



2012

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



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Enquiries should be directed to the Alfred & Baker IDI Research Office.

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*Professor Brendan Crabb
Director and CEO,
Burnet Institute
Chair, AMREP Council*

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AMREP continues to be a major contributor to health and medical research in Australia and internationally. Our contributions are innovative and highly relevant to major health concerns largely because of the close working relationships between member organisations. While facing many challenges, especially those of a tight government funding environment, we continued to improve on many of our key performance indicators especially around research output with increased levels of publications in peer-reviewed journals and in the translation of our research into tangible health benefits for the community.

The capacity for AMREP to perform even better will be enhanced with the formation of Monash Partners, the Academic Health Science Centre that involves AMREP members. This partnership will drive innovation and efficiency in healthcare delivery as it links research and education even more intimately with clinical practice.

The release of the McKeon Review into Health and Medical Research in early 2013 was welcomed by AMREP, outlining a blueprint for the sector for the next decade. Most importantly, the review says that better integrating research into healthcare delivery is essential if we are to continue to improve our health system while at the same time control costs. It was pleasing to note that both the Federal Government and Opposition are paying attention to the concerns outlined in this review. We very much welcomed the formation of a new Ministry for Medical Research in the Federal cabinet and the support of the Opposition via their recently released policy on health and medical research. We look forward to a comprehensive response to the review by all sides.

Our efforts in building the reputation of AMREP and member organisations within both State and Federal Governments is paying dividends with our contributions being noted across many portfolios. Our contributions to global health are also playing an important role as our partner collaborations increase and will continue to grow with the Monash Partners Academic Health Science Centre ramping up over the next year.

I would like to thank all staff across the campus for their significant input into making what is undoubtedly one of Australia's most important and cohesive health and medical research precincts.

AMREP Highlights 2012/2013

Launch of Monash Partners Academic Health Science Centre

Increasing the pace and scale at which clinical research is translated into better outcomes at the bedside is the aim of the Monash Partners Academic Health Science Centre, which was officially launched at Baker IDI by the Victorian Minister for Health David Davis on 23 July 2013. One of only two such centres in Victoria, Monash Partners brings AMREP together with Monash Health, Cabrini Health, Epworth HealthCare and Prince Henry's Institute of Medical Research. The government is providing \$150,000 to support priority work on principles and planning. Monash Partners will also receive \$850,000 to support development of a Clinician Researcher Fellowship program in partnership with the Victorian Cancer Agency.

Research Funding Success

AMREP researchers obtained an impressive \$65 million in new direct NHMRC funding commencing in 2013. This included a \$12.4 million Program Grant awarded to a team led by Professor David Kaye (Baker IDI) to pursue an innovative program in translational cardiovascular medicine. Forty-seven Project Grants totalling \$36.3 million included funding for Alfred/Monash researchers to conduct the following major multicentre clinical trials:

- Leslie K, Short T, Chan M, Myles P, Paech M, Corcoran T. The influence of anaesthetic depth on patient outcome after major surgery. \$2,893,794.
- 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. \$2,384,173.

- 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. \$2,752,725.
- Gruen R, Mitra B, Bernard S, Jacobs I, Medcalf R, Reade M, Tran H. Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage (The PATCH Study). \$1,668,152.

Under the NHMRC's Partnerships for Better Health initiative, Monash School of Public Health and Preventive Medicine researchers Dr Anna Barker and Professor Peter Cameron received a \$1.5 million grant to conduct a multicentre randomised controlled trial to prevent secondary falls in older people presenting to the emergency department with a fall (RESPOND). Partners in the RESPOND project include The Alfred, Royal Perth and Sir Charles Gairdner Hospitals.

Professor Simon Stewart (Baker IDI) and team have been awarded a \$4.6 million Program Grant commencing in 2014 for 'Optimising the cost-benefits of multidisciplinary heart disease prevention and management programs'.

AMREP researchers also received funding from the Australian Research Council (ARC). Dr Paul Gorry (Burnet Institute), Dr Tom Karagiannis (Baker IDI) and Associate Professor Andre Renzaho (Monash SPHPM) obtained Future Fellowships. Professor Mark Febbraio (Baker IDI) was awarded a Discovery Projects Grant, and Monash researchers Professor Paul Fitzgerald, Associate Professor Andre Renzaho, Associate Professor Peter Smith and Dr Maggie Kirkman were recently awarded ARC Linkage Projects grants.



Launch of Monash Partners Academic Health Science Centre on 23 July 2013. Theme and Discipline leaders (L-R): Professor Don Campbell (InnovationbyDesign), Professor Jonathan Serpell (Cancer & Blood Diseases), Professor Ian Meredith (Cardiovascular Disease), Professor Leon Bach (Diabetes, Obesity, Men's Health & Endocrinology), Professor Nick Freezer (Women's, Children's & Reproductive Health), Victorian Minister for Health the Hon David Davis MLC, Professor Sharon Lewin (Infection and Inflammation), Professor Jamie Cooper (Critical Care, Trauma & Perioperative Medicine), Professor Jayashri Kulkarni (Neuroscience and Mental Health), Professor David Kaye (Cardiovascular Disease) and Professor Ben Canny (Education).

Left: Dr Charbel Darido received the basic AMREP Research Prize in 2012.
Right: Professor Doug Hilton (L) presents the clinical AMREP Research Prize to Professor Jamie Cooper.



The RESPOND team. Back row (L-R): De Villiers Smit, Caroline Brand, Renata Morello, Judy Lowthian, Georgie Rose, Anna Barker and Jason Talevski. Front row (L-R): Glenn Arendts, Peter Cameron, Leon Flicker and Andrew Way.

Launch of Clinicians Online

Minister for Broadband, Communication and the Digital Economy, Senator Stephen Conroy, and Victorian Minister for Health and Ageing, David Davis, announced funding for the implementation of a telehealth connection service at The Alfred to support remote clinical consultations for cystic fibrosis patients. The Clinicians Online project will receive \$1.5 million in Commonwealth Government funding and \$1.85 million from the Victorian Government and its project partners to deliver video-based cystic fibrosis consultations between respiratory experts at major metropolitan hospitals and regional patients.

The Clinicians Online project will utilise the high-speed broadband provided by the National Broadband Network, improving access for rural cystic fibrosis patients who would normally travel great distances to a major metropolitan hospital for an appointment. Head of the Cystic Fibrosis Service at The Alfred, Professor John Wilson, led a team of researchers in the development of Clinicians Online.

Completion of AMREP Lecture Theatre

Construction of the AMREP Lecture Theatre was completed in September 2012. The 200-seat theatre, which was cleverly integrated with the existing seminar and meeting room complex, has been the venue for several national conferences as well as for many AMREP seminars and meetings. Funding for the lecture theatre was provided by the Alfred Whole Time Medical Specialists Trust.



The AMREP Lecture Theatre was completed in 2012.

Research Poster Display and Research Day

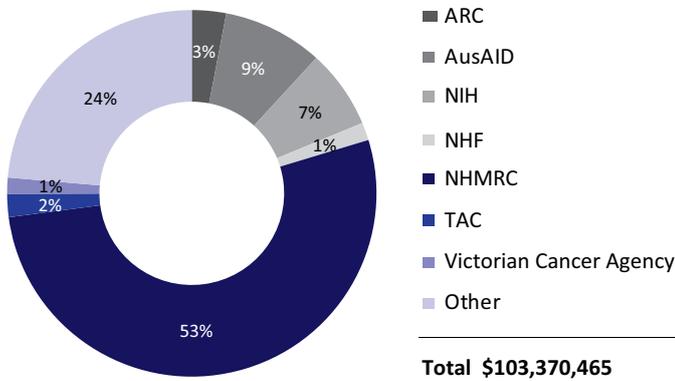
The popular annual Alfred Week Research Poster Display showcases research carried out across AMREP. The 2012 display attracted 175 posters; generous prizes were awarded for the posters judged to be the best in their category.

Research Day, held during Alfred Week, featured a keynote address titled 'Health and Medical Research in Australia' by Professor Doug Hilton, Director of the Walter and Eliza Hall Institute of Medical Research. Professor Hilton presented the 2012 AMREP Research Prizes to Professor Jamie Cooper (Alfred Intensive Care Unit) and Dr Charbel Darido (Monash Central Clinical School) in recognition of their high impact original research articles published in the *New England Journal of Medicine* and *Cancer Cell* respectively. The Research Day session also included brief oral presentations by researchers Professor Jennifer Wilkinson-Berka, Associate Professor Andrew Taylor, Professor David Dunstan and Dr Irina Caminschi.

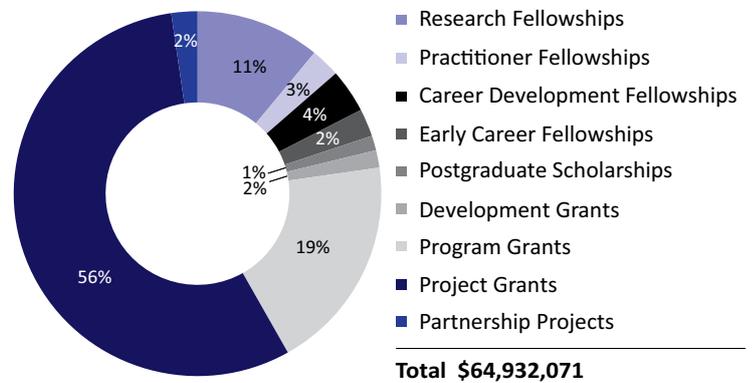
Major Awards

- Professor Garry Jennings AM, Director and CEO of Baker IDI, was recently awarded an Officer of the Order of Australia (AO) for distinguished service to medical research, particularly the prevention and control of cardiovascular disease, obesity and diabetes, to professional associations, and to education.
- Professor Jeffrey Rosenfeld AM has been appointed an Officer of the Order of the British Empire (OBE) for services to neurosurgery and to the School of Medicine at the University of Papua New Guinea.
- Professor Mike Toole, Head of Burnet's Centre for International Health, was awarded a Member of the Order of Australia (AM) for significant service to international health, particularly through leadership in medical research.
- Professor Paul Zimmet AO, Director Emeritus of Baker IDI, is the first Australian to become a member of the Spanish Royal Academy of Medicine.
- Dr Michelle Boyle, Burnet Institute PhD student, was one of three Victorian scientists presented with a Premier's Award for Health and Medical Research Commendee Award.
- Professor Russell Gruen, Head of the National Trauma Research Institute, was awarded the 2013 John Mitchell Crouch Fellowship at the Royal Australasian College of Surgeons (RACS) 82nd Annual Scientific Congress in May 2013. The Fellowship is worth \$150,000 and is the premier research award of the RACS.
- Associate Professor Anton Peleg received the Commonwealth Health Minister's Award for Excellence in Health and Medical Research in June 2013 for his research into hospital-acquired infections and antibiotic resistance. Anton, an infectious diseases physician at The Alfred, received a \$50,000 grant to identify how antibiotic-resistant human pathogens cause disease and assess novel treatment approaches that could potentially treat or prevent these infections from occurring.

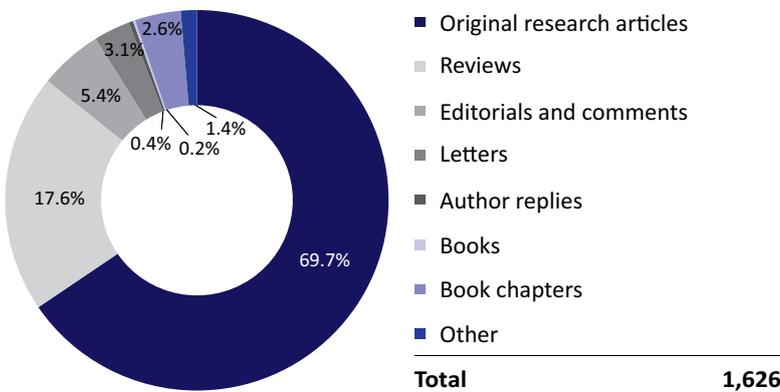
External funding received 2012



New NHMRC funding commencing in 2013



Publications 2012



In 2012, AMREP researchers published original research articles in top-ranking international journals including

New England Journal of Medicine [IF: 53.298]
Lancet [IF: 38.278]
Nature [IF: 36.280]
Nature Genetics [IF: 35.532]
Cell [IF: 32.403]
Science [IF: 31.201]

The average impact factor of all journal articles published in 2012 was 4.860.

