams G, Moore D, Power R. Reducing the health, social and economic burden of injecting drug use in Australia. 2010-2015: \$2,485,060. Administering institution: Burnet Institute.

MacIntyre R, Kirk M, Clements A, Komesaroff P, Heslop D, Wang Q, Sarkar S, Rawlinson W, De Barro P, Baker M. Integrated Systems for Epidemic Response (ISER). 2015-2020: \$2,491,912. Administering institution: University of New South Wales

Marks G, Jalaludin B, Abramson M, Williams G, Leeder S, Morawska L, Jones A, Morgan G, Dharmage S. Air pollution and human health. 2013-2016: \$2,584,848. Administering institution: University of Sydney.

Owen N, Salmon J, Trost S, Dunstan D, Eakin E, Healy G, Kingwell B, Lambert G, Timperio A. Centre of Research Excellence on Sedentary Behaviour and Chronic Disease Risk: Mechanisms, Measurement and Research Translation. 2013-2018: \$2,499,247. Administering institution: Baker IDI.

Reid C, Krum H, Cullen L, Chew D, Briffa T, Brieger D, Smith J, Duffy S, Macdonald P, Liew D. Centre of Research Excellence in Cardiovascular Outcomes Improvement. 2015-2020: \$2,500,000. Administering institution: Curtin University of Technology.

Scott A, Joyce C, Humphreys J, Kalb G. Centre for Research Excellence in Medical Workforce Dynamics. Medicine in Australia: Balancing Employment and Life (MABEL). 2011-2016: \$2,496,646. Administering institution: University of Melbourne.

Sorrell T, Sintchenko V, Cheng A, Gilbert G, Holmes E, Howden B, Smith D, Coiera E, Iredell J, Jones C. Protecting the public from emerging infectious diseases. 2015-2020: \$2,500,000. Administering institution: University of Sydney.

Stanley F, Bessarab D, Coffin J, Dudgeon P, Eades S, Kickett-Tucker C, Marriott R, Pearson G, Walker R, Wright M. From marginalised to empowered: transformative methods for Aboriginal Health and Wellbeing. 2010-2015: \$2,623,734. Administering institution: University of Western Australia.

Stewart S, Brown A, Thompson D, Stocks N, Scuffham P, Eades S, Carrington M, Sliwa K, Maguire G. Centre of Research Excellence to Reduce Inequality in Heart Disease. 2012-2017: \$2,493,649. Administering institution: Australian Catholic University.

Ward J, Kaldor J, Donovan B, Guy R, Fairley C, Arabena K, Mak D, Scrimgeour D, Ryder N, Nattabi B. Australian Centre for Research Excellence in Aboriginal Sexual Health and Blood Borne Viruses. 2015-2020: \$2,496,847. Administering institution: South Australian Health and Medical Research Institute.

Dementia Research Team Grants

Brodthmann A, Donnan G, Hachinski V, McNeil J, Jackman K, Nithianantharajah J, Thompson L, DeCarli C, Churilob L, Burrell. Vascular mechanisms of neurodegeneration: drivers and determinants of dementia. 2015-2020: \$6,421,722. Administering institution: University of Melbourne.

Sanson-Fisher R, Nair B, Koch S, Mazza D, Byles J, Doran C, D'Este C, Whitehead C, Eades S. An Australian community of practice in Research in Dementia (ACCORD) to improve health outcomes for people with dementia and their carers. 2015-2020: \$3,382,819. Administering institution: The University of Newcastle.

Brodsky H, Valenzuela M, Sachdev P, McNeil J, Maeder A, Lautenschlager N, Jorm L, Sigh M, Anstey K, Andrews G. Maintain Your Brain. 2015-2020: \$6,467,016. Administering institution: University of New South Wales.

Development Grants

Peter K, Sampson D, Lorensen K. Development of a catheter-based device for the detection of vulnerable atherosclerotic plaques. 2013-2016: \$545,507. Administering institution: Baker IDI.

Rosenfeld J, Harvey E, Lowery A, Blamey P, Rosa M, Ayton L, Harcourt J. Restoring vision with a wireless multi-electrode cortical device: towards commercialisation. 2014-2018: \$1,463,682. Administering institution: Monash University.

Enabling Grants

Bellomo R, Cooper DJ, Myburgh J, Finfer S. National Centre for Intensive Care Research. 2010-2015: \$2,500,000. Administering institution: Monash University.

European Union Collaborative Research Grants

Cooper DJ, Gruen R. OzENTER-TBI_Australia-Europe NeuroTrauma Effectiveness Research in TBI collaboration. 2014-2016: \$364,440. Administering institution: Monash University.

El-Osta A. Development and Epilepsy - Strategies for Innovative Research to improve diagnosis, prevention and treatment in children with difficult to treat Epilepsy. 2014-2016: \$444,126. Administering institution: Baker IDI.

Peter K. Systems biology to identify molecular targets for vascular disease treatment (SysVasc) with a focus on atherosclerotic plaque instability. 2015-2018: \$450,721. Administering institution: Baker IDI.

Global Alliance for Chronic Diseases

Maple-Brown L, Brown A, Connors C, O'Dea K, Shaw J, Oats J, Zimmet P, Sinha A, Wenitong M, Hanley A. Improving the management of Diabetes in Pregnancy in Remote Australia. 2015-2019: \$2,117,449. Administering institution: Menzies School of Health Research.

Thriff A, Oldenburg B, Chow C, Thomas N, Thankappan K, Maulik P, Srikanth V, Mahal A, Evans R, Joshi R. Improving the control of hypertension in rural India: Overcoming the barriers to diagnosis and effective treatment. 2012-2015: \$1,033,805. Administering institution: Monash University.

Partnership Projects

Barker AL, Cameron P, Hill K, Flicker L, Haines T, Lowthian J, Waldron N, Arendts G, Redfern J, Forbes A, Morris R. A multi-centre RCT to prevent secondary falls in older people presenting to the emergency department with a fall. 2013-2017: \$1,488,315. Administering institution: Monash University.

Bucknall T, Hutchinson A, Harvey G, Considine J, Mitchell I, Rycroft-Malone J, Graham I, Mohebbi M, Watts J. Prioritising Responses Of Nurses To deteriorating patient Observations (PRONTO). 2015-2018: \$459,688. Administering institution: Deakin University.

Cooper DJ, Wood E, Cameron P, Isbister J, French C, Stanworth S, McLintock MC, McQuilten Z, Zatta A, Barker A. Improving outcomes for patients with critical bleeding requiring massive transfusion. 2014-2016: \$861,706. Administering institution: Monash University.

Elliott J, Fairley C, Lewin S, Osborne R, Kidd M, Battersby M, Crooks L, Watson J. HealthMap: a cluster randomised trial of interactive self-care plans to prevent and manage chronic conditions by people living with HIV. 2011-2016: \$1,500,000. Administering institution: Monash University.

Elliott J, Green S, Thomas J, Tovey D, Glasziou P, Clarke M. Evidence Innovation: transforming the efficiency of systematic review. 2015-2018: \$928,416. Administering institution: Monash University.

Forbes D, O'Donnell M, Bryant R, Hodson S, Morton D, Battersby M, Forbes A. Optimising mental health and quality of life for Australia's military personnel and veterans with PTSD. 2015-2019: \$728,958. Administering institution: University of Melbourne.

George J, Abramson M, Zwar N, Russell G, Holland A, Bonevski B, Mahal A. Review of Airway Dysfunction and Interdisciplinary Community-based Care in Adult Long-term Smokers (RADICALS). 2014-2017: \$441,491. Administering institution: Monash University.

Haines T, Morris M, Taylor N, Holland A, Carey L, Skinner E, Williams C, Bardoel E, Martin J, O'Brien E. A partnership for evidence based resource allocation and enhanced research translation in allied health. 2015-2017: \$616,780. University of Melbourne.

Hinman R, Bennell K, French S, Forbes A, Harris A, Briggs A, Bunker S, Gale J. Integration of exercise counselling and support into the Musculoskeletal Help Line for people with knee osteoarthritis: a mixed-methods evaluation of a novel telephone service. 2015-2018: \$437,098. Administering institution: University of Melbourne.

McLachlan H, Forster D, Kildea S, Freemantle C, Browne J, Jacobs S, Oats J, Donath S, Newton M, Chamberlain C. Improving the health of Aboriginal mothers and babies through continuity of midwife care. 2015-2020: \$1,496,531. Administering institution: La Trobe University.

Middleton J, Cameron P, McClure R, Marshall R, Bowen D, Harrison J, Lyons N, Brown D. Right care, right time, right place: improving outcomes for people with spinal cord injury through early intervention and improved access to specialised care. 2012-2016: \$1,068,089. Administering institution: University of Sydney.

Simmons D, Bourke L, Roberts S, Magliano D, Morgan M, Glenister K. Longitudinal study of health, disease and access to care in rural Victoria: the Crossroads follow up study. 2015-2017: \$530,252. Administering institution: University of Melbourne.

Williams A, Manias E, Walker R, Toussaint N, Dooley MJ, Mulley B. Improving medicine adherence in kidney transplantation. 2013-2016: \$261,276. Administering institution: Monash University.

Zoungas S, Teede H, Kerr P, Cass A, Gallagher M, Fulcher G, Walker R, Polkinghorne K, Russell G, Johnson G. The diabetes renal project: better outcomes for patients with diabetes and chronic kidney disease. 2012-2016: \$628,148. Administering institution: Monash University.

Project Grants

Andrews D, Sullivan L. The role of H2-Q10 in liver immunity. 2015-2017: \$467,209. Administering institution: Monash University.

Andrews R, Ramshaw H, Cranmer S. A newly identified role for 14-3-3zeta protein in thrombosis and platelet procoagulant activity. 2013-2015: \$537,124.77. Administering institution: Monash University.

Barker A, McNeil J, Ward S, Sanders K, Khosla S. The ASPREE-fracture sub-study: does daily low-dose aspirin reduce fracture risk in healthy older adults? 2014-2018: \$1,290,628. Administering institution: Monash University.

Beeson J, Rogerson S. Surface antigens of Plasmodium falciparum-infected erythrocytes and immunity to malaria in humans. 2013-2015: \$578,502.60. Administering institution: Burnet Institute.

Berk M, McNeil J, Nelson M, Shah R, Woods R, Mohebbi M. ASPREE-D; Aspirin in the prevention of depression in the elderly. 2015-2018: \$767,594. Administering institution: Monash University.

Bernard S, Mitra B, Gruen R, Jacobs I, Medcalf R, Reade M, Tran H. Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage (The PATCH Study). 2013-2016: \$1,668,152.46. Administering institution: Monash University.