23% of all articles were published in journals with an impact factor of ≥ 5 .

Note: 2011 impact factors

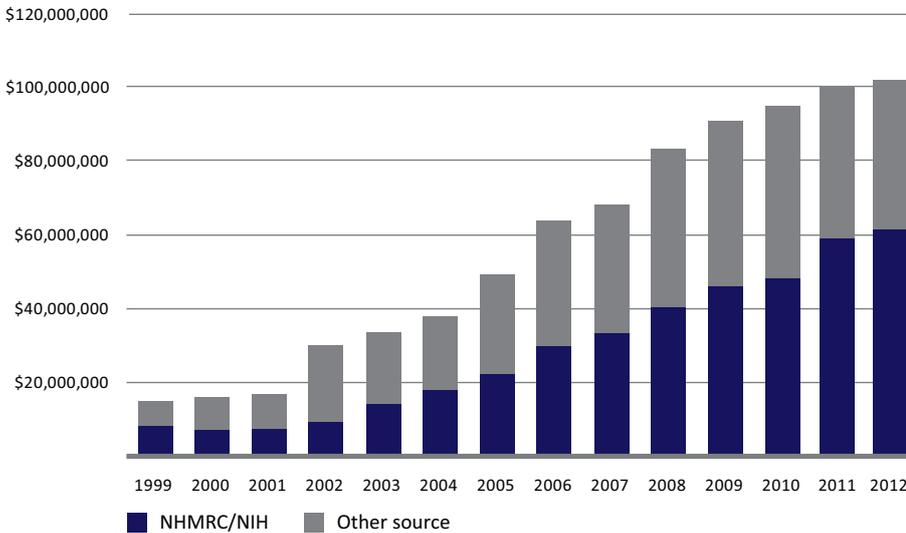
For a list of high-impact factor publications by AMREP staff in 2012, see page 91 of this report.

Higher degree completions

56 PhD completions
 4 Other doctoral completions
 114 Masters completions

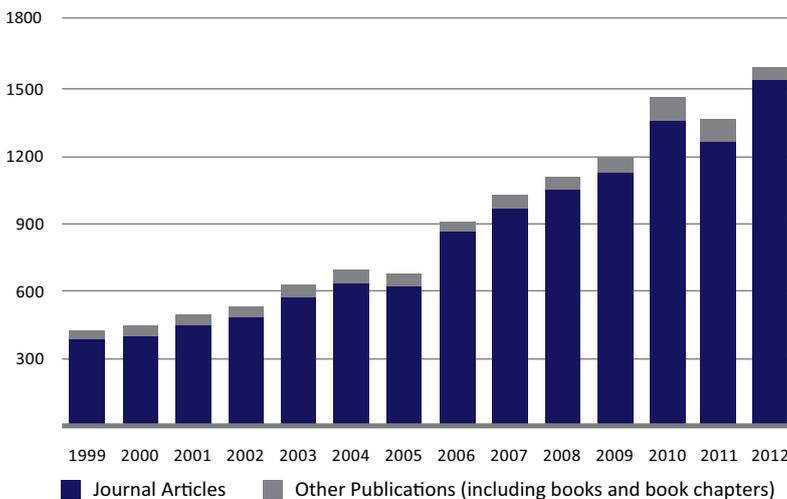
In 2012, there were 354 current PhD students and 28 other doctoral students at AMREP.

External research funding received



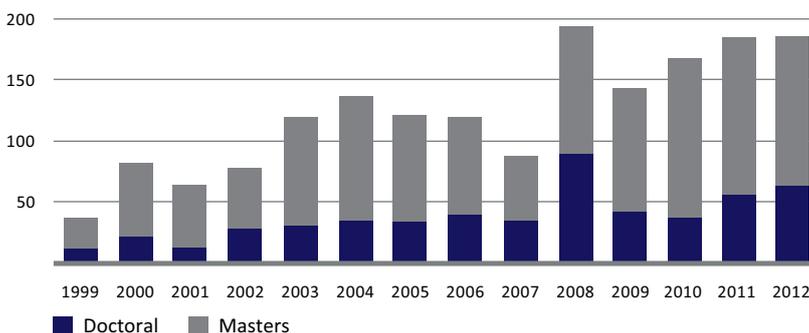
External research funding refers to competitive peer reviewed grants from schemes offered by funding bodies such as NHMRC, National Heart Foundation and NIH or government grants (e.g. Department of Human Services), industry and university grants. Funds received from commercially sponsored clinical trials 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.



Human Ethics and Research Governance

*Professor John McNeil AM
Chair, Alfred Hospital Ethics Committee*

www.alfredresearch.org

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). The approval of research by HRECs assures the public that the proposed research is ethically acceptable and complies with endorsed standards and guidelines.

Applications

In 2012, the Alfred HREC received 269 research projects for review. Of these, 131 were health and social sciences applications, 138 drugs and interventions applications. A further 261 'low risk' applications were received; these projects pose such little risk to participants that they do not need to be reviewed by the full HREC.

Multicentre Research

The 'streamlined' processes for reviewing projects that are to be conducted at more than one Australian centre have now been in operation for over three years. Most of the projects reviewed are commercially sponsored clinical trials. Much human research, including university research, is still submitted to each individual HREC for approval. In 2012, 14 applications were submitted to the Ethics Committee for review under the streamlined process. A total of 21 projects to be conducted at Alfred Health were reviewed by another certified HREC and 19 were authorised for commencement at The Alfred. Projects to be conducted at other AMREP partners' sites are authorised by those institutions.

Research Governance at AMREP

Each AMREP partner is expected to have a research governance framework so that any human research conducted under its auspices can be monitored to ensure it is conducted properly. The Australian Code for the Responsible Conduct of Research (the Code) outlines what is required of institutions and researchers. The requirements of the Code pertain to:

- Management of research data
- Supervision of research trainees
- Publication of research results
- Authorship
- Peer review of research
- Conflicts of interest
- How collaborative research is to be managed
- Research misconduct

Routine audits are conducted as a monitoring activity. They are intended not only to check how the research is progressing, but also as an instructive process that allows researchers to communicate face-to-face with the Research Governance Officer.

The General Ethical Issues Sub-committee

The General Ethical Issues Sub-committee (GEI S-C) considers broader ethical matters that the main Ethics Committee, with its focus on reviewing individual research projects, does not have the time to discuss. The GEI S-C comprises members of the main Ethics Committee, experts from within Alfred Health and AMREP, and members from the wider community. Other experts are often invited to attend and contribute to specific discussions. Discussion topics range from issues specific to research within Alfred Health and AMREP, to those of national relevance such as contributing to public consultations conducted by the NHMRC. The GEI S-C also assists the main Ethics Committee by developing guidance documents to promote good research practice and consistent ethical decision making. A formal referral process was put in place in 2012, whereby Alfred Health staff and AMREP partners may refer matters to the GEI S-C for discussion or an ethical opinion. The GEI S-C met nine times in 2012.

Discussion Topics in 2012

Guidance on Research Ethics

- Clinical Quality Registries – key ethical and governance requirements
- Criteria for an opt-out approach to consent
- Review of the Ethics Committee's approach to procedural authorisation for medical research procedures
- Conducting sensitive and respectful research contacts, e.g. mass mailings, contacting bereaved families
- Reviews of Alfred Hospital Ethics Committee Guidelines: Research involving legal risks to researchers and participants, Consent, Use of Discarded Surgical Tissue for Research, Complaints

Guidance on Research Governance

- Improving the quality of researchers' ethics submissions and reporting
- Premature cessation of research projects – researchers' obligations to participants

Ethical Opinion for Institution

- A 'global' consent process for ICU procedures (referred by Director ICU)

Public Consultations

- NHMRC Public Consultation on Using the National Statement: Ethical Review of Quality Improvement Activities in Health Services (submission made)
- NHMRC Public Consultation on National Statement on Ethical Conduct in Human Research 2007 – Chapter 3.4: Human biospecimens (submission made)
- Public Consultation on the proposed revisions to the National Statement on Ethical Conduct in Human Research Chapters 3.4 and 3.6 (Human Tissue Samples and Human Stem Cells)

Other

- Victorian Law Reform Commission's Final Report on Guardianship review



Animal Ethics

Dr Alana Mitchell

Chair, AMREP Animal Ethics Committees A and B

amrepaec.bakeridi.edu.au

AMREP Animal Ethics Committee

Two Animal Ethics Committees (AECs) are in operation at AMREP, with each committee meeting every four weeks. The AECs assess proposals for the use and breeding of animals for scientific purposes from Baker IDI Heart and Diabetes Institute, the Burnet Institute, Monash University Central Clinical School, The Alfred hospital and AMREP Animal Services. 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. Modifications and other project-specific documentation relating to an approved project are reviewed by the AEC that reviewed the original application.

AEC Applications in 2012

The AMREP AECs reviewed 112 new experimental proposals in 2012. A summary of applications in all categories is shown in the table below. The animals involved were mainly mice and rats, with a small number of rabbits and dogs.

SUMMARY OF APPLICATIONS REVIEWED BY THE AMREP AEC IN 2012				
	Baker IDI Heart and Diabetes Institute	Monash Central Clinical School	Burnet Institute	Alfred Health
New experimental applications	68 (66)	38 (34)	3 (11)	3 (1)
Modifications to experimental applications	67 (65)	60 (35)	4 (4)	1 (0)
Tissue applications	9 (4)	3 (7)	1 (2)	0 (0)
Colony applications	20 (6)	91 (86)	2 (13)	0 (0)
Antibody applications	0 (0)	0 (0)	0 (0)	0 (0)

In brackets: number of applications reviewed in 2011.

The AMREP Animal Ethics 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 Australian Code of Practice for the Care and Use of Animals for Scientific Purposes 2004 (The Code) and the relevant Victorian Legislation.

The main responsibilities of the committee are to:

- Determine 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 the education and training of AEC applicants and AEC members
- Monitor the performance of AECs A and B
- 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.

The GAP Committee recently implemented a process for post approval monitoring of animal use, and is currently developing new policies and procedures on reporting of adverse incidents/events, non-compliance with The Code, and grievances and complaints regarding the use of animals.

Updated AEC Application Platform

A substantial revision of the AEC application platform *EthicsAppOrder* has recently been launched following development of a new Microsoft Word application form by a working group of the GAP Committee. Applicants are now required to provide administrative details via a short online form and to upload the completed Word form with details of their proposal. This more flexible format is expected to expedite completion by applicants and facilitate review by the AEC.

Electronic AEC Meeting Agendas

The Animal Ethics Office is in the process of providing AEC members with tablet computers to access their meeting papers in a move away from the traditional hard copy format. AEC members are able to download their monthly agendas from a secure section of the animal ethics website (amrepaec.bakeridi.edu.au).

Training

The GAP Committee continued to provide on-site training in animal ethics legislation and animal welfare requirements for new and established researchers. All active animal users are required to attend one training session each year: either a 1-hour refresher program for laboratory heads whose staff use animals or a 3-hour training session for active animal users. The longer training sessions aim to assist AMREP animal users to learn about the relevant legislation, how the AECs function, how applications are reviewed, and the specific items on which the various AEC category members focus.