Bobik A, Toh BH, Tipping P. Regulatory T cells and cardiac fibrosis in hypertensive heart disease: cellular and molecular mechanisms of suppression. 2013-2015: \$690,627.60. Administering institution: Baker IDI.

Bobik A, Toh BH, Tipping P. Natural killer (NK) cells and development of atherosclerosis: cellular and molecular mechanisms. 2014-2016: \$705,558. Administering institution: Baker IDI.

Brown A, Carrington M, Eades S, Thompson D, Zeitz C. The Central Australian Heart Protection Study: a randomised trial of nurse-led, family based secondary prevention of acute coronary syndromes. 2011-2015: \$1,830,401. Administering institution: Baker IDI.

Buchbinder R. Comparative effectiveness of ultrasound-guided injection with either autologous platelet rich plasma or glucocorticoid for ultrasound-proven lateral epicondylitis: a three-arm randomised placebo-controlled trial. 2013-2015: \$510,135. Administering institution: Monash University.

Calkin A. Regulation of lipid metabolism skeletal muscle by IDOL – a novel degrader of the very low density lipoprotein receptor. 2015-2017: \$536,260. Administering institution: Baker IDI.

Cameron P, Lewin S, Chomont N. HIV latency and regulation of HIV life cycle. 2013-2015: \$489,927.26. Administering institution: Monash University.

Cameron P, Mallal S, Vatakis D. The impact of HIV integration sites on eliminating HIV latency. 2014-2016: \$752,950. Administering institution: Monash University.

Caminschi I, Heath W, Mueller S. Enhancing vaccine efficacy by harnessing dendritic cell receptors and their unique properties. 2014-2016: \$664,890. Administering institution: Burnet Institute.

Caminschi I, O’Keeffe M. The identification and characterisation of a new DNA receptor. 2014-2016: \$634,890. Administering institution: Burnet Institute.

Chapman M, Peake S, Bellomo R, Horowitz M, Davies A, Deane A. The Augmented versus Routine approach to Giving Energy Trial (TARGET). 2015-2019: \$3,534,236. Administering institution: Monash University.

Churchill M, Gorry P, Wesselingh S. Viral determinants of HIV-1 transcriptional latency in the central nervous system. 2013-2015: \$610,658.10. Administering institution: Burnet Institute.

Cooper DJ, Bernard S, Nichol A, Pressneil J, Cameron P, Myburgh J. POLAR - Prophylactic hypothermia trial to lessen traumatic brain injury: a randomised controlled trial. 2009-2017: \$2,061,507. Administering institution: Monash University.

Cooper DJ, Nichol AD, French C, Street A, Bellomo R. STandaRd Issue TrANsfusion versus Fresher red blood cell Use in intenSive carE (TRANSFUSE): a randomised controlled trial. 2012-2015: \$2,761,870. Administering institution: Monash University.

Cooper M, Chai Z. Targeting the CDA1 axis to confer renoprotection. 2014-2016: \$641,226. Administering institution: Baker IDI.

Cooper M, Kantharidis P. Role of microRNA-21 in diabetic kidney disease. 2014-2016: \$729,623. Administering institution: Baker IDI.

Corcoran T, Myles P, Cheng A, Bach L, Forbes A, Ho K, Chan M, Leslie K, Short T. Perioperative Administration of Dexamethasone and Infection – the PADDI trial. 2015-2019: \$4,603,039. Administering institution: Monash University.

Coughlan M. Does excess consumption of dietary advanced glycation end products activate the complement pathway contributing to diabetic nephropathy? 2013-2015: \$454,373.89. Administering institution: Baker IDI.

Crabb B, Beddoe T, de Koning-Ward T, Gilson P. The structural resolution of PTEX, the translocon of virulence proteins and malaria parasites. 2014-2016: \$542,562. Administering institution: Burnet Institute.

Curtis D, Jane S, Haigh J, Wei A, Powell J. Eradicating leukaemic stem cells by targeting the arginine methyltransferase PRMT5. 2015-2018: \$742,353. Administering institution: Monash University.

Curtis D, Pimanda J, McCormack M. The bHLH transcription factor LYL1 in normal and leukemic haematopoiesis. 2013-2015: \$502,964.28. Administering institution: Monash University.

Davis S, Brown K, Bell R. Investigating the use of metformin for the prevention of endometrial cancer. 2014-2016: \$655,321. Administering institution: Monash University.

- de Courten B, Scragg R, Walker K, de Courten M. Can vitamin D prevent diabetes by improving insulin sensitivity and secretion in overweight humans? 2014-2017: \$715,371. Administering institution: Monash University.
- Dickins R. 'Transcriptional tumour suppression' by Pax5 and Ikaros in B progenitor acute lymphoblastic leukaemia. 2015-2018: \$555,411. Administering institution: Monash University.
- Dickins R, Zuber J, Ritchie M. AML suppression by CEBPa and PU.1. 2015-2016: \$154,980. Administering institution: Monash University.
- Drummer H, Poubourios P, Center R. A universal prophylactic vaccine for hepatitis C virus. 2015-2017: \$623,475. Administering institution: Burnet Institute.
- Du X.J. Preclinical relaxin therapy to reverse cardiac fibrosis and gain functional benefits. 2015-2017: \$702,603. Administering institution: Baker IDI.
- Dunstan D, Green D, Ellis K, Cerin E. Taking a break for brain health: interacting effects of exercise bouts with breaks in sitting time on cognitive and cerebrovascular function in overweight adults. 2014-2016: \$748,285. Administering institution: Baker IDI.
- Dunstan D, Owen N, Straznicky N. Breaking up prolonged sitting: a practical daily therapeutic tool in the management of type 2 diabetes? 2015-2016: \$310,257. Administering institution: Baker IDI.
- Dworkin S, Jane S, Anderson P. Identifying the critical pathways which regulate vertebrate craniofacial development. 2014-2016: \$534,033. Administering institution: Monash University.
- Eades S, Banks E, Ward J, Wilkes E, Ivers R, Liu B, Gray D, D'Este C, Williamson A. The Forgotten Generation: understanding health trajectories in Aboriginal adolescents and youth. 2015-2019: \$1,999,392. Administering institution: Baker IDI.
- Eisen D, Leder K, McBryde E, Wolfe R, Pilcher D, Woods R. The Aspirin To Inhibit SEPSIS (ANTISEPSIS) trial; an ASPREE substudy to measure the benefit of low dose aspirin in the prevention of severe sepsis. 2013-2016: \$391,879.56. Administering institution: Monash University.
- El-Osta A, Thomas M, Cooper ME, Groop PH. Epigenetic determinants of nephropathy in adults with type 1 diabetes. 2015-2017: \$515,010. Administering institution: Baker IDI.
- El-Osta A, Thomas M, Tikellis C. Exploring the upstream mediators of metabolic memory. 2013-2015: \$614,104.73. Administering institution: Baker IDI.
- Esler M, Lambert E. Neural mechanisms of recurrent postural syncope. 2014-2016: \$589,569. Administering institution: Baker IDI.
- Febbraio M. Blocking IL-6 trans-signalling: a therapeutic strategy to prevent metabolic disease. 2013-2015: \$521,975.03. Administering institution: Baker IDI.
- Febbraio M. IC7: a gp130 receptor ligand to treat type 2 diabetes. 2013-2015: \$578,169.64. Administering institution: Baker IDI.
- Febbraio M, Whitham M. Is the role of IL6 in metabolism dependent on its cellular origin? 2014-2016: \$690,558. Administering institution: Baker IDI.
- Fisher J. Banking on the future: Establishing evidence for policy, protocols, and patient care relating to storage of reproductive material before treatment for cancer. 2013-2015: \$576,916. Administering institution: Monash University.
- Fitzgerald P, Hoy K. Accelerated repetitive transcranial magnetic stimulation in the treatment of depression. 2013-2015: \$471,252.60. Administering institution: Monash University.
- Fitzgerald P, Segrave R, Bittar R. Deep brain stimulation in the treatment of severe depression. 2015-2019: \$967,355. Administering institution: Monash University.
- Fowkes F. Human malarial immunity and risk of malaria post-partum and during infancy. 2013-2015: \$254,165.93. Administering institution: Burnet Institute.
- Fowkes F, Simpson J, Nosten F. Human malarial immunity and assessment of emerging artemisinin resistance. 2014-2016: \$302,647. Administering institution: Burnet Institute.
- Gabbe B, Cameron P, Harrison J, Lyons R, Ponsford J, Collie A, Ameratunga S. Outcomes after serious injury: what is the recovery trajectory and how do the priorities for treatment and disability services change over time? 2014-2017: \$738,450. Administering institution: Monash University.
- Gibson P, Muir J, Boyd B. Use of oral enzymes to treat carbohydrate intolerance: adjunct therapy to the low FODMAP dietary treatment of irritable bowel syndrome. 2013-2015: \$590,365.43. Administering institution: Monash University.
- Gorry P, Lee B, Churchill M, Ramsland P. Envelope glycoprotein determinants of HIV-1 subtype C tropism and pathogenicity. 2015-2017: \$636,760. Administering institution: Burnet Institute.
- Gorry P, Lee B, Payne R, Ramsland P. Elucidating the mechanisms and consequences of clinical HIV-1 resistance to the CCR5 antagonist maraviroc. 2014-2016: \$602,670. Administering institution: Burnet Institute.
- Green S, Jeffery J, McDonald S, Lahra M, Laopaiboon M, McKenzie J, Lumbiganon P. SEA-URCHIN: South East Asia - Using Research for Change in Hospital-acquired Infection in Neonates. 2011-2016: \$2,219,157. Administering institution: Monash University.
- Gregorevic P, Harrison C, de Kretser D. Targeting activins to treat cachexia. 2015-2018: \$671,851. Administering institution: Baker IDI.
- Guthridge M, Wei A. Targeting the apoptosis machinery in cancer. 2014-2016: \$527,948. Administering institution: Monash University.
- Hagemeyer C. Targeted activatable cell penetrating peptide delivery of nanoparticles for intracellular therapy. 2015-2017: \$593,813. Administering institution: Monash University.
- Haigh J. Identification and characterisation of novel RNAs involved in cardiovascular cell (de)differentiation. 2013-2016: \$632,701. Administering institution: Monash University.
- Haigh J. Role of Zeb2/Sip1 in leukaemic stem cell formation and cancer progression. 2013-2016: \$655,174. Administering institution: Monash University.
- Hamilton J. Defining the function of the thrombin receptor, PAR4, on human platelets. 2013-2015: \$522,270. Administering institution: Monash University.
- Head G, Davern P. Role of the paraventricular hypothalamus in angiotensin induced neurogenic hypertension. 2013-2015: \$431,586. Administering institution: Baker IDI.
- Head G, Davern P, Marques F, Charchar F. Mechanisms responsible for neurogenic hypertension: role of a novel interaction between amygdala-hypothalamic GABA pathways and the microRNA regulation of rennin. 2014-2016: \$557,562. Administering institution: Baker IDI.