Baker IDI Heart and Diabetes Institute

Research Programs and Laboratories

Director: Professor Garry Jennings AO, AM

Deputy Director/Chief Scientific Officer: Professor Mark Cooper

Diabetes - Clinical and Population Health

Head: A/Prof. Jonathan E Shaw

Clinical Diabetes and Epidemiology (JE Shaw)
Obesity and Population Health (A Peeters)
Diabetes and Population Health (D Magliano)

Cell Signalling and Metabolism

Head: Prof. Mark Febbraio

Cellular and Molecular Metabolism (M Febbraio)
Muscle Research and Therapeutics (P Gregorevic)
Cardiac Hypertrophy (J McMullen)

Diabetic Complications

Head: Prof. Karin Jandeleit-Dahm

Diabetes and Kidney Disease (K Jandeleit-Dahm)
Diabetes and Atherosclerosis (T Allen)
Biochemistry of Diabetic Complications (M Thomas)
Molecular Group (P Kantharidis, Z Chai, J de Haan)
Genomics and Systems Biology (K Bozaoglu)
Glycation, Nutrition and Metabolism (M Coughlan)
Diabetes and Dyslipidaemia (B Drew and A Calkin)

Indigenous Health Research

Head: A/Prof. Graeme Maguire

Executive Director Central Australia (G Maguire)
Deputy Director Central Australia (J Ward)

Human Physiology and Behavioural Science

Head: Prof. Bronwyn Kingwell

Metabolic and Vascular Physiology (B Kingwell)
Physical Activity (D Dunstan)
Behavioural Epidemiology (N Owen)
Nutritional Interventions (P Clifton)

Epigenetics

Head: Prof. Assam El-Osta

Human Epigenetics (A El-Osta)
Epigenomic Medicine (T Karagiannis)

Vascular Lipids and Lipoproteins

Head: Prof. Jaye Chin-Dusting

Vascular Pharmacology (J Chin-Dusting)
Lipoproteins and Atherosclerosis (D Sviridov)
Metabolomics (P Meikle)
Computational Biology (R Lazarus)

Cell Biology and Atherosclerosis

Head: Prof. Karlheinz Peter

Atherothrombosis and Vascular (K Peter)
Vascular Biotechnology (C Hagemeyer)
Vascular Biology and Atherosclerosis (A Bobik)

Hypertension Obesity and Stress

Head: Prof. Markus Schlaich

Hypertension and Kidney Disease (M Schlaich)
Human Neurotransmitters (G Lambert)
Neuropharmacology (G Head)
Clinical Obesity Research (J Dixon)

Basic and Clinical Cardiology

Head: Prof. David Kaye

Heart Failure Research Group (D Kaye)
Experimental Cardiology (XJ Du)
Molecular Cardiology (E Woodcock)
Heart Failure Pharmacology (R Ritchie)
Clinical Electrophysiology (P Kistler)
Clinical Cardiology (S Duffy, J Shaw, A Taylor)
Imaging (A Taylor)

Preventative Cardiology

Head: Prof. Simon Stewart

Preventative Health (S Stewart)
Data Management
Healthy Hearts (M Carrington)



Baker IDI Heart and Diabetes Institute is a world renowned medical research facility, with a history spanning more than 87 years.

Baker IDI Heart and Diabetes Institute

Director: Professor Garry Jennings AO, AM, MBBS, MD, FRCP, FRACP, FAHA, FCSANZ

Baker IDI Heart and Diabetes Institute's work extends from the laboratory to hospital research and widescale national and international community studies with a focus on diagnosis, prevention and treatment of diabetes and cardiovascular disease.

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 terms of treatments and hospitalisation.

Our main laboratory facilities located at AMREP in Melbourne are complemented by a network that includes a research facility in Alice Springs dedicated to Indigenous health.

The institute's work covers six broad themes of research, each of which supports groups of scientists who work in a laboratory setting as well as researchers who work in the community. This integration of basic scientists with epidemiologists, clinicians and public health professionals is central to Baker IDI's strategy to perform research that is directly informed by community needs and to translate discoveries into everyday clinical practice.

Institute Research Themes

Population Studies and Profiling

This group works at understanding the prevalence of disease and disease risk in the population and improving the health of the community. The focus is on prevention and education, as well as development of better profiling tools.

Human Physiology and Behavioural Science

The focus of this group is on metabolism and blood vessel function including behavioural and environmental influences such as physical activity and nutrition. This work is directed toward prevention, risk prediction and novel intervention strategies for obesity, diabetes, coronary and peripheral blood vessel disease.

Metabolism

The group explores the complex relationship between weight regulation and the genetic and environmental underpinnings of metabolism to address the causes and complications of metabolic disorders and obesity.

Diabetic Complications

Diabetes is a chronic disease and is currently the fastest growing disorder in Australia. Among its many debilitating complications are heart and vascular disease, kidney and eye disease. The Diabetic Complications group focuses on understanding which people are most at risk of the complications of diabetes and discovering ways to mitigate the effects of the disease.

Vascular Biology and Hypertension

This group brings together studies on high blood pressure, kidney disease, the neurobiology of the relationship between depression and heart disease, as well as research into the damage to arteries caused by atherosclerosis, and the damage caused by heart attack.

Cardiology and Therapeutics

Heart failure, acute coronary syndromes and better treatment options for atrial fibrillation are among the research areas investigated by this group. These forms of cardiovascular disease are increasing the health burden on communities. The focus is on taking laboratory findings and translating them into better drugs, surgical and therapeutic devices for people suffering from heart disease.

As well as these research themes, we have a strong presence in healthcare that includes a multidisciplinary, evidence-based diabetes clinic, diabetes education, and the Healthy Hearts Clinic, providing cardiovascular disease risk assessments to the community. Baker IDI is also active in training health professionals and collaborating on international projects in heart disease and diabetes.



Associate Professor Rebecca Ritchie (centre), an NHMRC Senior Research Fellow, heads the Heart Failure Pharmacology Laboratory.

Over the years, our researchers have been responsible for many groundbreaking advances including:

- Proving that exercise can lower blood pressure
- Proving that mental stress and cigarette smoking both provide powerful, selective and potentially harmful stimulation of the nerves of the heart
- Developing techniques to assess stiffness of arteries, enabling the reliable early detection of atherosclerosis and hypertension
- Establishing open heart surgery in Australia in collaboration with The Alfred hospital
- Developing a method to repair heart valves without surgery
- Identifying key factors involved in clotting
- Defining the differences between type 1 and type 2 diabetes
- Identifying pathways that explain how sugar can cause permanent damage to blood vessels

The Baker IDI Research Framework

Baker IDI's research agenda is based on the notion of a disease continuum from birth to death, with the opportunity of preventing the progression of disease at any stage. These themes encompass our activities ranging from cellular and molecular biology, to integrative physiology, population studies, preventative health initiatives and clinical services focused on:

- **Early life:** includes experiences during pregnancy and infancy that may be a determinant of an individual's propensity to develop diabetes, metabolic syndrome and subsequently, cardiovascular disease in middle age.
- **Childhood and adolescence:** with a view to informing policy and developing novel ways of altering the balance in an individual between energy expenditure, food intake and nutrient density, as well as providing better information on optimal diets and physical activity programs.
- **Adults with risk factors:** including assessment of cardiac and metabolic risk; the causes and treatment of the major cardiovascular risk factors particularly diabetes, hypertension and abnormalities of blood fats; and risk factor clusters such as the metabolic syndrome.



A research nurse takes a blood pressure reading from a participant in AusDiab, the largest Australian longitudinal population-based diabetes, obesity and lifestyle study of its kind. The third round of screening commenced in Victoria in August 2011 and was completed in the Northern Territory and Tasmania in June 2012.

- **Sub-clinical organ damage:** with a focus on the time in life when asymptomatic risk factors cause measurable changes in the body, particularly the arteries of the heart, brain, kidneys and eyes.
- **Acute complications:** heart attack, stroke and sudden death; with a focus on understanding the mechanisms underlying the development and rupture of unstable plaques.
- **Clinical complications:** angina, kidney failure, dementia; with a focus on the development of disease management programs, particularly in high risk communities such as the Australian Indigenous community.

- **Heart failure and terminal disease:** including work ranging from fundamental research on maintaining the viability and function of heart cells in the context of advanced disease, the prevention of complications of a failing heart such as arrhythmia, the development of new devices to cure atrial fibrillation, and stem cell research to replace damaged heart muscle or help arteries heal.

Research Highlights

Our work spans cellular and molecular studies to wide-scale community screening and intervention programs, and the translation of research findings into the next stage of therapy development. Highlights across our research groups include a focus on disease and disease prevention in the following life stages:

Early Life

- Baker IDI Central Australia has partnered with the NT Department of Health and Menzies School of Health Research to develop a clinical register of women with diabetes in pregnancy in the Northern Territory. There is currently no comprehensive information source from which to investigate the size of the problem or understand what is happening with women and their babies in the Territory. To close this gap, this project will collect data that will be used to assist with healthcare planning and service delivery.
- Description of the molecular mechanism that explains how blood vessels are damaged by prior episodes of high glucose, a well-described clinical phenomenon called metabolic memory, is starting to be unravelled using modern molecular biology.

Childhood and Adolescence

- Discovery that a heat shock protein in muscle inhibits inflammation and prevents insulin resistance (pre-diabetes) in the context of obesity and high-fat feeding. Plans are now under way to test these findings in human clinical trials. This research was recognised in the NHMRC publication *Ten of the Best Research Projects 2012*.
- Contribution to inaugural international guidelines for the diagnosis of rheumatic heart disease (RHD), published by the World Heart Federation in *Nature Reviews Cardiology* in February 2012. RHD predominantly affects children and in Australia, is almost exclusively restricted to Aboriginal Australians and Torres Strait Islander children.
- Baker IDI convened a group of clinicians, policy makers and researchers to make recommendations on the diagnosis, screening, management and prevention of type 2 diabetes in young Indigenous Australians. The recommendations were published in the *Medical Journal of Australia* in July 2012.

Adults with Risk Factors

- In November 2010, Baker IDI was awarded \$2.5 million through the NHMRC's grant program in support of round three of the Australian Diabetes, Obesity and Lifestyle Study (AusDiab). AusDiab is the largest Australian longitudinal population-based study of its kind. The third round of screening commenced in Victoria in August 2011 and was completed in the Northern Territory and Tasmania in June 2012. Results will be presented in 2013.
- Demonstrated that renal denervation treatment for drug-resistant hypertension is safe and highly effective in reducing blood pressure following a one-year study of patients who received the treatment. The study, published in *Circulation*, found that 83% of the treatment group experienced a drop in systolic blood pressure of at least 10 mmHg at six months, and nearly 79% of the group maintained such reductions at 12 months. Critically, the study found that participants' kidneys were not damaged or functionally impaired and there were no ill effects on long-term health from the procedure. Renal denervation is expected to revolutionise treatment options for people with high blood pressure.



Professor Bronwyn Kingwell heads the Human Physiology and Behavioural Science Program. A landmark publication from her group reported that patients with peripheral arterial disease of the legs experience longer and more pain-free time on their feet when treated with a standard antihypertensive drug.

- Discovery that inhibiting tiny molecules called microRNAs can prevent heart failure in mice and improve the pumping performance of the heart, with findings published in October 2012 in the *Proceedings of the National Academy of Sciences USA*.
- Demonstrated through a four-year study of Adelaide residents that travelling to work by car may contribute to weight gain, with people who did not drive putting on an average of 1.2 kg, compared with 2.4 kg for people who drove every day.
- A Baker IDI-led study involving more than half a million Australians found that more than one in three people visiting their general practitioner recorded a high blood pressure reading and that at least half did not meet their individualised blood pressure target, placing them at high risk for a future heart attack or stroke.
- Baker IDI, in collaboration with the Diabetes Surgery Center at Weill Cornell Medical College / New York Presbyterian Hospital and A*STAR Singapore Institute for Clinical Sciences, organised the Asia-Pacific Workshop on Metabolic Surgery for Diabetes in Singapore in February 2012. The meeting highlighted the latest developments in the field and addressed the challenges and opportunities offered by metabolic/diabetes surgery to populations and health care systems in Asia and Australia-New Zealand.
- Baker IDI staff played a central role in organising the 24th Scientific Meeting of the International Society of Hypertension in Sydney in September 2012, which included Director Professor Garry Jennings AO, AM as chair for this key scientific event.
- The NT Department of Health and Families and Baker IDI hosted an educational symposium in Darwin focused on diabetes care at the Top End in October 2012. The symposium reviewed the latest management and preventative health programs, as well as research around key issues such as barriers to care, with a particular focus on remote communities.
- Professor Simon Stewart will lead a multidisciplinary team to create new and innovative healthcare programs to optimise the prevention and management of heart disease, after receiving an NHMRC Program Grant worth \$4.6 million for 2014-2018.

Sub-clinical Organ Damage

- Baker IDI and Alfred Health researchers have identified a protein that may be an early marker of heart damage, with this discovery currently being explored as a potential new test to rapidly diagnose heart attacks. In particular, it may provide early prognostic indicators to guide clinical staff in regional areas about treatment pathways for people following a cardiac event, as well as informing clinical guidelines around the most efficient use of cardiac interventions.
- Demonstrated in a landmark *Journal of the American Medical Association* publication that patients with peripheral arterial disease of the legs can enjoy longer and more pain-free time on their feet when treated with a standard anti-hypertensive drug. Patients treated with the drug improved their walking ability by five times the amount achieved with current medical therapies.