- Hibbs M, Anderson G. Targeting macrophage subtypes as a strategy for chronic inflammatory lung disease therapy. 2015-2017: \$639,794. Administering institution: Monash University.
- Hogarth M, Pietersz G, Baker R, Powell M. Human Fc receptors in antibody mediated inflammation. 2014-2016: \$619,890. Administering institution: Burnet Institute.
- Hogarth M, Wines B, Grimbaldeston M, O'Hehir R. Structure and function of human Fc receptors. 2015-2017: \$673,472. Administering institution: Burnet Institute.
- Holland A, McDonald C, Mahal A. Benefits and costs of home-based pulmonary rehabilitation in chronic obstructive pulmonary disease. 2013-2015: \$364,360. Administering institution: La Trobe University.
- Jabbour A. Signals that are deregulated in leukaemia. 2015-2016: \$202,890. Administering institution: Monash University.
- Jandeleit-Dahm K, Kantharidis P. The role of the microRNA let 7 in diabetic proliferative vascular disease. 2014-2016: \$651,896. Administering institution: Baker IDI.
- Jandeleit-Dahm K, Thomas M, Tikellis C. The role of methylglyoxal and RAGE in diabetes associated atherosclerosis. 2013-2015: \$454,375. Administering institution: Baker IDI.
- Jane S. The role of the mammalian Grainyhead-like gene family in neural tube closure. 2013-2015: \$613,612. Administering institution: Monash University.
- Jane S. Towards a cure for the beta-hemoglobinopathies. 2014-2016: \$617,562. Administering institution: Monash University.
- Jane S, Pearson R, Darido C. Translating molecular insights in squamous cell carcinoma into novel therapeutics. 2013-2016: \$823,336. Administering institution: Monash University.
- Jaworowski A, Crowe S, Cameron P, Elliott J. A longitudinal study of natural killer cell function in HIV-infected individuals initiating therapy. 2013-2015: \$598,938. Administering institution: Burnet Institute.
- Kingwell B, Duffy S, Siebel A. HDL elevation and glucose metabolism: a mechanistic proof-of-concept intervention trial in pre-diabetes. 2014-2016: \$490,468. Administering institution: Baker IDI.
- Kulkarni J. Adjunctive hormone therapy for treatment resistant depression in perimenopausal women. 2013-2015: \$599,514. Administering institution: Monash University.
- Kulkarni J, Barton D, Gurvich C. Selective estrogen receptor modulators - a new adjunctive treatment for men with schizophrenia? 2013-2015: \$788,419. Administering institution: Monash University.
- Kyaw T. B1a B cells: atheroprotective mechanisms and therapeutic application. 2014-2016: \$529,169. Administering institution: Baker IDI.
- Lahoud M, Shortman K, Caminschi I. Molecular basis for the efficient processing of antigens taken up by Clec9A, a DAMP receptor on dendritic cells. 2015-2019: \$1,248,500. Administering institution: Burnet Institute.
- Lannin N, Ratcliffe J, Ada L, English C, Crotty M. Optimising upper limb recovery following stroke: a randomised controlled trial of the effects of botulinum toxin-A combined with intensive rehabilitation compared to botulinum toxin-A alone. 2015-2017: \$1,036,713. Administering institution: La Trobe University.
- Leder K, Boving T, Gautam S, Forbes A, Mahal A, Luby S. Improving access to safe water using Riverbank Filtration Technology. 2015-2017: \$1,021,398. Administering institution: Monash University.
- Leslie K, Myles P, Paech M, Story D, Chow C. POISE-2: a large, international, placebo-controlled, factorial trial to assess the impact of clonidine and aspirin in patients undergoing non-cardiac surgery who are at risk of a perioperative cardiovascular event. 2011-2015: \$1,136,310. Administering institution: Monash University.
- Leslie K, Short T, Chan M, Myles P, Paech M, Corcoran T. The influence of anaesthetic depth on patient outcome after major surgery. 2013-2017: \$2,893,794. Administering institution: Monash University.
- Luchters S, Crowe S, Stoové M, Anderson D, Markby J, Ryan C, Kelly A, Chen XS, Kelso D, Vallely A. Reduced HIV infection and increased survival among HIV-exposed infants using two newly developed point-of-care tests in Papua New Guinea and China. 2014-2016: \$923,691. Administering institution: Burnet Institute.
- Luchters S, Lim M, Hellard M, Stoové M, Jaoko W, Kingola N, L'Engle K, Chersich M, Temmerman M. Reducing unintended pregnancies among female sex workers in Kenya using mHealth: a cluster randomised trial. 2015-2017: \$706,692. Administering institution: Burnet Institute.
- Maguire G, Ward J. Preventing hospital readmission in a regional Australian hospital setting. 2014-2016: \$546,862. Administering institution: Baker IDI.
- McMullen J. Targeting PI3K-regulated lipids to treat heart failure. 2013-2015: \$472,889. Administering institution: Baker IDI.
- McMullen J, Lin R. The cardioprotective role of PI3K-regulated small non-coding RNAs. 2013-2015: \$589,695. Administering institution: Baker IDI.
- McMullen J, Ritchie R. Identification of a microRNA-based therapy for the diabetic heart. 2014-2016: \$510,505. Administering institution: Baker IDI.
- McNamara B, Eades S, Jorm L, Preen D, Jones J, Joshy G, Gubhaju L, Shepherd C, McAullay D. 'Defying the odds': exploring the impact of perinatal outcomes, maternal social and health outcomes and levels of culturally appropriate service availability on the health of Western Australian Aboriginal infants and children. 2015-2018: \$634,885. Administering institution: Baker IDI.
- McNeil J, Egan G, Brodtmann A, Ward S, Ferris N. ASPREE-NEURO: aspirin and cerebral microhaemorrhages. 2015-2018: \$956,186. Administering institution: Monash University.
- McNeil J, Guymer R, Robman L, Woods R. Low dose aspirin and age-related macular degeneration: randomised controlled trial. 2013-2017: \$991,797. Administering institution: Monash University.
- Medcalf R, Lawrence D. Proteases and protease-inhibitor complexes as modulators of traumatic brain injury severity. 2013-2015: \$592,142. Administering institution: Monash University.
- Medcalf R, Mitchell A. New approaches to improve thrombolysis in ischaemic stroke. 2013-2015: \$565,847. Administering institution: Monash University.
- Meikle P, Best J. Lipidomic analysis of the FIELD trial: mechanism of action and prediction of response to fenofibrate treatment in type 2 diabetes. 2013-2015: \$621,134. Administering institution: University of Sydney.
- Myles P, Bellomo R, Christophi C, Corcoran T, Forbes A, Peyton P, Story D. Restrictive versus Liberal Fluid Therapy in Major Abdominal Surgery: The RELIEF Trial. 2013-2017: \$2,384,173. Administering institution: Monash University.

- Nandurkar H, Cowan P, Dwyer K. VCAM-targeted delivery of recombinant CD39 to the endothelium is antithrombotic, anti-inflammatory and ameliorates ischaemia reperfusion injury. 2015-2017: \$620,419. Administering institution: Monash University.
- Nichol A, Davies A, Hodgson C, Fraser J, Bersten A, Cooper DJ. A multi-centre RCT of an open lung strategy including permissive hypercapnia, alveolar recruitment and low airway pressure in patients with ARDS. 2012-2015: \$997,535. Administering institution: Monash University.
- O'Keefe M, Radford K, Lucas M. Exploring the contribution of interferon-lambda to autoimmune disease. 2015-2017: \$807,787. Administering institution: Burnet Institute.
- Oldenburg B, Hare D, Taylor C, McKenzie D, Forbes A, Sanderson K, Clarke D, Hollingsworth S. A prospective cohort study investigating the relationships between negative emotions, biomarkers and long term functioning in post-MI patients. 2012-2015: \$851,071. Administering institution: Monash University.
- Oldenburg B, Thankappan K, Tapp R, Zimmet P, Jolley D, Hollingsworth B, Fisher E. Kerala Diabetes Prevention Program (K-DPP): a cluster RCT of its effectiveness and cost-effectiveness. 2011-2015: \$1,046,991. Administering institution: Monash University.
- Peter K. Defining 'therapeutic' cells as well as establishing cell targeting and tracking technology for the treatment of myocardial infarction and atherosclerosis. 2014-2016: \$642,952. Administering institution: Baker IDI.
- Peter K. Developing functionalised microbubbles for molecular ultrasound imaging, drug and microRNA delivery. 2013-2015: \$653,597. Administering institution: Baker IDI.
- Peter K. Nanoparticle and virus assisted targeting of microRNA and DNA for the treatment of atherosclerosis, myocardial infarction and other inflammatory diseases. 2014-2016: \$640,853. Administering institution: Baker IDI.
- Peter K. The role of C reactive protein (CRP) in localising inflammation to misfolded proteins and stressed cells: a basis for the development of new anti-inflammatory reagents. 2014-2016: \$700,465. Administering institution: Baker IDI.
- Poumbourios P, Drummer H. Studies on the activation and immunogenicity of the HIV-1 glycoproteins, gp120-gp41. 2014-2016: \$615,558. Administering institution: Burnet Institute.
- Ritchie R. Annexin-A1 mimetics: a novel therapeutic approach for targeting the cardiac complications of diabetes. 2015-2018: \$784,154. Administering institution: Baker IDI.
- Ritchie R, Gao XM, Yang Y. Annexin-A1 agonists rescue cardiac contractile function after myocardial infarction. 2013-2015: \$599,972. Administering institution: Baker IDI.
- Schlaich M. Renal denervation to improve outcomes in patients with end-stage renal disease. 2013-2015: \$992,544. Administering institution: Baker IDI.
- Schlaich M, Head G, Denton K. Mechanisms and consequences of renal denervation in chronic kidney disease. 2013-2015: \$1,247,960. Administering institution: Baker IDI.
- Schlaich M, Lambert G. Renal denervation for uncontrolled hypertension. 2012-2016: \$2,073,675. Administering institution: Baker IDI.
- Shehabi Y, Bellomo R, Reade M, Seppelt I, McArthur C, Bailey M, Howe B. Early goal-directed sedation compared with standard care in mechanically ventilated critically ill patients: a prospective multicentre randomised controlled trial. 2013-2017: \$2,752,725. Administering institution: Monash University.
- Storey E. Mechanisms of ataxia in spinocerebellar ataxia type 1 transgenic mice. 2013-2015: \$348,864. Administering institution: Monash University.
- Storey E, Ward S, Woods R, Hamilton G, Janke A, Kawasaki R, Naughton M. The SNORE-ASA study: a study of neurocognitive outcomes, radiological and retinal effects of aspirin in sleep apnoea. 2012-2016: \$850,000. Administering institution: Monash University.
- Stoové M, Kinner S, Butler T, Aitken C, Ogloff J, Dietze P. A prospective cohort study of ex-prisoners with a history of injecting drug use: examining health service utilisation, physical and mental health and blood borne virus trajectories. 2012-2016: \$956,019. Administering institution: Burnet Institute.
- Tachedjian G, Anderson D, Cone R, Hearps A, Gugasyan R. Immune modulatory effects of vaginal microbiota metabolites and HIV susceptibility. 2015-2017: \$770,084. Administering institution: Burnet Institute.
- Tachedjian G, Chalmers D, Sluis-Cremer N, Arnold E, Simpson J. Towards a new class of reverse transcriptase inhibitor for HIV prevention. 2014-2016: \$663,918. Administering institution: Burnet Institute.
- Taylor A. The role of diffuse myocardial fibrosis in myocardial stiffness. 2012-2015: \$479,940. Administering institution: Baker IDI.
- Teede H, Lombas C, Zoungas S, Keating C. Preventing weight gain in young to mid-aged women living in rural communities: a cluster randomised controlled trial. 2012-2015: \$863,888. Administering institution: Monash University.
- Thomas M, Pflieger K. Interactions between RAGE and the type 1 angiotensin receptor determine the pro-atherosclerotic actions of angiotensin II. 2015-2017: \$505,615. Administering institution: Baker IDI.
- Thomson K, Millar J, Kavnoudias H, Stricker P, Neal II R. Developing irreversible electroporation non-thermal tumor ablation for organ-confined prostate cancer treatment. 2015-2017: \$281,746. Administering institution: Monash University.
- Ting S, Curtis D. Endocytosis and asymmetric cell division in leukaemia. 2013-2015: \$529,419. Administering institution: Monash University.
- Urquhart D, Cicuttini F, Rosenfeld J, Forbes A, Wluka A, Leder K. Is antibiotic treatment effective in the management of chronic low back pain in those with disc herniation? A double-blind, randomised, placebo-controlled trial with an economic evaluation. 2015-2017: \$533,760. Administering institution: Monash University.
- Wang B, Kompa A, Kelly D. Mechanisms underlying the contribution of uremic toxins to cardiorenal syndrome. 2015-2017: \$400,588. Administering institution: Monash University.
- Wang Y, Cicuttini F, Tonkin A, Hill C, Ding C. Does statin use have a disease modifying effect in symptomatic knee osteoarthritis? A multicentre randomised, double-blind, placebo-controlled trial. 2013-2015: \$971,019. Administering institution: Monash University.
- Watson A. Role of intrarenal nerves in the progression of hypertension and diabetic nephropathy. 2015-2017: \$713,337. Administering institution: Baker IDI.
- Wei A, Bradstock K, Levis M, Murray M, Roberts A. A randomised study to optimise clinical outcomes in patients with FLT3 mutant AML. 2013-2017: \$1,111,891. Administering institution: Monash University.

Weller C, Haines T, Ward S, Darby I, Barker A, Underwood M. Clinical effectiveness of aspirin in healing chronic venous leg ulcers: a randomised double-blinded placebo-controlled trial. 2014-2017: \$766,311. Administering institution: Monash University.

Westein E, Murphy A. Investigation into the intervention of arterial thrombosis and atherosclerosis using shear sensitive nanoparticle drug delivery. 2015-2017: \$447,077. Administering institution: Baker IDI.

Wilkinson-Berka J, Smith J, Schmidt H, Appukuttan B. Inhibition of specific NOX isoforms as a new treatment for hypertensive and diabetic retinopathy. 2015-2018: \$823,373. Administering institution: Monash University.

Wluka A, Cicuttini, Urquhard D, Teichtahl A. Does low dose amitriptyline reduce pain in knee osteoarthritis? A double blind, randomised, pragmatic, placebo controlled clinical trial of amitriptyline in addition to usual care. 2015-2017: \$401,362. Administering institution: Monash University.

Wood E, Stanworth S, Szer J, Westerman D, Cole-Sinclair M, McQuilten Z, Estcourt L. Trial to Evaluate Anti-fibrinolytic Therapy in Thrombocytopenia (TREAT). 2015-2019: \$1,012,635. Administering institution: Monash University.

Zoungas S, McNeil J, Tonkin A, Wolfe R, Nelson M, Beilin L, Storey E, Abhayaratna W. A study of Statins for reducing events in the elderly. 2014-2018: \$5,336,890. Administering institution: Monash University.

Research Fellowships

Andrews R. 2011-2016. Administering institution: Monash University.

Beeson J. 2015-2019. Administering institution: Burnet Institute.

Buchbinder R. 2015-2019. Administering institution: Monash University.

Crowe S. 2013-2017. Administering institution: Burnet Institute.

Davis S. 2013-2017. Administering institution: Monash University.

Dart A. 2010-2015. Administering institution: Baker IDI.

Dietze P. 2011-2016. Administering institution: Burnet Institute.

Dixon J. 2015-2019. Administering institution: Baker IDI.

Drummer H. 2013-2017. Administering institution: Burnet Institute.

Du XJ. 2013-2017. Administering institution: Baker IDI.

Dunstan D. 2015-2019. Administering institution: Baker IDI.

Esler M. 2015-2019. Administering institution: Baker IDI.

Fitzgerald P. 2015-2019. Administering institution: Monash University.

Gardiner E. 2013-2017. Administering institution: Monash University.

Gerondakis S. 2011-2015. Administering institution: Monash University.

Guthridge M. 2014-2018. Administering institution: Monash University.

Head G. 2011-2016. Administering institution: Baker IDI.

Hellard M. 2014-2018. Administering institution: Burnet Institute.

Hibbs M. 2010-2015. Administering institution: Monash University.

Jandeleit-Dahm K. 2014-2018. Administering institution: Baker IDI.

Kaye D. 2013-2017. Administering institution: Baker IDI.

Kingwell B. 2014-2018. Administering institution: Baker IDI.

Lambert G. 2013-2017. Administering institution: Baker IDI.

McMullen J. 2015-2019. Administering institution: Baker IDI.

Medcalf R. 2013-2017. Administering institution: Monash University.

Meikle P. 2013-2017. Administering institution: Baker IDI.

O'Keefe M. 2015-2019. Administering institution: Burnet Institute.

Owen N. 2011-2016. Administering institution: Baker IDI.

Plebanski M. 2014-2018. Administering institution: Monash University.

Peter K. 2015-2019. Administering institution: Baker IDI.

Reid C. 2013-2017. Administering institution: Monash University.

Ritchie R. 2014-2018. Administering institution: Baker IDI.

Shaw J. 2015-2019. Administering institution: Baker IDI.

Sviridov D. 2010-2015. Administering institution: Baker IDI.

Thomas M. 2015-2019. Administering institution: Baker IDI.

Wilkinson-Berka. 2011-2015. Administering institution: Monash University.

Zoungas S. 2015-2019. Administering institution: Monash University.

Practitioner Fellowships

Cooper DJ. 2013-2017. Administering institution: Monash University.

Cameron P. 2009-2015. Administering institution: Monash University.

Fitzgerald P. 2015-2019. Administering institution: Monash University.

Gruen R. 2012-2016. Administering institution: Monash University.

Kistler P. 2012-2016. Administering institution: Baker IDI.

Krum H. 2012-2015. Administering institution: Monash University.

Maguire G. 2013-2017. Administering institution: Baker IDI.

Myles P. 2013-2017. Administering institution: Monash University.

Career Development Fellowships

Andrews D. 2015. Administering institution: Monash University.

Barker A. 2014-2018. Administering institution: Monash University.

Cheng A. 2014-2018. Administering institution: Monash University.

Gabbe B. 2013-2016. Administering institution: Monash University.

Gregorevic P. 2013-2016. Administering institution: Baker IDI.

Hoy K. 2015-2018. Administering institution: Monash University.

Leder K. 2015-2018. Administering institution: Monash University.

Lee-Young R. 2013-2016. Administering institution: Baker IDI.

Maller J. 2011-2015. Administering institution: Monash University.

Murphy A. 2015-2018. Administering institution: Baker IDI.

Peleg A. 2013-2016. Administering institution: Monash University.

Stoové M. 2015-2018. Administering institution: Burnet Institute.

Ting S. 2013-2016. Administering institution: Monash University.

Urquhart D. 2011-2018. Administering institution: Monash University.

Wang Y. 2014-2017. Administering institution: Monash University.

Wluka A. 2014-2017. Administering institution: Monash University.

Early Career Fellowships

Agostino M. 2013-2016. Administering institution: Burnet Institute.

Bilardi J. 2011-2020. Administering institution: Monash University.

Binger K. 2012-2015. Administering institution: Baker IDI.

Boyle M. 2014-2017. Administering institution: Burnet Institute.

Bray J. 2014-2017. Administering institution: Monash University.

Brijnath B. 2012-2016. Administering institution: Monash University.

Chan W. 2013-2016. Administering institution: Baker IDI.

Chang C. 2015-2018. Administering institution: Monash University.

Chow E. 2015-2018. Administering institution: Monash University.

Drew B. 2009-2015. Administering institution: Baker IDI.

Duncan R. 2014-2017. Administering institution: Burnet Institute.

Elliott J. 2012-2015. Administering institution: Monash University.

Fitzgibbon B. 2014-2018. Administering institution: Monash University.

Freak-Poli R. 2013-2016. Administering institution: Monash University.

Hodgson C. 2012-2015. Administering institution: Monash University.

Horyniak D. 2015-2018. Administering institution: Burnet Institute.

Howell J. 2014-2017. Administering institution: Burnet Institute.

Iles L. 2014-2017. Administering institution: Baker IDI.

Jackson K. 2015-2018. Administering institution: Baker IDI.

Jenkinson R. 2013- 2016. Administering institution: Burnet Institute.

Lim K. 2013- 2016. Administering institution: Baker IDI.

Lowthian J. 2013-2016. Administering institution: Monash University.

McKenzie J. 2014-2017. Administering institution: Monash University.

McNamara B. 2010-2015. Administering institution: Baker IDI.

Mitra B. 2014-2017. Administering institution: Monash University.

O'Connor D. 2010-2015. Administering institution: Monash University.

O'Toole J. 2011-2015. Administering institution: Monash University.

Page M. 2015-2018. Administering institution: Monash University.

Panjari M. 2012-2015. Administering institution: Monash University.

Pedrana A. 2014-2017. Administering institution: Burnet Institute.

Read T. 2015-2018. Administering institution: Monash University.

Richards J. 2012-2015. Administering institution: Burnet Institute.