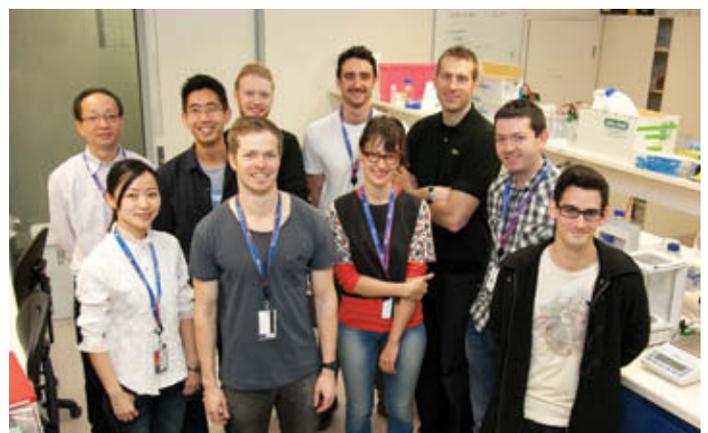
- Demonstrated for the first time that brown adipose tissue – a type of body tissue located on a person's back known as 'brown fat' – can be manipulated through drugs, highlighting a potential new therapeutic treatment for obesity. The finding, profiled in *Diabetologia*, showed that the activation of this tissue through a single dose of the drug, ephedrine, could be achieved in young, lean men.
- Demonstrated in pre-clinical trials that diabetes can be reversed by blocking the effects of the growth differentiation factor (GDF) family of proteins. In diabetes, GDF proteins are overproduced, which can compromise pancreas, liver, kidney, fat and muscle function.

Clinical Complications

- Clinical trials of a medical device developed at Baker IDI in conjunction with Osprey Medical continued. The device allows people with kidney disease to undergo coronary angiography without further damage to their kidneys. Osprey Medical debuted on the Australian Stock Exchange in May 2012.
- Orthostatic intolerance is a disordered control of blood pressure and causes recurrent fainting and severe fatigue when people stand up. Our molecular research has uncovered a new mechanism that may be responsible for this and this discovery will be the basis for new treatments. Greg Page, a founding member of The Wiggles, is a sufferer and has supported our research by establishing a fund.
- Baker IDI led an Australian-Dutch research team which confirmed the role of a specific enzyme in the accelerated development of diabetic atherosclerosis NOX1.

Acute Complications

- Baker IDI researchers found home-based care for patients with chronic heart failure was more effective in a comparative study of home versus clinic-based care, particularly when it comes to cost and fewer days of hospitalisation. This was published in the *Journal of the American College of Cardiology* in September 2012.
- Research has uncovered what appears to be the basic cause of heart attack risk in depressive illness. This finding suggests specific treatment to protect patients with depression from heart attack beyond treating their depression alone.
- Recent advancements by the Laboratory for Muscle Research and Therapeutic Development are shedding new light on the potential use of gene therapy to treat the complications of inactivity and advancing age. This research has the potential to address a host of conditions that are caused or complicated by loss of muscle mass and strength, including frailty and cardiovascular disease.



Dr Paul Gregorevic (back row, 5th from left) heads the Muscle Research and Therapeutics Laboratory. Recent advancements from his group are shedding new light on the potential use of gene therapy to treat the complications of inactivity and advancing age.

Future Directions

The institute has established a range of state-of-the-art facilities designed to enhance diabetes and heart disease research and management. These facilities include:

Metabolomics

Devising new therapies to combat obesity is challenging due to the complex nature of metabolic disease. To develop treatments for metabolic disorders such as obesity, therapies must first be tested in isolated cell systems before progressing to clinical trials. The knowledge gained through research conducted in this facility will allow researchers to devise more effective preventions and treatments. Once the gene functions and defects implicated in particular diseases are identified, researchers can develop ways to screen people for risk factors and design remedies that target the causes and complications of disease.

DNA and Blood Profiling

The establishment of this facility in 2008 represented a major advance in the area of personalised medicine. By more effectively understanding the genetic underpinnings of disease, clinicians will be able to diagnose, treat and care for their patients in a holistic manner. The central idea behind this facility is to integrate existing research disciplines so that health problems are understood and resolved in a way that takes into account individual responses to risk factors.

The Healthy Lifestyle Research Centre

Diet, exercise and genetics all play important roles in body weight regulation. However, it is important to understand the specific underlying causes of obesity, which remain unclear. The Healthy Lifestyle Research Centre enables scientists to examine how genetic and environmental factors combine to influence body weight. This unique facility is helping to improve our understanding of the effects of physical activity and nutrition for the prevention, management and treatment of obesity and its complications, including diabetes and cardiovascular disease. Since it was established in 2010, researchers from the centre have had more than 120 original research papers published along with reviews, book chapters and reports, as well as presenting at more than 30 conferences.



Senior staff of Baker IDI's Indigenous Health Program based in Central Australia. (L-R): Professor Jeffrey Reading (Associate Director, Global Indigenous Health), James Ward (Deputy Director, Indigenous Health) and Associate Professor Graeme Maguire (Executive Director, Indigenous Health).

Specialist Diabetes Clinic

The Baker IDI Specialist Diabetes Clinic provides the highest quality medical care and support services for the management of diabetes and its complications. With more than 8,000 patients, it is the largest facility of its kind in Australia. The co-location of these clinical services with Baker IDI's research facilities provides significant opportunities to link groundbreaking research with patient care. Recent additions to the clinic's services include a Weight Assessment and Management Clinic for people with severe obesity, as well as a respiratory specialist.



Professor John Dixon is head of Baker IDI's new Weight Assessment and Management Clinic.

Medicinal Chemistry

This facility promotes and enhances existing Baker IDI research projects by providing scientists with the tools they need to further examine the therapeutic potential of particular compounds. Medicinal chemistry is the science of providing small, technically accessible, synthetic molecules. These molecules can be used to induce a change to the human system or better facilitate scientific observations.

Bioinformatics

An internal, web accessible workbench called Galaxy has been established at Baker IDI to allow scientists to more easily study large data sets, support reproducible, translational genomic and genetic research and allow common analysis among researchers. The work sits at the intersection of biology and computer science, applying computational and mathematical methods to experimental biology. A founding member of the team that created Galaxy, Dr Ross Lazarus – the Director of Bioinformatics at the Channing Laboratory at Harvard – has a joint appointment as Head of Medical Bioinformatics at Baker IDI.

Baker IDI Central Australia: Indigenous Health

As part of our mission to address the health inequalities of disease between Indigenous and non-Indigenous Australians, the institute established a dedicated Indigenous health research facility based at Alice Springs in Central Australia. Baker IDI's research program, which is conducted in close consultation with local communities and focuses on working with existing community services, is designed to have an immediate effect on vascular health, while improving mortality rates in future generations.

In 2012, we continued to expand our team and key areas of focus with the appointment of several senior researchers. Baker IDI's expertise in chronic disease is now informing a broader research agenda, including lung and infectious diseases. Like heart disease and diabetes, these diseases have a significant impact on Aboriginal Australians and Torres Strait Islanders.

Imaging Suite

Baker IDI is home to leading researchers skilled in the use of cardiac imaging technology. To cement our position in this field, the institute is progressing a proposal to establish Australasia's first comprehensive research centre of excellence in cardiac, diabetes and metabolic imaging, which would incorporate MRI, CT and echocardiography. The imaging suite would be located on the AMREP campus with direct links to the institute's Diabetes Clinic and Healthy Lifestyle Research Centre. It is envisaged that the facility would form the basis of a broad-based preventative health and clinical research centre, opening up new imaging modalities to researchers and clinicians.

International Projects

By providing an extension of its Australian research to vulnerable societies, Baker IDI improves the understanding of health and disease around the globe and provides a powerful presence in countries that can benefit from its research expertise. Part of Baker IDI's mission is to reduce premature ill health and mortality from diabetes and heart disease wherever it occurs. There is a great disparity in health outcomes between western and developing communities. Poverty is one of the strongest indicators of poor health and it is this inequality that must be addressed. Some projects under way include:

Mauritius

Baker IDI is currently involved in advising the Prevention Program for Type 2 diabetes in Mauritius. Screening of subjects for the intervention program is in the final stages, with a follow-up study for diabetes and associated risk factors conducted every five years. Baker IDI is a partner in the next national survey scheduled for 2014.

Heart of Soweto / Heart of Africa

This landmark program of research is being conducted by Baker IDI via the NHMRC Centre of Research Excellence to Reduce Inequality in Heart Disease, in close collaboration with the Hatter Institute, University of Cape Town, South Africa. The team is documenting emergent heart disease in Africa's largest urban concentration of black Africans. Comprehensive data from more than 6,000 hospital cases (2006-2008) and 1,300 primary care cases (2009), resulted in unique reports on emergent heart disease (*The Lancet and European Heart Journal*), heart failure (*Circulation*), hypertension (*International Journal of Cardiology*), rheumatic heart disease (*European Heart Journal*), HIV and heart disease (*European Heart Journal*), atrial fibrillation (*Heart*) and primary



A primary healthcare worker monitors the blood pressure of a participant in the Heart of Soweto study.

care burden of heart disease (*International Journal of Cardiology*). The data has informed and influenced health care policy in that country. A new phase of research involving wider collaborations in Africa (particularly Nigeria) has extended heart disease surveillance in sub-Saharan Africa, as well as a multicentre primary prevention study in primary care (the PROTECT-AFRICA Study) involving pregnant women and their families.

China

Baker IDI is involved in two collaborative studies with Peking University Institute of Cardiovascular Sciences. One study is examining novel β adrenergic signalling pathways leading to heart disease, and another is looking at the pathophysiology of macrophage migration inhibitory factor (MIF) in acute myocardial infarction. These studies are funded by the National Science Fund of China and have resulted in three papers submitted for publication. The MIF study is currently in the process of recruiting 3,000 patients with acute coronary syndrome.



Professor Paul Zimmet AO, Director Emeritus Baker IDI (L), and HH Sheikh Dr Sultan bin Mohammad AL Quassimi, Ruler of Sharjah (R), sign an MoU between the University of Sharjah's Academy of Scientific Research on behalf of the Sharjah Medical Excellence Cluster and Baker IDI. The MoU formalises Baker IDI's advisory role in the United Arab Emirates National Diabetes Study.

United Arab Emirates

The United Arab Emirates (UAE) is the epicentre of the global diabetes epidemic. Under a memorandum of understanding with the University of Sharjah, Baker IDI is acting in an advisory capacity on the UAE National Diabetes Study. It is the first nationwide survey looking at the impact of lifestyle on the health outcomes of 7,000 residents. The survey will include national Emirati citizens as well as expatriates. Survey work has commenced in the expatriate community and, in the latter half of 2013, Emirati citizens will be studied. A pilot phase of the survey has already demonstrated that expatriates who have been living in the country for four or more years have a much greater chance of developing diabetes.

Postgraduate Students

38 PhD Students

Publications

396 Journal Articles
7 Book Chapters



www.nucleusnetwork.com.au



A volunteer trial participant and research nurse in the Nucleus Network facility.

Nucleus Network

Chief Executive Officer: Craig Rogers BPharm, MAppSc, LLB, GDLP, GradDipCommSec

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 provides the establishment of unique collaborations with hospital-based principal investigators, medical schools and access to dedicated research facilities and capabilities across AMREP.

The Centre for Clinical Studies at AMREP and the Centre for Clinical Studies at the Austin Hospital in Heidelberg are purpose-built facilities for the conduct of clinical trials, which together are 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 pre-clinical testing into clinical application.

Phase 1 clinical trials, where new drug therapies are tested in 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 the people 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 2012

- Over \$2 million of services, donations, education subsidies and contract work paid to AMREP members.
- Approximately \$13 million of direct export revenue generated for the Australian biopharmaceutical industry plus unquantifiable flow-on benefits for the industry and other economic sectors.
- Clients include international pharmaceutical and biotech companies from Australia, USA, France, New Zealand, China and the United Kingdom.
- More than 45 clinical trials conducted.
- Appointment of an oncology trained Medical Director.
- Expansion of the Centre for Clinical Studies AMREP facility from 24 to 35 beds.

- Support of investigator-led studies in spinal cord injury patients and heart failure patients.
- Five direct student placements, plus support provided to external researchers (including PhDs).



A volunteer for a clinical trial has his blood pressure monitored.




Burnet Institute
Ready to Research. Proven to Act.


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Ready to Research. Proven to Act.