Roche M. 2014-2017. Administering institution: Monash University.

Rogasch N. 2014-2017. Administering institution: Monash University.

Sacre J. 2014-2017. Administering institution: Baker IDI.

Sands S. 2013-2017. Administering institution: Monash University.

Segrave R. 2012-2015. Administering institution: Monash University.

Senthi S. 2015-2018. Administering institution: Monash University.

Sharma A. 2015-2018. Administering institution: Baker IDI.

Stub D. 2015-2018. Administering institution: Baker IDI.

Teichtahl A. 2014-2017. Administering institution: Baker IDI.

Weiss G. 2013- 2016. Administering institution: Burnet Institute.

Zou H. 2015-2018. Administering institution: Burnet Institute.

Other Australian Grants

AusAID – NGO Project Grants

Power R. Asia Regional HIV/AIDS Project; Indonesian HIV/AIDS Prevention and Care Project; Indonesian-Australian Specialised Training Program; Xinjiang HIV/AIDS Prevention and Care Project; HAARP. 2007-2015: \$3,451,850. Administering institution: Burnet Institute.

Toole M. Community-based HIV programs for youth and vulnerable populations. Improving Immunisation and Newborn Survival at Aid Post Level (IINSP) Project (East Sepik). Improving community demand for timely maternal and child health services in 4 rural townships in Yangon, Burma; Improving Women and Children's Health in Vilabouly District. 2012-2015: \$341,840. Administering institution: Burnet Institute.

Toole M. PNG Health and HIV AIDS. 2014-2015: \$198,834. Administering institution: Burnet Institute.

Toole M. Tibet Health Capacity Building Program. 2013-2015: \$1,993,763. Administering institution: Burnet Institute.

Australian and New Zealand College of Anaesthetists – Research Grants

Bain C, Shaw A, Corcoran T, Bozaoglu K. Analysis of the impact of pre-existing differential DNA methylation on inflammatory gene expression and the inflammatory response to major abdominal surgery. 2015: \$69,000. Administering institution: Monash University.

Marshall S, Lenne M. Investigation and prevention of fixation errors during airway management. 2015-2016: \$58,000. Administering institution: Monash University.

McGuinness S, Bihari S, Bersten A, Hodgson C, Nichol A. DO ARDS patients with different subtypes behave differently - A PHARLAP sub-study. 2014-2015: \$34,950. Administering institution: Monash University.

McIlroy D, Pilcher A, Pellegrino V, Cooper DJ, Aubron C. Heparin low dose protocol versus standard care in critically ill patients undergoing extracorporeal membrane oxygenation. 2015: \$37,000. Administering institution: Alfred Health.

Australian Research Council – Discovery Projects

Smith B, Bauman A, Rissel C, Shilton T. Evaluation in health promotion: gathering evidence to improve effectiveness. 2015-2017: \$147,380. Administering institution: Monash University.

Australian Research Council – Discovery Early Career Researcher Awards

Dworkin S. 2014-2016. Administering institution: Monash University.

Australian Research Council – Future Fellowships

Fowkes F. 2013-2017. Administering institution: Burnet Institute.

Gorry PR. 2012-2016. Administering institution: Burnet Institute.

Hamilton J. 2013-2017. Administering institution: Monash University.

Karagiannis T. 2012-2016. Administering institution: Baker IDI.

Renzaho AM. 2012-2015. Administering institution: Monash University.

Australian Research Council – Linkage Grants

Bucknall T, Hutchinson AM. Listen to me, I really am sick! Understanding patient and family perspectives in triggering responses to medical emergencies. 2012-2015: \$197,293. Administering institution: Deakin University.

Fitzgerald PB, Fifield W. The development and testing of a device to enhance the application of repetitive transcranial magnetic stimulation. 2013-2016: \$581,643. Administering institution: Monash University.

Kirkman M, Fisher J, Souter K, Dobson A, Butera R, Casper G, Dally G, Farrell E, L'Huillier E, Malone J, Michelmore J, Tomlinson J, Vollenhoven B. Elucidating the increasing demand for genital cosmetic surgery among girls and women in Australia. 2013-2016: \$327,220. Administering institution: Monash University.

Renzaho A, Polonsky M, Mellor DJ, Green JB, Nicholson J, Oldenburg B, Horton K. Community capacity building for healthy lifestyles (CBHL) initiative: engaging communities in childhood obesity prevention in disadvantaged areas. 2013-2016: \$252,000. Administering institution: Monash University.

Smith B, Ewing M, Newton F, Donovan R, Bauman A, Mahal A, Mackay B. Harnessing recreational infrastructure to improve physical activity and community well-being. 2013-2016: \$169,605. Administering institution: Monash University.

Smith P, Sim M, LaMontagne A, Hogg-Johnson S, Lilley R, McConnell-Lynch H, Ryan S, Hill J, Fitzpatrick T, Browne T. Understanding individual, workplace and system level influences on return to work in a changing Australian labour market. 2013-2016: \$416,282. Administering institution: Monash University.

beyondblue National Priority Drive Research Grant Program – Research Grant

Segrave R. Cognitive control training for treatment resistant depression: application, evaluation and augmentation. 2013-2015: \$97,598. Administering institution: Monash University.

BUPA Health Foundation – Project Grant

Abbott A. Optimising outcomes in patients with carotid arterial disease. 2014-2016: \$286,783. Administering institution: Monash University.

Davis S. Improving the health of Australian women at midlife. 2013-2015: \$200,000. Administering institution: Monash University.

CASS Foundation – Science and Medicine Grants

Calkin A. The role of IDOL in protection against myocardial ischaemia/infarction and cardiac insulin resistance. 2015-2016: \$55,000. Administering institution: Baker IDI.

De Blasio M. Novel gene therapy to rescue heart function in type 2 diabetic heart failure. 2015-2016: \$55,000. Administering institution: Baker IDI.

Qin C. Preventing diabetes-induced heart failure with a natural anti-inflammatory protein. 2015-2016: \$55,000. Administering institution: Baker IDI.

Tachedjian G. Bat molecule to fight human viruses. 2015: \$55,000. Administering institution: Burnet Institute.

Diabetes Australia Research Trust – General Grants

Drew B. Promoting mitochondrial health to prevent skeletal muscle insulin resistance. 2015: \$59,100. Administering institution: Baker IDI.

Febbraio M. Does the cytokine release inhibitory drug CRID3 improve symptoms of type 2 diabetes? 2015: \$60,000. Administering institution: Baker IDI.

Gray S. The role of Nox5 in diabetic associated vascular disease. 2015: \$59,979. Administering institution: Baker IDI.

Gregorevic P. Enhancing BMP signalling to prevent and treat type 2 diabetes. 2015: \$60,000. Administering institution: Baker IDI.

Henstridge D. Can exercise trained gut microbiota be used to treat diet induced obesity and insulin resistance? 2015: \$60,000. Administering institution: Baker IDI.

Murphy A. How does insulin resistance, obesity and type 2 diabetes affect atherosclerotic lesion regression? 2015: \$60,000. Administering institution: Baker IDI.

Reutens A. A randomised, open-label study using continuous glucose monitoring to compare the effects of once a day versus twice a day prednisolone dosing schedule on glycaemic control in people with type 2 diabetes mellitus. 2014-2015: \$54,832. Administering institution: Baker IDI.

Thallas-Bonke V. Central role of Nox4 in mediating diabetic nephropathy via a PKC dependent pathway. 2015: \$60,000. Administering institution: Baker IDI.

Department of Health (Federal Government)

Dietze P. Ecstasy and Related Drug Reporting System (EDRS). 2010-2015: \$251,428. Administering institution: University of New South Wales.

Dietze P, Hellard M. Illicit Drug Reporting System (IDRS). 2010-2015: \$339,685. Administering institution: University of New South Wales.

Drummer H. Analytical tools for GLP and GMP manufacture of a novel HCV vaccine candidate, Delta3TM. 2015: \$170,000. Administering institution: Burnet Institute.

Gorry P. Second generation CCR5 antagonists as new HIV-1 entry inhibitors. 2015: \$168,000. Administering institution: Burnet Institute.

Gray L. Clinically validating the first suite of genotypic prognostic tropism tests for non-B-HIV-1 subtypes. 2015: \$170,000. Administering institution: Burnet Institute.

Hearps A. Mapping the HIV reservoir in monocytes and macrophages. 2015: \$165,000. Administering institution: Burnet Institute.

Palmer C. Prognostic tools to improve the clinical care of people living with HIV infection. 2015: \$170,000. Administering institution: Burnet Institute.

Poumbourios A. Novel HIV-like particle and recombinant glycoprotein vaccines with enhanced presentation of broad neutralisation epitopes. 2015: \$170,000. Administering institution: Burnet Institute.

Wright E. START HIV-1 reservoir substudy. 2015: \$119,000. Administering institution: Burnet Institute

Department of Health and Human Services (Victorian Government)

Fisher J, Rowe H. Advancing perinatal mental health to diverse audiences with interactive social media applications. 2013-2015: \$148,141. Administering institution: Monash University.

Harding P. Advanced Musculoskeletal Physiotherapy (AMP) implementation program. 2014-2015: \$180,000. Administering institution: Alfred Health.

Wright E. Victorian Pre-exposure Prophylaxis (PrEP) demonstration project. 2014-2016: \$320,000. Administering institution: Alfred Health.

Zalberg J. Upper gastro-intestinal cancer clinical quality registry (UGI-CR). 2015-2017: \$985,000. Administering institution: Monash University.

Institute for Safety, Compensation and Recovery Research – Development Grant

Lannin N, Petrie S, Johnson T, Phillips K. The use of Google Calendar to increase independence in target activities in survivors of traumatic brain injury. 2014-2015: \$49,894. Administering institution: La Trobe University.

Institute for Safety, Compensation and Recovery Research – Project Grants

Cooper DJ. OzENTER-TBI: Australian-European NeuroTrauma Effective Research, Traumatic Brain Injury Collaboration - a prospective longitudinal observation study. 2015-2018: \$118,271. Administering institution: Monash University.

Lannin N, Hunter P, Gruen R, Gabbe B, Holland A, Ratcliffe J. Rehabilitation after catastrophic acquired brain injury (Phase II). 2014-2018: \$915,000. Administering institution: Alfred Health.

Mosley I. Management of traumatic spinal cord injuries in the acute setting. 2014-2015: \$50,000. Administering institution: Monash University.

Juvenile Diabetes Research Foundation (Australia)/ARC - Australian Type 1 Diabetes Clinical Research Network

Cooper M, Shaw JE, Bach L, El-Osta A, Jandeleit-Dahm K, Thomas M, Colman P, Zoungas S, Teede H. CONCEPT A - A double-blind randomised placebo-controlled phase IIa study evaluating the safety and efficacy of inhibition of NADPH Oxidase with GKT137831 in adults with type 1 diabetes and elevated urinary albumin excretion. 2015-2019: \$2,820,000. Administering institution: Baker IDI.