AMREP 75
About Medical Research & Education Progress



Burnet Institute – Centres and Working Groups

Director: Professor Brendan Crabb

Deputy Directors: Professor Mike Toole AM and Associate Professor David Anderson

Centre for Biomedical Research

Heads: Profs Sharon Lewin and James Beeson
Deputy Head: Prof. Paul Gorry

Anderson Laboratory
Diagnostics Development

Beeson Laboratory
Immunity Vaccines & Prevention

Caminschi Laboratory
Dendritic Cells in Innate
& Adaptive Immunity

Churchill Laboratory
HIV Neuropathogenesis

Crowe Laboratory
Clinical Research, WHO
Regional Reference Laboratory
for HIV Resistance

**Drummer/Poumbourios
Laboratory**
Viral Fusion

Gavin Laboratory
Leukocyte Development
in Health & Disease

Gilson/Crabb Laboratory
Malarial Research

Gorry Laboratory
HIV Molecular Pathogenesis

Gugasyan Laboratory
Lymphocyte Biology

Hogarth Laboratory
Inflammatory Diseases, Infection
& Cancer

Jaworowski Laboratory
HIV Pathogenesis

Lahoud Laboratory
Dendritic Cell Receptors

Lewin Laboratory
HIV & Hepatitis
Immunopathogenesis

Ffrench Laboratory
Immunomonitoring Facility

Fowkes Group
Malaria & Infectious Diseases

O’Keeffe Laboratory
Dendritic Cell Function

Pietersz Laboratory
Bio-organic & Medicinal Chemistry

Ramsland Laboratory
Structural Immunology

Richards Laboratory
Malaria & Tropical Disease

Tachedjian Laboratory
Retroviral Biology & Antivirals

Tannock Laboratory
Influenza

Wright Group
Neuro AIDS Research

Loveland/Gowans Laboratory
Replication & Virus Assembly

Centre for Population Health

Head: Prof. Margaret Hellard

Infectious Diseases and Malaria: F Fowkes & J Beeson

Drugs and Alcohol: P Dietze & P Higgs

Justice Health: M Stoové

Viral Hepatitis: M Hellard

HIV: M Stoové

Sexual Health: M Hellard & M Lim

Modelling and Biostatistics: E McBryde

Surveillance and Evaluation: C El-Hayek

Centre for International Health

Heads: Profs Robert Power and Stanley Luchters

Technical and Research Operations: S Luchters

HIV and Harm Reduction: C Hughes

Women’s and Children’s Health: E Kennedy

Education and Capacity Strengthening: M Brown

Infectious Diseases: C Morgan

International Operations: R Power

Project Management:

Hub Partnership:

M Nicholas

Tibet Health Facility:

R Bradley

Hub & Healthy Ageing:

K Durrant

Communications, Hub

Partnership: J Hawtin

Country Representatives:

Myanmar:

L Burns

PNG:

L Harper

Mekong Delta Region:

R Bradley

In 2013, the Centre for Virology and the Centre for Immunology were replaced by the Centre for Biomedical Research.



The Burnet Institute's international activities include a program in Myanmar with local 'in-country' partners aimed at improving maternal and child health.

Burnet Institute

Director: Professor Brendan Crabb PhD

In 2012, the Burnet Institute achieved an outstanding output across medical and health research, research translation, and in local and international public health activities. We published more peer-reviewed scientific papers than ever before. Our output of 181 publications was 15% higher than last year, with much of this increase coming from our local public health experts who are tackling some of society's major health afflictions.

Translating research findings into practical solutions has been enabled by our success in securing internationally competitive funding for this purpose. The institute was awarded a number of grants from overseas bodies, such as the Bill and Melinda Gates Foundation, which are designed to fund projects closely associated with practical interventions. Scientists working on malaria, HIV, vaccines, tuberculosis (TB) and maternal health were all recipients of such awards this year.

Our low cost, point-of-care CD4 test was launched at the AIDS 2012 conference in Washington. This simple test opens up HIV therapy to millions of the world's most needy people, especially to women and children who comprise the majority of HIV-positive people throughout the developing world. Our reputation for the development of improved diagnostic tests led to a large grant from the Gates Foundation for improving the detection of TB, the world's most significant 'silent' killer.

Our international health programs have spanned a wide range of disciplines and activities in Myanmar (Burma), Papua New Guinea (PNG), Lao PDR, Timor-Leste, China (including the Tibet Autonomous Region) and Zimbabwe. In the last year we spent around \$15 million on international health programs, expanding maternal and child health programs that also complement our mainstay activities, and reputation in sexual and reproductive health.

Centre for Virology

The Centre for Virology focuses on the study of chronic viral diseases such as HIV, hepatitis B and C, and understanding how viruses manipulate their host cells in order to infect them and replicate within the body. There is a strong emphasis on basic research to facilitate the development of new drugs and new drug targets, as well as the technologies and diagnostics required to monitor treatments. These include the development of new drug resistance assays as well as developing appropriate diagnostic tools and point-of-care assays for use within resource-constrained countries. We are also identifying possible new drug targets at the molecular level and developing diagnostic tools and point-of-care assays for chronic infectious diseases.

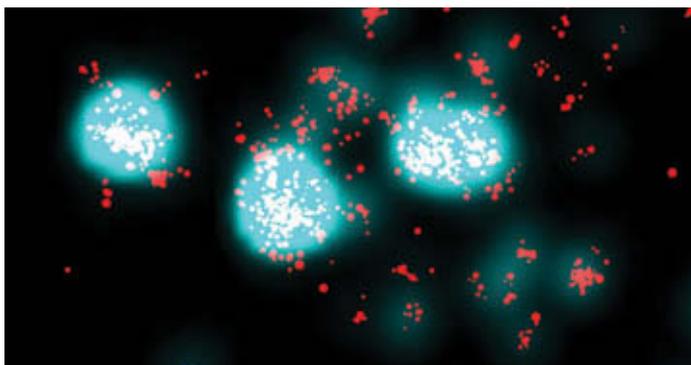
Our research program is focused on:

- HIV neuropathogenesis
- Hepatitis immunovirology
- HIV pathogenesis and HIV reservoirs
- Point-of-care diagnostics and low-cost monitoring in resource-constrained countries
- Retroviral biology and molecular pathogenesis
- Emerging infectious diseases – influenza
- HIV eradication, antivirals, treatment and prevention

Virology Working Groups

- **Anderson Laboratory: Diagnostics Development**
Focuses on development, refinement and validation of diagnostic techniques for infectious diseases in disadvantaged populations.
- **Churchill Laboratory: HIV Neuropathogenesis**
Focuses on understanding HIV neuropathogenesis, development of viral reservoirs and characterisation of viral/host factors that impact the central nervous system.
- **Crowe Laboratory: International Clinical Research Laboratory (iCRL)**
An accredited WHO Regional HIV Drug Resistance Laboratory for the Asia and Pacific regions, the group focuses on developing and assessing laboratory monitoring tests for HIV infection, particularly for use in low-cost settings.
- **Drummer/Poumbourios Laboratory: Viral Fusion**
Focuses on how HIV and hepatitis C virus (HCV) attach and enter cells to find new targets for development of antiviral agents and vaccines.
- **Gorry Laboratory: HIV Molecular Pathogenesis**
Aims to understand HIV pathogenesis, develop new HIV inhibitors and diagnostics to assist physicians in treating patients.
- **Gowans/Loveland Laboratory: Hepatitis C Immunity and Immunotherapies**
Undertakes immunotherapy studies and clinical trials to address persistent infection with HCV.
- **Jaworowski Laboratory: HIV Pathogenesis**
Studies pathogenesis of HIV infection with a view to improving patient outcomes in the era of successful viremia control with antiretroviral therapy.

- **Lewin Laboratory: HIV and Hepatitis Immunopathogenesis**
Headed by physician scientists Sharon Lewin and Paul Cameron, the group focuses on HIV, hepatitis B virus (HBV) and cytomegalovirus.
- **Tachedjian Laboratory: Retroviral Biology and Antivirals**
Focuses on understanding retroviral biology with a view to drug target discovery.
- **Tannock Laboratory: Influenza**
Investigates causes of variability in the growth of influenza B viruses in eggs and in developing methods to increase yields of vaccine antigens.
- **Wright Group: Asia Pacific NeuroAIDS Consortium**
Dedicated to improving health in the Asia-Pacific regions by conducting training programs and research studies on HIV clinical management and neurological complications of HIV.



HIV proteins visualised through a super-resolution microscope.

- **Hogarth Laboratory: Inflammation, Cancer and Infection**
Focuses on cellular and molecular basis of inflammation with a view to translation into the development of immunomodulatory therapeutics for autoimmune diseases and infection.
- **Gavin Laboratory: Leukocyte Development in Health and Disease**
Focuses on understanding how responses by the immune system lead to autoimmunity.
- **Gugasyan Laboratory: Lymphocyte Biology**
Focuses on immune system response to external factors promoting immune cell differentiation.
- **Fowkes Laboratory: Malaria Epidemiology**
Studies malarial dynamics in populations.
- **Gilson/Crabb Laboratory: Malarial Research**
Aims to identify new targets and approaches for malarial drugs and vaccines.
- **Beeson Laboratory: Malaria Immunity, Vaccines and New Therapies**
Focuses on understanding immune responses to malaria and how the disease develops, particularly in children and pregnant women, with a view to develop drugs and vaccines.
- **Ramsland Laboratory: Structural Immunology**
Examines the 3D structures of immune system proteins.
- **Ffrench Laboratory: Viral Immunology**
Aims to understand cellular immune responses to viral infections to aid the development of drugs and vaccines.
- **Anderson Laboratory: Diagnostics Development**
Part of both the Centre for Virology and the Centre for Immunology.

Centre for Immunology

The Centre for Immunology integrates fundamental and applied research programs to understand the way the immune system functions in health and disease. This knowledge is used for the development of new treatments, vaccines and diagnostic tests for major human diseases. Key aims include understanding how the immune system attacks or clears infectious agents, why the immune system attacks normal cells it should ignore in autoimmune diseases, and how infectious agents and cancer cells avoid immune destruction.

Our research program is focused on:

- Malaria and other infectious diseases
- Autoimmune and inflammatory diseases
- Vaccines for infectious diseases and cancer
- Immune function in health and disease
- Structural biology

Immunology Working Groups

- **Pietersz Laboratory: Bio-Organic and Medicinal Chemistry**
Focuses on designing novel vaccines for cancer and major infectious diseases.
- **Lahoud Laboratory: Dendritic Cell Receptors**
Focuses on molecular interactions that underpin Clec9A function.
- **O'Keeffe Laboratory: Dendritic Cell Research**
Focuses on understanding how dendritic cells are activated by pathogens and other signals.
- **Hogarth Laboratory: Immunology and Cancer Vaccines**
Focuses on how the immune system responds to cancer cells with a view to developing vaccines to treat cancer.



Dr Michelle Boyle (Beeson Laboratory) works on Plasmodium falciparum, the parasite that causes the majority of malaria sickness and death worldwide.

Centre for Population Health

We aim to improve the health of the community by conducting high quality, innovative research that addresses the major public health problems associated with infectious diseases and drugs and related behaviours. HIV, hepatitis C, sexually transmitted infections (STIs), malaria, TB, and drug and alcohol use are serious health concerns in Australia, Asia and the Pacific. It is an enormous challenge to reduce the impact of these diseases and behaviours, particularly in highly vulnerable populations and disease endemic areas.

The Centre for Population Health implements novel, multidisciplinary scientific programs that use cutting-edge epidemiology, high quality

laboratory science, excellent clinical and social research, and strong public health principles to address these major health problems in our region. The broad spectrum of work ranges from research that helps to better understand the priority diseases and their transmission and ecology, to discovery science with potential for longer-term benefits such as therapeutics and vaccines, to health systems oriented research that directly influences health policy.

Population Health Working Groups

• Alcohol and Other Drugs

Co-headed by **Professor Paul Dietze** and **Dr Peter Higgs**, the group researches alcohol and other drug use, and related harms, in Australia with collaboration from researchers at key national and international institutions.

• HIV

Headed by **Dr Mark Stoové**, the group studies the transmission and prevention of HIV in high-risk populations.

• Justice Health

Headed by **Dr Mark Stoové**, the group conducts policy-relevant research using prospective cohort designs, randomised controlled trials and record linkage to enhance the evidence base for justice health policy and practice.

• Malaria and Infectious Diseases Epidemiology

Headed by **Dr Freya Fowkes**, the group researches malaria immunology, with a focus on developing and utilising immunological biomarkers for vaccine trials, disease surveillance and evaluating the impact of interventions for malaria. This group is part of both the Centre for Population Health and the Centre for Immunology.

• Infectious Diseases Surveillance

Managed by **Carol El-Hayek**, the group conducts evaluations of projects and programs aimed at better understanding the transmission and prevention of communicable diseases, including HIV and STIs, and the health and wellbeing of affected populations.

• Sexual Health

Co-headed by **Professor Margaret Hellard** and **Dr Megan Lim**, the group conducts public health research and health promotion to create a strong evidence base for tackling STIs in Australia, and the Asia and Pacific region, particularly in the young.

• Viral Hepatitis

Headed by **Professor Margaret Hellard**, the group focuses on HCV to improve understanding of the virus, to develop harm reduction strategies for populations at greatest risk, and ultimately to develop a vaccine.

• Modelling and Biostatistics

Headed by **Dr Emma McBryde**, the group applies modelling and biostatistics to public health research.

Centre for International Health

We respond to major health problems in developing countries through the provision of technical advice and support, organisational capacity building, applied research, policy analysis and development, and training and education programs. Our expertise spans HIV prevention and care, women's and children's health, sexual and reproductive health, drug use, primary health care, strengthening national health systems, and education across these fields. In PNG, Indonesia, Lao PDR, Myanmar (Burma), China (including Tibet), Fiji and Thailand, we work with local communities, governments, the UN system and international organisations including Australia's development agencies. Our locally based country 'reps' are supported by public health project managers in Australia to implement our country programs, which aim

through practical action to improve the health for people in low-income communities.

International Health Working Groups

• International Operations

Led by **Professor Robert Power**, the group focuses on improving the health of local vulnerable communities through effective public health action and capacity building across Asia and the Pacific regions.

• Education and Capacity Development

Led by **Marion Brown**, the group has oversight, development and strategic direction of the centre's education, training and capacity development programs in Melbourne and overseas.

• HIV and Harm Reduction

Led by **Chad Hughes**, the group provides technical assistance, strategic direction and advice to countries and communities addressing the HIV epidemic, and/or drug and alcohol related harms.

• Infectious Disease and Health System Strengthening

Led by **Dr Chris Morgan**, the group supports 'in-country' partners to tackle malaria and TB using technologies from 'bench to the bedside' through basic science, clinical and social research.

• Women's and Children's Health

Led by **Professor Stanley Luchters**, the group works to improve the health of women and children in resource-poor settings through capacity building, technical advice, research and advocacy.



The Burnet's Women's and Children's Health team implements integrated programs to improve the health of women and children within a life-cycle approach, and in a way that strengthens the capacity of individuals and health systems 'in-country'. A new 'Healthy Mothers – Healthy Babies' program is operating in Papua New Guinea. Lynton Crabb Photography.

Major Themes and Highlights

Sexual and Reproductive Health

Sexual and reproductive health (SRH) is an important global issue, with outcomes such as unintended pregnancy, safe abortions and STIs (including HIV) impacting on the health of all communities. Burnet is engaged in a broad range of research, evaluation projects and development interventions, from basic (laboratory) science projects, clinical trials and epidemiological studies, through to capacity building, education, training and policy development.

Monitoring HIV

The Crowe Laboratory is committed to providing validated, low-cost tests for monitoring HIV patients in resource-limited settings, including training scientists in PNG in low-cost HIV-1 viral load assays to facilitate paediatric HIV care.

Clinical Trials

The Tachedjian Laboratory, in collaboration with Starpharma Pty Ltd, has completed a Phase 1 trial of VivaGel[®], a candidate microbicide for HIV prevention. The Tachedjian Laboratory is also working on understanding the role of lactic acid in the inactivation of sexually transmitted viruses, including HIV in order to improve female sexual health. The Lewin Laboratory is currently involved in a trial to see whether vorinostat (a cancer treatment drug) can activate latent (hibernating) HIV in patients on therapy, an important potential step towards curing HIV.

STI Prevalence in Pregnant Women in PNG

In PNG, treatable STIs cause significant morbidity. The Health Pregnancy in PNG Study is the largest bio-behavioural investigation in pregnant women in PNG, which aims to determine STI prevalence. The study is a partnership between the PNG Institute of Medical Research, Burnet and the Kirby Institute. The work will provide the first local type-specific prevalence data of human papillomavirus (HPV), the virus necessary for the development of cervical cancer, and support the advocacy for introducing the HPV vaccine into PNG.

Community-based Interventions: Sexual and Reproductive Health

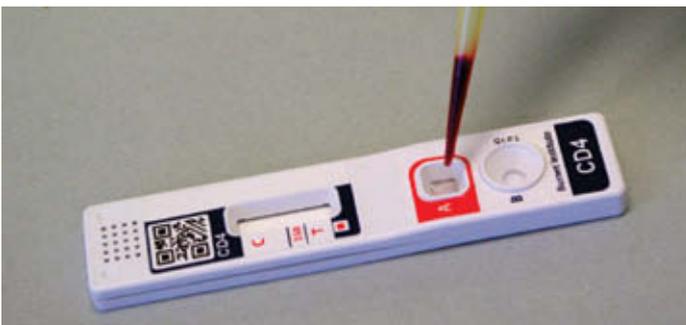
These include a diverse range of local and international activities including: ongoing refinements to disease surveillance systems to inform prevention priorities; working with organisations such as Marie Stopes International to establish best-practice monitoring and evaluation frameworks for their services; modelling the health benefits for investment in family planning in the Pacific; and implementation of community-based SRH prevention interventions.

Maternal and Child Health

Considerable progress has been made over the past two decades to reduce maternal and child deaths globally. However, more than seven million children and almost 300,000 women die each year. The overwhelming majority of these deaths occur in developing countries and most could be prevented.

Field Validation of Burnet's Point-of-Care CD4 Test

Associate Professor David Anderson, Professor Suzanne Crowe AM and their team have developed the world's first instrument-free, low cost, point-of-care CD4 test. The inexpensive, simple to use finger-prick test allows health workers to assess CD4 counts during the first antenatal visit without the need for a laboratory so that lifesaving interventions can be immediately initiated. Burnet's VISITECT[®] CD4 test was awarded one of only 15 innovation grants (out of more than 500 applications worldwide) by the Grand Challenges 'Saving Lives at Birth' Initiative. The project, led by Professor Stanley Luchters, will assess the accuracy, feasibility and acceptability of the test through antenatal clinics in Kenya and South Africa.



Burnet's point-of-care CD4 test for diagnosis and management of HIV in resource-poor settings.

Mental Health of Pregnant and New Mothers

A systematic review conducted by Dr Wendy Holmes in collaboration with Professor Jane Fisher at Monash University was published in the *Bulletin of the World Health Organization*. It found that 16% of pregnant women and 20% of new mothers in low- and lower-middle income countries are affected by mental ill-health; these rates are higher than in developed countries. To identify effective strategies to improve maternal mental health, Burnet was involved in a review of 13 interventions in eight countries in Africa, Asia, South America and the Caribbean. This review found that improving health worker training and working with women, their families and communities can help prevent maternal mental health problems such as depression and improve the health and wellbeing of children. Building on these findings, Burnet is currently developing an intervention in Vietnam, which will test the acceptability and cultural appropriateness of a behavioural modification program for women after childbirth to address maternal depression and improve outcomes for mothers and their children.

Iron Deficiency Anaemia and Malaria in PNG

Burnet has conducted a comprehensive research project to quantify the burden of iron deficiency anaemia and malaria in pregnant women in a rural area of PNG. We found that the burden of iron deficiency anaemia was very high in these pregnant women (>70%), and that most pregnant women were anaemic (>90%). Ongoing studies seek to understand how these factors impact on maternal and infant health, and the development of strategies to address these major health issues.



Children in Papua New Guinea. Lynton Crabb Photography.

Malaria and Immune Responses

Major research projects aim to understand the biological mechanisms that cause malaria disease and immune responses that protect people against malaria. Our studies of childhood malaria in PNG and Kenya have identified key targets of immune responses that protect against malaria. In studies of Karen women on the Thai-Burma border and PNG women, we have progressed our understanding of how pregnant women develop immunity to malaria and maintain this over time.

Young People's Health

Young people experience disproportionately high levels of substance use disorders, risky sex with consequent STIs, blood-borne viruses, unintentional injuries and interpersonal violence. Burnet has a strong track record in using innovative methods to understand the key issues affecting young people and implementing programs to reduce risk events.

Communicating Health Messages to Young People

The use of information communication technology (ICT) in health has expanded greatly in the past decade. ICT includes mobile phones, computers and the internet, and other technologies such as personal digital assistants (PDAs). These technologies are particularly useful for

reaching young people, as they are the demographic with the fastest rate of technology uptake. ICTs have many advantages over traditional modes of communication; they are cheaper and less time consuming to use and can reach people in an asynchronous manner in almost any location. In most settings, particularly developing countries, the reach of technologies like mobile phones is far greater than coverage of other media such as television or infrastructure such as roads and clinics.

Sexual and Reproductive Health Promotion: SMS and Social Media

Burnet's past randomised controlled trials using SMS (text messaging) for sexual health promotion and STI research targeting young people have made us international leaders in the field. We have used Facebook and other social networking sites to promote sexual health to at-risk groups in Victoria. One of our projects is investigating the potential to use ICT in monitoring and evaluating programs for the prevention of parent-to-child transmission of HIV in PNG.

Smart Phone Apps and Alcohol

An example of our current work in ICT is a pilot study investigating existing smart phone applications (apps) that could be used in alcohol-related health promotion. However, while smart phone apps can be used to influence health, other Burnet research has shown that this influence is not always positive. A comprehensive review of alcohol-related smart phone apps identified worryingly poor categorisation and regulation of apps, particularly of those falsely claiming to provide legitimate health messages. Apps claiming to provide health information were often scientifically inaccurate and unreliable. Young people were more likely to download apps that encourage drinking (such as drinking games or bottle shop locators) rather than apps that aim to reduce alcohol consumption and related harms.

Infectious Diseases

Infectious diseases remain among the leading causes of mortality in developing countries, especially in poor and vulnerable communities. Burnet's unique blend of skills and expertise in infectious diseases is utilised across basic science research, clinical management and public health responses.

HIV

Current HIV treatment is extremely effective in suppressing replication of the HIV virus but is unable to completely eradicate the virus from the body. Despite treatment, HIV is able to lie dormant, sleeping within the human body in 'latent reservoirs'. Key strategies to achieve an HIV cure were identified by a team of world experts from the International AIDS Society that included Professor Sharon Lewin and Associate Professor Melissa Churchill. Key recommendations included the need for increased basic research into viral latency and clinical trials for the cure of HIV. Professor Lewin's group also started a clinical trial with the cancer drug vorinostat, normally used in the treatment of leukaemia, to awaken the virus from its latent state.

Malaria

Burnet continued to play a key role in influencing regional malaria control with its involvement in a landmark policy meeting, hosted by Australian Foreign Minister, Senator the Hon Bob Carr. This meeting forged a regional consensus on priorities for malaria control; an issue of particular importance given the recent reports of increasing drug resistance for antimalarial medications in South-East Asia.

Burnet's contribution to implementing regional malaria control included preparatory work for a trial of home-based management of malaria in PNG. This study starts in 2013 and aims to deploy new rapid diagnostic tests and initiate early treatment of malaria by training local village volunteers in remote areas of PNG that are not well serviced by existing health services.

Malaria control in Timor-Leste is also likely to be strengthened with the institute transferring knowledge about key diagnostic tests to detect different types of malaria parasites with greater precision than existing microscopy based tests. The development and transfer of a new test to detect glucose-6-phosphate dehydrogenase deficiency is also likely to lead to safer malaria treatment in Timor-Leste and pave the way for the first national survey of this genetic condition which can lead to widespread red blood cell destruction if left unrecognised.



Burnet's Andrew Guy (L) working with Ismael Barreto from Timor-Leste on a key diagnostic test that will improve malaria treatment in Timor-Leste.

Zoonotic Infections

Burnet also contributed to better preparedness for emerging infections, especially those that arise in animals and are transmitted to humans (called zoonotic infections). In collaboration with the Australian Animal Health Laboratory, a global database has been developed that identifies key stakeholders and gaps in international policy to prevent and control zoonotic infections. Burnet has also contributed to a Global Avian Influenza (bird flu) project that focuses on improving communication strategies to prevent potential pandemics.