Leukaemia Foundation – Grant-in-Aid

Tremblay C. Finding new and more efficient treatments for T-cell acute lymphoblastic leukaemia. 2014-2015: \$100,000. Administering institution: Monash University.

Multiple Sclerosis Research Australia – Incubator Grant

Peter K, Hagemeyer C, Orian JM. Platelets as central players in the pathophysiology of multiple sclerosis and targets for early detection. 2015: \$50,000. Administering institution: Baker IDI.

National Heart Foundation of Australia – Career Development Fellowships

Hagemeyer C. 2012-2016. Administering institution: Monash University.

National Heart Foundation of Australia – Future Leader Fellowships

Calkin A. 2014-2018. Administering institution: Baker IDI.

La Gerche A. 2015-2019. Administering institution: Baker IDI.

Murphy A. 2015-2019. Administering institution: Baker IDI.

National Heart Foundation of Australia – Overseas Research Fellowship

Weeks K. 2013-2016: Administering institution: Baker IDI.

National Heart Foundation of Australia – Postdoctoral Fellowships

Chen YC. 2015-2016. Administering institution: Baker IDI.

Harrison C. 2014-2015. Administering institution: Monash University.

Wang X. 2015-2016. Administering institution: Baker IDI.

Westein E. 2014-2016. Administering institution: Baker IDI.

National Heart Foundation of Australia – Vanguard Grant

Reid C, Smith J, Tran L, Baker R. Effectiveness of surgeon performance feedback on improving cardiac surgery. 2015: \$73,026. Administering institution: Monash University.

Sylvia and Charles Viertel Charitable Foundation – Senior Medical Research Fellowship

Curtis D. Using mouse models to identify improved therapies for hematologic malignancies. 2010-2015. Administering institution: Monash University.

Dickins R. Modelling lymphocytic leukaemia and its treatment using RNA interference. 2015. Administering institution: Monash University.

Transport Accident Commission – Research Grants

Cameron P. Victorian Orthopaedic Trauma Outcomes Registry (VOTOR). 2011-2015: \$2,201,012. Administering institution: Monash University.

Gabbe B. Evaluation of the implementation of a new model of bladder management care at the Victorian Spinal Cord Service. 2015-2018: \$372,064. Administering institution: Monash University.

Victorian Neurotrauma Initiative – Project Grants

Cooper DJ, Bellomo R, Bernard S. Multi-centre randomised controlled trials of early acute interventions (hypothermia, and erythropoietin) to improve outcomes after traumatic brain injury. 2010-2015: \$2,100,000. Administering institution: Monash University.

INTERNATIONAL GRANTS

Juvenile Diabetes Research Foundation International – Career Development Award

Tikellis C. 2010-2015. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Postdoctoral Fellowships

Chow B. 2015-2018. Administering institution: Baker IDI.

Higgins G. 2014-2017: Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Project Grant

Thallas-Bonke V. Synergistic actions of NADPH oxidase and PKC in diabetic nephropathy. 2012-2015: US\$269,820. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Strategic Research Agreement

Hagemeyer C, Cooper M, Allen T, Shaw JE, Caruso F. Smart insulin delivery with glucose responsive nanomaterials. 2015-2017: \$1,877,608. Administering institution: Monash University.

Juvenile Diabetes Research Foundation International – Target Discovery and Validation for Diabetic Nephropathy

Coughlan M. Targeting the C5a-CD88 axis in diabetic nephropathy. 2014-2015: US\$110,000. Administering institution: Baker IDI.

Jandeleit-Dahm K. Nox5 is a new target for diabetic nephropathy. 2014-2016: US\$500,000. Administering institution: Baker IDI.

National Multiple Sclerosis Society

Petratos S. Delineating the role of the monocarboxylate transporter 8 (MCT8) in driving oligodendrocyte precursor cell maturation. 2014-2015: US\$40,000. Administering institution: Monash University.

Petratos S. Limiting axonal degeneration in a model of multiple sclerosis. 2014-2015: US\$107,786. Administering institution: Monash University.

National Institutes of Health (USA)

Anderson D. Development of anti-Salmonella single chain antibodies as serum diagnostics. 2015: US\$117,148. Administering institution: Duke University.

Bukrinsky M, Fitzgerald ML, Sviridov D. HIV disease and impairment of high density lipoprotein metabolism. 2010-2016: US\$3,658,822. Administering institution: George Washington University.

Churchill M. Transcriptional HIV-1 latency in astrocyte and macrophage reservoirs of the central nervous system. 2013-2015: US\$296,944. Administering institution: Burnet Institute.

Grimm R, McNeil J. ASPIrin in Reducing Events in the Elderly (ASPREE). 2010-2015: US\$23,372,347. Administering institution: Monash University.

McIndoe R, Chai Z. A potential role of CDA1 in inflammatory pathway in diabetic complications. 2014-2015: US\$1,460,000. Administering institution: Georgia Regent University.

Wright E, Hoy J. International Network for Strategic Initiatives in Global HIV Trials (INSIGHT). 2010-2015: US\$ \$165,754.00. Administering institution: Monash University.

Worldwide Cancer Research

Dietze P, O'Keefe M. Investigating dendritic cells of bone marrow in healthy and myelodysplastic states. 2014-2016: \$114,445. Administering institution: Burnet Institute.

Mackay F, Ting S. Investigating and correcting immune system defects in chronic lymphocytic leukaemia (CLL). 2014-2016: \$376,036. Administering institution: Monash University.

NHMRC GRANTS COMMENCING IN 2016

Program Grants

Cowman A, Crabb B, Mueller I, Beeson J, Rogerson S. Understanding malaria in the human host. 2016-2020: \$10,894,940. Administering institution: Walter and Eliza Hall Institute of Medical Research.

Krum H, Reid C, Liew D. Novel approaches to the prevention and treatment of chronic heart disease and its co-morbid complications. 2016-2020: \$5,603,110. Administering institution: Monash University.

Program Grants (funding commencing 2017)

Glasziou P, Buchbinder R, Maher C, McCaffery K. Using healthcare wisely: reducing inappropriate use of tests and treatments. 2017-2021: \$9,578,895. Administering institution: Bond University.

NHMRC-NSFC Joint Call for Research

El-Osta A, Yu H, Chan J, Thomas M, Cooper M. Epigenomic Profiling of CVD in Chinese Adults with Type 2 Diabetes. 2016-2020: \$596,662. Administering institution: Baker IDI.

Project Grants

Abramson M, Walters E, Corte T, Benke G. Occupational and environmental exposures associated with idiopathic pulmonary fibrosis in Australia. 2016: \$282,760. Administering institution: Monash University.

Alt K, Paterson B. Novel targeted PEG nanoparticles for cancer treatment and monitoring. 2016-2018: \$606,979. Administering institution: Monash University.

Bernard S, Smith K, Cameron P, Finn J, Grantham H, Bray J, Stub D, Rogers I, Perkins G. Reduction of oxygen after cardiac arrest: the EXACT trial. 2016-2020: \$1,891,020. Administering institution: Monash University.

Bobik A, Toh B, Tipping P, Kyaw T. Cardiac fibrosis in hypertensive heart disease: cellular and molecular mechanism. 2016-2018: \$631,979. Administering institution: Baker IDI.

Churchill M, Gorry P, Estes J, Lee B, Wesselingh S. HIV phenotypes important for the establishment of persistent reservoirs in the central nervous system and which impact neurotropism and neuropathogenesis. 2016-2018: \$762,491. Administering institution: Burnet Institute.

Churchill M, Gorry P, Estes J, Wesselingh S. Viral determinants of HIV-1 transcriptional latency in the central nervous system: impact on cure strategies. 2016-2018: \$847,520. Administering institution: Burnet Institute.

Coughlan M, Cooper M, Devenish R. Investigating pathways of mitochondrial quality control in diabetic kidney disease. 2016-2020: \$944,517. Administering institution: Baker IDI.

Darido C, Jane S, Georgy S. Stratification of therapies in HNSCC through discovery of molecular signatures. 2016-2019: \$852,600. Administering institution: Monash University.

Davis S, Bell R, Wolfe R. Sex hormones and heart disease in older women study (the SHOW study). 2016-2019: \$594,672. Administering institution: Monash University.

Drummer H, Poubourios P, Hellard M. Profiling the specificity of the neutralising antibody response in people who have had long term protection from developing chronic HCV. 2016-2018: \$372,972. Administering institution: Burnet Institute.

Fisher J, Biggs B-A, Tran T, Luchters S, Tran T, Hipgrave D. Learning clubs to improve women's health and infant's health and development in Vietnam: a cluster randomised controlled trial of a low-cost, evidence-informed, structured intervention. 2016-2019: \$1,372,748. Administering institution: Monash University.

Forbes A, Kahan B, Hemming K, Carlin J, McKenzie J, Haines T. New methods and guidelines for the design, analysis and reporting of cluster-crossover and stepped wedge randomised trials in clinical and public health research. 2016-2018: \$391,257. Administering institution: Monash University.

Gregorevic P, Harvey K. Pre-clinical assessment of the therapeutic potential of targeting the Hippo pathway in muscle wasting & muscle-derived cancer. 2016-2018: \$621,979. Administering institution: Baker IDI.

Haigh J, Mecucci C, Dickins R. Role of ZEB/NuRD interactions in haematopoiesis and lymphoid malignancies. 2016-2018: \$810,497. Administering institution: Monash University.

Head G, Marques F, Charchar F, Evans R. Neural control of renin expression by microRNA in hypertension. 2016-2019: \$805,972. Administering institution: Baker IDI.

Hibbs M, Fouras A. Characterisation of emerging new signalling networks that underlie COPD phenotypes. 2016-2018: \$696,966. Administering institution: Monash University.

Holland A, McDonald C, Mahal A, Wootton R, Alison J. Telerehabilitation for chronic obstructive pulmonary disease. 2016-2019: \$697,942. Administering institution: La Trobe University.

Jane S, Georgy S. Identification of factors critical for maintenance of the epidermal barrier. 2016-2018: \$616,950. Administering institution: Monash University.

Jaworowski A, Hoy J, Crowe S, Elliott J, Hearps A. A new monocyte atherogenic phenotype in chronic HIV disease. 2016-2018: \$632,037. Administering institution: Burnet Institute.

Murphy A, Thomas M. S100A8/A9 as a target in metabolic diseases to inhibit the acceleration of cardiovascular disease. 2016-2018: \$554,990. Administering institution: Baker IDI.