Alcohol, Other Drugs and 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. The Drugs and Public Health Interest Group fosters cross-centre collaboration by sharing information about potential opportunities for Burnet in Australia and the Asia and Pacific regions.

Alcohol and Other Drugs

The Melbourne Injecting Drug User Cohort Study (MIX) is the biggest longitudinal cohort study of people who inject drugs (PWID) ever established in Australia. With over 700 participants, MIX has already provided important information on the way in which heavy alcohol consumption impacts on the lives of PWID, as well as the incidence of blood-borne viral infections such as HCV. As a result of our findings on HBV, a new study has commenced comparing two schedules for HBV vaccination that will provide new evidence of the most effective way to provide this vaccine in PWID and the wider population.

A cohort of 800 young risky drinkers was recruited as part of the Young Adults and Alcohol Study. This study will provide new evidence about the trajectories of risky drinking among young adults in Melbourne, as well as their experiences of harm.

Harm Reduction

In 2012, the Australian Capital Territory became the first Australian jurisdiction to provide naloxone, an opioid overdose reversal drug, for use by potential overdose victims. This is the first time naloxone has been provided for use outside of emergency medical settings such as ambulances and hospital emergency departments. Professor Paul Dietze, Head of the Alcohol and other Drug Research Group, is leading the evaluation of the effects of the wider distribution of naloxone along with colleagues from Curtin University, Australian National University and University of New South Wales. The results of the evaluation of the rollout of the program in the ACT will be available in 2014. Professor Dietze is also involved in a study based at the Sydney Medically Supervised Injecting Centre that will determine whether intranasal administration of naloxone is as effective as intramuscular administration of the drug in reversing the effects of opioid overdose.



A Burnet Institute field researcher works with people who inject drugs to better understand hepatitis C and its spread within the community.

HIV Prevention in Lao PDR and Vietnam

Burnet works on HIV prevention in Lao PDR and Vietnam as part of the second northern Greater Mekong sub-region transport network improvement project (Asian Development Bank funding). It includes training government counterparts in Lao PDR on harm reduction and site visits for the Lao government to learn from needle syringe programs and methadone services in Vietnam.

Training and Capacity Building

UNESCO, UNICEF and UNFPA funding has allowed us to conduct regional capacity building training focusing on young people and adolescents who inject drugs in HIV-epidemic areas in Asia and the Pacific. Burnet has designed a standard comprehensive package of HIV services interventions for injecting drug users, men who have sex with men, people in correctional facilities and sex workers in Zanzibar (UNICEF funding). We conducted a number of Australian Leadership Award Fellowship programs with AusAID funding, including those relating to amphetamine type stimulants (in Laos and Myanmar) and harm reduction (in the Solomon Islands). Our Australian NGO Cooperation Program in PNG is focused on developing targeted drug and alcohol harm reduction interventions in PNG (AusAID funding).

Immunity, Vaccines and Immunisation

Vaccine and immunisation programs remain the single most effective preventive health strategies to combat infectious diseases. Burnet's research and public health actions are driven by the needs to protect

against threats to the world's most vulnerable populations from diseases such as malaria, polio, TB, hepatitis C, hepatitis B and HIV. Discovery research and public health initiatives at Burnet focus on producing new vaccines, researching disease patterns and testing new approaches to implement vaccination programs. Burnet is also at the forefront of technologies to manipulate the immune system for the production of vaccines against non-infectious diseases such as cancer and arthritis.

Hepatitis C Vaccine Progress

Treatment options for HCV have been limited to the use of a combination of pegylated interferon and ribavirin, although the severe side effects, variable sustained virological response rates and lengthy treatment times limit the number of people who are treated to less than 5,000 Australians per year. Associate Professor Heidi Drummer leads a team of researchers developing a vaccine that would prevent infection and she was invited to present her work at the 7th Annual Immunotherapeutics and Vaccines Summit in Massachusetts, USA, in August 2012.

Vaccination Initiatives in Developing Countries

CIH continues to research new ways to support immunisation program managers in the provision of vaccination services, with a special focus on developing countries. Professor Mike Toole AM continued to support the worldwide push to eradicate polio through contributions to the World Health Organization's (WHO) eight-person Independent Monitoring Board for the Global Polio Eradication Initiative. Dr Ben Coghlan also contributed to polio eradication by supporting efforts in Afghanistan (one country where polio transmission risk persists) to monitor progress and plan for expanded services.

Burnet continues to support a new global hepatitis program and the WHO's immunisation program in scaling up vaccination against hepatitis B within 24 hours of birth. Dr Chris Morgan and Priya Mannava continued work on a global review of effective practice in this area, conducted with support from the AusAID Women's and Children's Health Knowledge Hub hosted at Burnet. Work also started in partnership with the US Centers for Disease Control and Prevention to turn this evidence into a practical manual for national immunisation program managers.



A child in Papua New Guinea. Lynton Crabb Photography.

Postgraduate Students

39 PhD Students

Publications

180 Journal Articles
1 Book Chapter

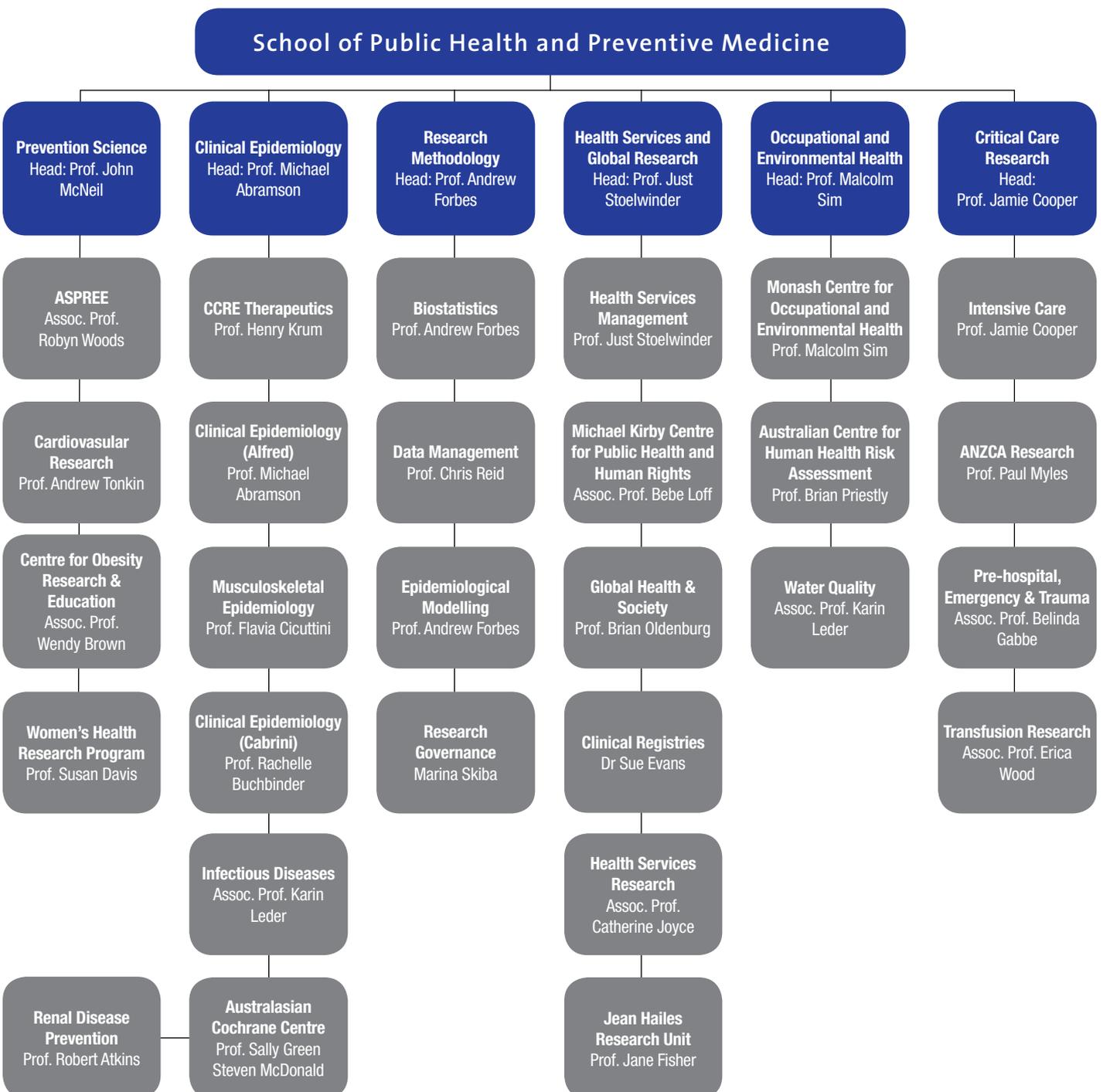




Monash School of Public Health & Preventive Medicine

Head: Professor John McNeil AM

Deputy Head: Professor Michael Abramson





ASPREE (ASpirin in Reducing Events in the Elderly) participant in the Biobus.

Epidemiology and Preventive Medicine

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

The Department of Epidemiology and Preventive Medicine (DEPM) has broad expertise in applied clinical and public health research. Its core skills of epidemiology, biostatistics and data management support extensive research programs aimed at reducing suffering, preventing illness and improving quality of life. The department's research program takes place in settings ranging from remote communities and workplaces to intensive care units.

ASPREE Reaches New Heights

ASPREE (ASpirin in Reducing Events in the Elderly) is investigating whether low dose aspirin can delay or prevent the onset of common age-related diseases such as cardiovascular disease, dementia and certain cancers in healthy people aged 70 and over. The trial aims to recruit 19,000 participants – 16,000 from Australia and 3,000 across the USA. ASPREE, an international collaboration between researchers, universities, general practitioners and the community, continued to reach new milestones throughout 2012.

The ASPREE trial broadened its reach across Australia during 2012. Federal Minister for Health and Ageing, the Hon Mark Butler MP, officially launched the ASPREE Clinical Trial Centre in Adelaide. An additional new centre in Albury/Wodonga will service the border region and southern NSW and the trial made inroads into establishing a new site in Wollongong, which will begin recruiting in 2013. ASPREE's regional sites are among the fastest growing recruitment areas, with country Victoria almost doubling participant numbers in 2012.

The NHMRC-funded SNORE-ASA project, a study of neurocognitive outcomes, radiological and retinal effects of aspirin in sleep apnoea, was launched in 2012, inviting the first of 3,500 ASPREE volunteers across Victoria to participate. SNORE-ASA will help determine if sleep apnoea adversely affects concentration and memory in older people and if aspirin can help slow down associated changes in small blood vessels in the brain.

Lead Investigator in Australia, Professor John McNeil, and the Executive Officer, Associate Professor Robyn Woods, were invited to the National Institutes of Health (NIH) supported Inflammation Symposium in August. During their visit, they met with members of the National Cancer Institute and secured funding to investigate the association between aspirin and cancer prevention. The US\$2.2 million funded ACES (ASPREE Cancer Endpoint Study) will explore the potential mechanisms of aspirin's hypothesised cancer protective effect through the examination of DNA molecules. This substudy will commence in 2013.

ASPREE hosted a successful Monash Business Breakfast at the Park Hyatt Hotel in Melbourne. Monash Chancellor, Dr Alan Finkel AM, chaired the event, with presentations by Professor John McNeil and Associate Professor Robyn Woods. Dr Evan Hadley, Director of the Division of Geriatric and Clinical Gerontology at the NIH National Institute on Aging, the organisation which funded the main ASPREE study, attended via videoconference.

Workplace Practices of Firefighters

Firefighting is an important occupation in Australia involving more than 260,000 paid and volunteer personnel. To improve workplace practices and maximally protect firefighters from exposure to dangerous and toxic substances, it is important to understand the morbidity and mortality patterns of this workforce.

The Monash Centre for Occupational and Environmental Health (MonCOEH) is currently undertaking a retrospective cohort study of Australian firefighters commissioned by the Australasian Fire and Emergency Service Authorities Council. Led by Associate Professor Deborah Glass, the national study is assessing cancer, mortality and other possible health outcomes in Australian firefighters.