Myles P, Richards R, Smith J, Cooper DJ, Wood E, Carter R, Heritier S, Klein A. IV iron for treatment of anaemia before cardiac surgery (ITACS trial). 2016-2020: \$2,285,289. Administering institution: Monash University.

O'Hehir R. Phase I/IIa trials of a novel T cell epitope-based peptide therapy for peanut allergy. 2016-2018: \$1,440,000. Administering institution: Monash University.

Peter K. Activated platelets as unique targets for early imaging and site-directed therapy of cardiovascular and inflammatory diseases. 2016-2018: \$846,979. Administering institution: Baker IDI.

Plebanski M, Stephens A, Oehler M, Gorrell M. A new anti-diabetes drug as a novel therapy for ovarian cancer. 2016-2018: \$711,966. Administering institution: Monash University.

Renzaho A, Toole M, Agho K, Kounnavong S, Watts J, Billah M, Coghlan B. Integrated solutions for healthy birth, growth and development: a cluster-randomised controlled trial to evaluate the effectiveness of a mixed nutrition intervention package in reducing child undernutrition in Lao People's Democratic Republic. 2016-2019: \$1,558,515. Administering institution: Burnet Institute.

Thomas M, El-Osta A. The persisting vascular effects of activation of the renin-angiotensin system. 2016-2018: \$628,455. Administering institution: Baker IDI.

Webb S, McArthur C, Berry D, Paterson D, Cheng A, Heritier S, Presneill J, Litton E. Optimisation by Platform Trial Involving Multiple Interventions with Simultaneous Evaluation in Communication Acquired Pneumonia (OPTIMISE-CAP). 2016-2020: \$4,413,145. Administering institution: Monash University.

Development Grants

Dear A, Kaye D, Byrne M, Perlmutter P. Development of a novel endovascular therapy for occlusive peripheral vascular disease. 2016-2018: \$624,197. Administering institution: Monash University.

Wang B, Gu Z, Harcourt K. A non-invasive fluid status monitoring device for heart failure. 2016-2018: \$360,715. Administering institution: Monash University.

Partnership Projects

Bucknall T, Hutchinson A, Harvey G, Considine J, Mitchell I, Rycroft-Malone J, Graham I, Mohebbi M, Watts J. Prioritising Responses Of Nurses To deteriorating patient Observations (PRONTO). 2016-2018: \$459,688. Administering institution: Deakin University.

Elliott J, Green S, Thomas J, Tovey D, Glasziou P, Clarke M. Evidence Innovation: transforming the efficiency of systematic review. 2016-2018: \$928,416. Administering institution: Monash University.

Hellard M, Thompson A, Doyle J, Dietze P, McBryde E, Sievert W, Stooze M, Higgs P, Petrie D, Vickerman P. Eliminating hepatitis C transmission by enhancing hepatitis C care and treatment in primary health care settings. 2016-2020: \$1,221,831. Administering institution: Burnet Institute.

Research Fellowships

Hellard M. (SPRF). 2016-2020. Administering institution: Burnet Institute.

Summers S. (SRF-A). 2016-2020. Administering institution: Baker IDI.

Thomas M. (SRF-A). 2016-2020. Administering institution: Baker IDI.

TRIP Fellowship

Lannin N. 2016-2017. Administering institution: La Trobe University.

Career Development Fellowships

Davern P. RD Wright Level 1. 2016-2019. Administering institution: Baker IDI.

Early Career Fellowships

Ekegren C. 2016-2019. Administering institution: Monash University.

Gibson-Helm M. 2016-2019. Administering institution: Monash University.

Gilmartin J. 2016-2016. Administering institution: Monash University.

Hopper I. 2016-2019. Administering institution: Monash University.

Joham A. 2016-2019. Administering institution: Monash University.

Lee S. 2016-2019. Administering institution: Monash University.

McMahon J. 2016-2019. Administering institution: Burnet Institute.

McQuilten Z. 2016-2019. Administering institution: Monash University.

Ong J. 2016-2019. Administering institution: Monash University.

Tran T. 2016-2019. Administering institution: Monash University.

Trevillyan J. 2016-2019. Administering institution: Monash University.

Doctoral Degrees Completed and Passed 2015

PhD

Abramovitch J. Influence of food processing on the allergic immune response to allergens of crustacean species. Monash University. *Department of Immunology, Monash / Department of Allergy, Immunology and Respiratory Medicine, Alfred.*

Alam K. Burden of chronic disease and the socioeconomic determinants: evidence from Matlab, Bangladesh. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Al-Hammad Y. The role of HCV variable regions in the infectivity of cell-culture derived HCV. Monash University. *Burnet.*

Anders K. Individual and household risk factors for dengue and acute viral respiratory infections in Vietnamese infants. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Angelovich T. Investigating the impact of chronic low level endotoxaemia on monocytes. RMIT University. *Burnet.*

Barzel B. The role of neuromodulatory factors in the hypothalamus in the development of obesity related hypertension. Monash University. *Baker IDI.*

Bissessor M. Sexually transmitted infections in the rectum and HIV co-transmission in men who have sex with men. University of Melbourne. *Melbourne Sexual Health Centre, Alfred.*

Cangkrama M. Analysis of the grainyhead-like genes in mammalian development and disease. Monash University. *Department of Medicine, Monash.*

Cantwell K. Ambulance demand: random events or predictable patterns? Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Burnet.*

Cashin K. Characterisation of viral tropism alterations during progressive HIV-1 subtype C infection. University of Melbourne. *Burnet.*

Chamberlain C. Assessing the efficacy of screening for gestational diabetes amongst Aboriginal women. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Charnaud S. The mechanism of protein export in the blood stage of *Plasmodium falciparum*. Monash University. *Department of Medicine, Monash / Burnet.*

Chin KY. Investigation of the mechanism(s) of flavonol-induced cardioprotection. RMIT University. *Baker IDI.*

Christopher M. Dyslipidaemia resulting from obesity or other high-risk states is a major contributor and predictor of the onset and progression of diabetes. Monash University. *Department of Medicine, Monash / Baker IDI / Department of Cardiovascular Medicine, Alfred.*

Doyle J. Early treatment of Hepatitis C infection in Australia. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Burnet / Infectious Diseases Unit, Alfred.*

Ekegren C. Implementation and evaluation of a club-based online injury surveillance system in community Australian football. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Elsworth B. Characterisation of the *Plasmodium falciparum* translocon protein PTEX150. Monash University. *Department of Immunology, Monash / Burnet.*

Fancke B. Dendritic cells: development, tolerance and immunity. A novel cross-species study. Monash University. *Department of Immunology, Monash / Burnet.*

Fooladi E. The effect of transdermal testosterone on sexual function among SSRI(s) drugs users. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Gibson-Helm M. Women's public health in vulnerable populations and high risk groups. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Guirguis A. Apoptosis and its regulation in myelodysplasia - using basic mouse models and human samples. Monash University. *Australian Centre for Blood Diseases, Monash.*

Habersberger J Proinflammatory effects of monomeric C reactive protein in vascular endothelium. Monash University. *Department of Medicine, Monash / Baker IDI / Department of Cardiovascular Medicine, Alfred.*

Harding J. The epidemiology and diabetes, obesity, the metabolic syndrome and cancer in Australia. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Baker IDI.*

Haregu T. Integration of health system responses to HIV/AIDS and non-communicable diseases in developing countries. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Heywood S. The novel actions of HDL on cardiac metabolism and function. University of Melbourne. *Baker IDI.*

Hosseini H. Anti-atherogenic B1a B cells protect atherosclerosis via secreted IgM and IL10. Monash University. *Baker IDI.*

Hussain M. Socioeconomic status and coronary heart disease risk factor trends in Bangladesh. Monash University. *Department of Epidemiology and Preventive Medicine / Department of Rheumatology, Monash.*

Jennings N. A randomised controlled trial evaluating outcomes of an emergency nurse practitioner service. Queensland University of Technology. *Nursing / Emergency Medicine, Alfred.*

Joglekar A. Mechanisms of tolerance following genetic manipulation and transfer of bone marrow stem cells. Monash University. *Department of Immunology, Monash.*

Joham A. Interventions in borderline personality disorder. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Jones D. The Medical Emergency Team: patient characteristics and resource utilisation. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Kaplan Z. Determining the role of GPIb binding to thrombin specifically pertaining to its effect on fibrin generation and impact on leukocyte – platelet interactions. Monash University. *Australian Centre for Blood Diseases, Monash.*

Khamisa N. The causal nature of existing relationships between work-related stressors, burnout, job satisfaction and general health of South African nurses. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Khoury G HIV persistence on antiretroviral therapy - the role of homeostatic proliferation and T-cell trafficking. Monash University. *Department of Medicine, Monash / Infectious Diseases Unit, Alfred / Burnet.*

Kilgour E. Experiences and interactions of those who receive, deliver or negotiate rehabilitation services in personal injury compensation systems in Victoria. Monash University. Completed 2015. *Department of Epidemiology and Preventive Medicine, Monash.*

Kirkovsky M. Theory of mind and neural connectivity in

- autism spectrum disorders. Monash University. *Monash Alfred Psychiatry Research Centre*.
- Kitson M.** A study of the relationship between vitamin D status and outcomes of chronic liver disease. Monash University. *Department of Medicine, Monash / Department of Gastroenterology, Alfred*.
- Klassen KM.** Determining the prevalence of vitamin D deficiency and insufficiency in HIV-infected individuals in Melbourne and Queensland. University of Melbourne. *Melbourne Sexual Health Centre, Alfred*.
- Kong YY.** Effects of cancer cells on the cells of the dendritic cell lineage. Monash University. *Department of Immunology, Monash*.
- Kozica S.** Polycystic ovary syndrome (PCOS): optimal model of care. Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.
- Kraakman M.** Role of 11-6 in obesity-induced insulin resistance: advantages and therapeutic strategies to overcome these pitfalls. Monash University. *Baker IDI*.
- Lockery J.** Correlates of medication understanding and cognitive function in the Australian healthy elderly. Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.
- Lowe G.** Integration of nurse practitioners into Australia healthcare settings: a mixed methods study of the structural, human resource, political and symbolic implications for organisational change. Monash University. *Emergency and Trauma Centre, Alfred*.
- Madondo M.** Study of the principles for the design of optimal nanoparticle based cancer vaccines. Monash University. *Department of Immunology, Monash*.
- Mahar P.** Management of toxic epidermal necrolysis (TEN) in a burns unit. Deakin University. *Burns Unit, Alfred*.
- McLellan A.** Atrial fibrillation and hypertension: reverse cardiac remodelling post renal denervation. University of Melbourne. *Department of Cardiovascular Medicine, Alfred / Baker IDI*.
- McQuilten Z.** Improving patient outcomes through understanding and changing transfusion practice. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / National Trauma Research Institute*.
- Middleton P.** Contribution of Australian maternal and perinatal trials to health outcomes. University of Adelaide. *Australasian Cochrane Centre, Monash*.
- Millard T.** The development and evaluation of an online self management program for men living with HIV. Monash University. *Infectious Diseases Unit, Alfred / Department of Medicine, Monash*.
- Mohd Hanafiah SK.** Dimeric IgA and cell wall components of *M. tuberculosis* as tools in point-of-care diagnostics. Monash University. *Department of Medicine, Monash / Burnet*.
- New P.** A study of patient flow through inpatient rehabilitation and potential for improvements. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / National Trauma Research Institute / Rehabilitation, Aged & Community Care, Alfred*.
- Newnham E.** Shifting treatment paradigms in newly diagnosed coeliac disease. Monash University. *Department of Gastroenterology, Alfred / Monash*.
- Ong J.** A trial of annual anal examination to detect early anal cancer in HIV positive men who have sex with men. University of Melbourne. *Melbourne Sexual Health Centre, Alfred*.
- O'Reilly G.** International Trauma Epidemiology: paths and challenges to the establishment of trauma registries in developing (and developed) countries. Monash University. *Emergency and Trauma Centre, Alfred / Department of Epidemiology and Preventive Medicine, Monash / National Trauma Research Institute*.
- Page M.** Investigating selective inclusion and reporting in systematic reviews of randomised trials. Monash University. *Australasian Cochrane Centre, Monash*.
- Rafehi H.** Characterisation of the genome-wide effects of trichostatin A, glucose and metformin in human endothelial cells. University of Melbourne. *Baker IDI*.
- Rasmiena A.** Assessment of the role of plasmalogens as lipoprotein anti-oxidants in atherosclerosis. University of Melbourne. *Department of Cardiovascular Medicine, Alfred / Baker IDI*.
- Rijal S.** Investigating the prognostic significance of phosphoinositide signalling in acute myeloid leukaemia. Monash University. *Australian Centre for Blood Diseases, Monash*.
- Schneider A.** Renal perfusion quantification with contrast-enhanced ultrasound. Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.
- Sharma A.** The use of novel Caveolin-1 peptides to attenuate atherosclerosis. Monash University. *Baker IDI*.
- Smith G.** Evidence-based model for pre-hospital emergency management of supraventricular tachycardia. Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.
- Taechalertpaisarn T.** Investigation of human erythrocyte invasion by *Plasmodium falciparum*. University of Melbourne. *Burnet*.
- Tavender EJ.** Management of mild traumatic brain injury in the emergency department: barriers, enablers to evidence uptake and development of an intervention to facilitate best practice and improve patient outcomes. Monash University. *Department of Surgery, Monash / National Trauma Research Institute / Australasian Cochrane Centre, Monash*.
- Telwatte S.** Investigating the role of silent mutations in the HIV-1 reverse transcriptase domain. Monash University. *Burnet*.
- Trevillyan J.** Pathogenesis and prevention of cardiovascular disease in HIV positive patients. Monash University. *Infectious Diseases Unit, Alfred / Department of Medicine, Monash*.
- van der Merwe J.** Effect of VentrAssist pump on the peripheral circulation and the response of the pump to exercise. Monash University. *Department of Surgery, Monash / Department of Cardiothoracic Surgery, Alfred*.
- Wasiak J.** The physical and psychosocial outcomes following burn injury: a 12-month follow-up study. Monash University. *Burns Unit, Alfred / Department of Epidemiology and Preventive Medicine, Monash*.
- Wong E.** Modelling risk of comorbidities of cardiovascular disease, diabetes and chronic kidney disease using Markov chain. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Baker IDI*.
- Wright B.** Follow up of psychological health, mortality and cancer incidence in Gulf War Veterans. Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.

Other Doctorates

- Fitzgerald M.** Computer-aided decision support for trauma reception and resuscitation. Doctor of Medicine, Monash University. *Department of Surgery, Monash / Emergency and Trauma Centre, Alfred*.
- Rintoul A** Observations of corporate and political interests in public health: improving health equity in the context of drugs, gambling and refugee health. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash*.
- Ruben J.** Intensity modulated radiotherapy: effect on dose distribution and scattered dose and implications for carcinogenesis. Doctor of Medicine, Monash University. *William Buckland Radiotherapy Centre, Alfred*.
- For a list of current postgraduate students, go to www.amrep.org.au**

HIGH IMPACT FACTOR PUBLICATIONS 2015

* 2014 impact factors > 10

ORIGINAL RESEARCH

FLOW Investigators, Bhandari M, Jeray KJ, Petrisor BA, Devereaux PJ, Heels-Ansdell D, Schemitsch EH, Anglen J, Della Rocca GJ, Jones C, Kreder H, Liew S, McKay P, Papp S, Sancheti P, Sprague S, Stone TB, Sun X, Tanner SL, Tornetta P 3rd, Tufescu T, Walter S, Guyatt GH. A trial of wound irrigation in the initial management of open fracture wounds. *N Engl J Med* 2015;373(27):2629-41. [IF: 55.873]

Foster GR, Afdhal N, Roberts SK, Bräu N, Gane EJ, Pianko S, Lawitz E, Thompson A, Shiffman ML, Cooper C, Towner WJ, Conway B, Ruane P, Bourlière M, Asselah T, Berg T, Zeuzem S, Rosenberg W, Agarwal K, Stedman CA, Mo H, Dvory-Sobol H, Han L, Wang J, McNally J, Osinusi A, Brainard DM, McHutchison JG, Mazzotta F, Tran TT, Gordon SC, Patel K, Reau N, Mangia A, Sulkowski M; ASTRAL-2 Investigators; ASTRAL-3 Investigators. Sofosbuvir and velpatasvir for HCV genotype 2 and 3 infection. *N Engl J Med* 2015;373(27):2608-17. [IF: 55.873]

Green JB, Bethel MA, Armstrong PW, Buse JB, Engel SS, Garg J, Josse R, Kaufman KD, Koglin J, Korn S, Lachin JM, McGuire DK, Pencina MJ, Standl E, Stein PP, Suryawanshi S, Van de Werf F, Peterson ED, Holman RR; TECOS Study Group. Effect of sitagliptin on cardiovascular outcomes in type 2 diabetes. *N Engl J Med* 2015;373(3):232-42. [IF: 55.873]

Kaukonen KM, Bailey M, Pilcher D, Cooper DJ, Bellomo R. Systemic inflammatory response syndrome criteria in defining severe sepsis. *N Engl J Med* 2015;372(17):1629-38. [IF: 55.873]

Léauté-Labrèze C, Hoeger P, Mazereeuw-Hautier J, Guibaud L, Baselga E, Posiunas G, Phillips RJ, Caceres H, Lopez Gutierrez JC, Ballona R, Friedlander SF, Powell J, Perek D, Metz B, Barbarot S, Maruani A, Szalai ZZ, Krol A, Boccara O, Foelster-Holst R, Febrer Bosch MI, Su J, Buckova H, Torrelo A, Cambazard F, Grantzow R, Wargon O, Wyrzykowski D, Roessler J, Bernabeu-Wittel J, Valencia AM, Przewratil P, Glick S, Pope E, Birchall N, Benjamin L, Mancini AJ, Vabres P, Souteyrand P, Frieden IJ, Berul CI, Mehta CR, Prey S, Boralevi F, Morgan CC, Heritier S, Delarue A, Voisard JJ. A randomized, controlled trial of oral propranolol in infantile hemangioma. *N Engl J Med* 2015;372(8):735-46. [IF: 55.873]

Lonial S, Dimopoulos M, Palumbo A, White D, Grosicki S, Spicka I, Walter-Croneck A, Moreau P, Mateos MV, Magen H, Belch A, Reece D, Beksac M, Spencer A, Oakervee H, Orlowski RZ, Taniwaki M, Röllig C, Einsele H, Wu KL, Singhal A, San-Miguel J, Matsumoto M, Katz J, Bleickardt E, Poulart V, Anderson KC, Richardson P; ELOQUENT-2 Investigators. Elotuzumab therapy for relapsed or refractory multiple myeloma. *N Engl J Med* 2015;373(7):621-31. [IF: 55.873]

Young P, Saxena M, Bellomo R, Freebairn R, Hammond N, van Haren F, Holliday M, Henderson S, Mackle D, McArthur C, McGuinness S, Myburgh J, Weatherall M, Webb S, Beasley R; HEAT Investigators; Australian and New Zealand Intensive Care Society Clinical Trials Group. Acetaminophen for fever in critically ill patients with suspected infection. *N Engl J Med* 2015;373(23):2215-24. [IF: 55.8733]

Cholesterol Treatment Trialists' (CTT) Collaboration, Fulcher J, O'Connell R, Voysey M, Emberson J, Blackwell L, Mihaylova B, Simes J, Collins R, Kirby A, Colhoun H, Braunwald E, La Rosa J, Pedersen TR, Tonkin A, Davis B, Sleight P, Franzosi MG, Baigent C, Keech A. Efficacy and safety of LDL-lowering therapy among men and women: meta-analysis of individual data from 174,000 participants in 27 randomised trials. *Lancet* 2015;385(9976):1397-405. [IF: 45.217]

De Cruz P, Kamm MA, Hamilton AL, Ritchie KJ, Krejany EO, Gorelik A, Liew D, Prideaux L, Lawrance IC, Andrews JM, Bampton PA, Gibson PR, Sparrow M, Leong RW, Florin TH, Geary RB, Radford-Smith G, Macrae FA, Debinski H, Selby W, Kronborg I, Johnston MJ, Woods R, Elliott PR, Bell SJ, Brown SJ, Connell WR, Desmond PV. Crohn's disease management after intestinal resection: a randomised trial. *Lancet* 2015;385(9976):1406-17. [IF: 45.217]

GBD 2013 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life years (DALYs) for 306 diseases and injuries and healthy life expectancy (HALE) for 188 countries, 1990-2013: quantifying the epidemiological transition. *Lancet* 2015;386(10009):2145-91. [IF: 45.217]

GBD 2013 Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;386(10010):2287-323. [IF: 45.217]

Global Burden of Disease Study 2013 Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;386(9995):743-800. [IF: 45.217]

Nichol A, French C, Little L, Haddad S, Presneill J, Arabi Y, Bailey M, Cooper DJ, Duranteau J, Huet O, Mak A, McArthur C, Pettilä V, Skrifvars M, Vallance S, Varma D, Wills J, Bellomo R; EPO-TBI Investigators; ANZICS Clinical Trials Group. Erythropoietin in traumatic brain injury (EPO-TBI): a double-blind randomised controlled trial. *Lancet* 2015;386(10012):2499-506. [IF: 45.217]

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Alfred Medical Research and Education Precinct

Commercial Road
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Australia

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