The Australian Firefighters' Health Study is assembling a cohort of current and former firefighters by extracting data from existing computerised records held by nine participating firefighting agencies and the Department of Defence. The cohort of approximately 225,000 firefighters will include men and women, career, part-time and volunteer firefighters. Cancer and mortality outcomes will be obtained through data linkage with the Australian Cancer Database and the National Death Index. Existing historical occupational and incident data will be used to investigate any links between occupational firefighting and later cancer and death outcomes.

Previously published studies have not undertaken analyses based on contemporary exposure incident data, therefore the use of this data is likely to result in more refined exposure assessment methods than previously used. The study will give insight into differences in the overall cancer and death rates in Australian firefighters compared to those of the general population. The study will provide comparison of cancer incidence and death rates for subgroups within the cohort, for example, by agency, type of firefighter, duration of active firefighting, types of incidents attended and other exposure types. It will help to identify exposures that may be associated with increased risk of cancer and/or mortality among firefighters. The findings will then be used to inform preventive strategies to better protect the health of future firefighters.

New Research Centre of Critical Importance: Blood-CRE

The Centre of Research Excellence for Patient Blood Management in Critical Illness and Trauma at Monash University – the Blood-CRE – was established in 2012, with \$2.5 million in funding from the NHMRC. The Blood-CRE, led by Intensive Care physician Professor Jamie Cooper, represents a consortium of national research and key organisations responsible for the regulation, manufacture, supply and surveillance of blood products, including the Australian Red Cross Blood Service, National Blood Authority, Transfusion Outcomes Research Collaborative, Australian and New Zealand Intensive Care Research Centre, Australian Defence Force, Australian and New Zealand Society for Blood Transfusion, and the Australian and New Zealand Intensive Care Society Centre for Outcomes and Resource Evaluation.

Transfusion of blood products is one of the most common medical procedures in hospital patients. Despite common usage, there is considerable uncertainty about the relative risks and benefits of transfusions, with a large and growing body of literature that questions the appropriateness of many common transfusion practices in terms of patient outcomes. In addition, current guidelines are based on inadequate evidence, and compliance with their recommendations is reputedly poor.

The Blood-CRE provides a solution to the critical problem of an unmet need with regard to the transfusion evidence-practice base. It provides a pathway by which the implementation of patient blood management guidelines can be optimised and monitored and the transfusion evidence base improved. Transfusion policy will also be informed by knowledge generated by the Blood-CRE. This will assist in optimising transfusion practices to ensure that demand does not outpace supply and that the outcomes for critically ill patients, for whom blood transfusion is vital for survival, are not compromised. In addition, it will develop greater research capacity in the fields of transfusion, critical care and military medicine by expanding established networks of current collaborators and creating new research partnerships that will maximise our ability to effect change in transfusion practice and improve patient outcomes.

Achievements

Awards

- Associate Professor Allen Cheng was awarded the Frank Fenner Award for Advanced Research in Infectious Diseases by the Australasian Society for Infectious Diseases in 2012.
- Professor Robin Bell received the Roger Wurm Award in 2012 for the best scientific presentation at the Australian Society for Psychosocial Obstetrics and Gynaecology conference in Melbourne.
- Dr Judy Lowthian, Professor John McNeil and Professor Just Stoelwinder won the Australian Medical Association Victoria 2012 Stawell Prize for a study investigating the increasing demand for ambulance services by an ageing population (Lowthian *et al. Med J Aust* 2011; 194(11):574-8).

Grants

- In 2012, researchers at DEPM secured eight NHMRC Project Grants to commence in 2013. Professor John McNeil, Associate Professor Damon Eisen, Professor Jane Fisher, Professor Kate Leslie, Associate Professor Yahya Shehabi, Dr Yuanyuan Wang and Professor Christopher Reid headed these grants. Our NHMRC success continued with Professor Jamie Cooper receiving funds under the CRE scheme for patient blood management in critical illness and trauma. Associate Professor Sophia Zoungas was successful in securing funding from the Partnership Project Grant Scheme to investigate better outcomes for patients with diabetes and chronic kidney disease.
- A number of staff were successful in securing NHMRC Fellowships to commence in 2013: Professor Jamie Cooper was awarded a Practitioner Fellowship, Professor Christopher Reid and Professor Susan Davis were awarded Research Fellowships, Associate Professor Belinda Gabbe was awarded a Career Development Fellowship and Dr Judy Lowthian was awarded an Early Career Fellowship.

Postgraduate Students

89 PhD Students
11 Other Doctoral Students
406 Masters Students

Publications

473 Journal Articles
10 Book Chapters
1 Book
1 Working Paper



Global Health

Professor Brian Oldenburg (centre, first row sitting), Head of the Monash International Public Health Unit and Co-Director of AMREP Global Health, with trainees and faculty of the ASCEND Program.



Australasian Cochrane Centre

Neonatal Intensive Care Unit nurses attend to a newborn at Srinagarind Hospital in Khon Kaen, Thailand, one of the 11 hospitals involved in the SEA-URCHIN project.



acc.cochrane.org

SEA-URCHIN project investigators assembled at the 2012 Investigators Meeting in Khon Kaen, Thailand.

Australasian Cochrane Centre

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

The Australasian Cochrane Centre (ACC) is part of the Cochrane Collaboration, an independent international network of more than 28,000 people from over 100 countries. Cochrane's philosophy is that effective health care is created through equal partnerships between researcher, provider, practitioner and patient. Cochrane supports health care by preparing and promoting access to Cochrane systematic reviews.

The ACC coordinates the activities of the Cochrane Collaboration in Australia and in the wider Asia-Pacific region. Funded by the Australian Government through the NHMRC, the Centre provides training and support to authors of Cochrane reviews and is an advocate on behalf of Cochrane regionally. The Centre has an extensive program of research exploring effective ways to inform decisions through the uptake of evidence. Current projects include prevention of neonatal infection in low- and middle-income countries, care of people with dementia in general practice and the use of evidence from research by policy makers.

IRIS

IRIS (Investigating Research Implementation Strategies) is a project concerned with the care of people with dementia in general practice. Semi-structured interviews with general practitioners (GPs) have been conducted to identify the barriers and enablers to implementation of evidence-based clinical practice recommendations. A survey of measured practice patterns of a larger representative sample of 290 Australian GPs has also been completed. The final phase of the project is a cluster randomised trial: 138 general practices were recruited into the trial in early 2012. The intervention workshop took place in June 2012 and consisted of interactive workshops and educational sessions. The final trial outcomes will be collected in 2013.

CIPHER

The Centre for Informing Policy in Health with Evidence from Research (CIPHER) is an NHMRC funded collaborative Centre of Research Excellence exploring how to increase the use of evidence from research in a policy environment. SPIRIT (Supporting Policy In health with Research: an Implementation Trial), which commenced in six health policy agencies in 2012, is the trial at the heart of CIPHER. The trial will use data from measurement tools designed by staff at the ACC and the Sax Institute to assess the effectiveness of a tailored program to support research use in policy.

SEA-URCHIN

SEA-URCHIN (South East Asia – Using Research for Change in Hospital acquired Infection in Neonates) is a five-year project (2011-2015) that aims to investigate the effectiveness of an educational intervention to prevent hospital-acquired neonatal infection in hospitals in Indonesia, Malaysia, Thailand and the Philippines. Infection is one of the leading causes of death in newborn babies and is a significant global health challenge. The yearlong audit of clinical practice and neonatal outcomes began in mid-2012 and will provide baseline data for newborn babies who spend time in intensive care units in the SEA-URCHIN hospitals. In preparation for the educational intervention, two clinical educators were recruited from each of the 11 hospitals involved in the project. The first part of the intervention roll out will be an intensive two-week training program for the clinical educators in Sydney in February 2013. The clinical topics chosen for the educational sessions – hand hygiene, breastfeeding, management of central lines, antibiotic policy and kangaroo mother care – reflect the practices most likely to impact on neonatal infection.

Achievements

- Matthew Page received the Thomas C Chalmers Award for his presentation entitled 'Types of selective inclusion and reporting bias in randomised trials and systematic reviews of randomised trials' at the 20th Cochrane Colloquium held in Auckland in 2012. The award recognises early career researchers who deliver the best presentation addressing methodological issues related to systematic reviews.
- Professor Sally Green was appointed a member of the NHMRC's Health Care Committee for the 2012-2015 triennium.
- Joanne McKenzie was awarded a doctorate for her thesis entitled 'Methodological issues with meta-analysis of randomised controlled trials with continuous outcomes'.

Postgraduate Students

3 PhD Students

Publications

14 Journal Articles

Professor Henry Krum conducts clinical research into the impact of renal denervation. Placement of the renal denervation catheter is monitored during the procedure.



Centre of Cardiovascular Research and Education in Therapeutics

Head: Professor Henry Krum MBBS, PhD, FRACP, FCSANZ

The mission of the Centre for Cardiovascular Research and Education in Therapeutics (CCRET) is to improve the clinical outcomes at the individual and community level through the use of evidence that is based on high-quality clinical research. CCRET conducts clinical trials that focus on mechanistic and hospital-based studies in the Department of Clinical Pharmacology at the Alfred Hospital and at the Clinical Trial Centre at Caulfield Hospital.

The Clinical Pharmacology Department at the Alfred provides clinical service, education, training and research regarding optimal drug prescribing. The Department continued to conduct both investigator-initiated and commercially supported clinical research during 2012. A major source of funding has been the five-year NHMRC Program Grant 'Prevention and treatment of chronic heart and kidney disease via epidemiological, pharmacological device and cell-based approaches', which commenced in 2010.

Heart Failure Prevention Trials

Highlights of 2012 included leadership of a multinational trial examining the role of renal denervation in systolic chronic heart failure and global leadership of ATMOSPHERE (Aliskirin Trial to Minimise OutcomeS in Patients with HEart failure).

Renal Denervation

Renal denervation involves catheter-based radiofrequency ablation via femoral access to knock out the sympathetic nerves that run adjacent to the renal arteries. This percutaneous approach is minimally invasive and the procedure takes about 40 minutes. CCRET leads the clinical investigation of the potential utility of this procedure in patients with systolic heart failure and renal impairment. The study is being conducted at eight sites in Australia and Europe.

Renin Inhibition

Professor Henry Krum is the Study Chair of ATMOSPHERE, which is being conducted at The Alfred and approximately 800 other sites throughout the world with a view to recruiting over 7000 patients with systolic chronic heart failure. The study, which is almost fully recruited, will assess whether direct renin inhibition with the agent aliskirin is useful as add-on therapy to the gold standard treatment of angiotensin-converting-enzyme (ACE) inhibitors or may be used as an alternative to these agents.

Achievements

- Professor Henry Krum was awarded a Heart Foundation Grant-in-Aid to commence in 2013 to investigate the effect of renal sympathetic denervation on glycaemic status in diabetic patients. Renal sympathetic denervation was initially developed to treat refractory hypertension and was found to be extremely effective at lowering blood pressure in patients with diabetes. Sympathetic activation is also associated with diabetes and may be involved in the worsening of glycaemic control and potentially related to reduced peripheral muscle glucose uptake. Professor Krum will test this hypothesis with renal sympathetic denervation. Laboratory models of diabetes with and without hypertension will be assessed, as will patients with impaired glucose tolerance.
- Ingrid Hopper was awarded an NHMRC Postgraduate Scholarship to commence in 2012 to support her research 'Polypharmacy in heart failure – are all the prescribed drug classes required?'
- Professor Henry Krum was the named Basic Science Lecturer at the 2012 60th Annual Scientific Meeting of the Cardiac Society of Australia and New Zealand for his presentation 'Fibrosis and its contribution to the failing heart: therapeutic implications'.



Publications

44 Journal Articles



Emeritus Professor Paul O'Brien (R) with a patient who lost 66% excess weight resulting in diabetes remission.

Centre for Obesity Research and Education

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

Overview

The Centre for Obesity Research and Education (CORE) applies a multidisciplinary approach to the study of obesity, which integrates a major clinical obesity management program with strengths in clinical research, clinical epidemiology, public health, basic sciences and professional and community education. This integration equips CORE with the unique capacity to measure the health consequences of obesity and to evaluate the health benefits of weight loss. The establishment of a multidisciplinary clinic at The Alfred, with a research stream embedded in the clinic design, strengthens collaboration with clinicians and offers exciting future possibilities.

Gastric Banding to Treat Obesity

CORE has completed a 15-year follow up of the laparoscopic adjustable gastric banding (LAGB) procedure and conducted a systematic review to compare the results with those found in the peer-reviewed bariatric surgical literature. A total of 3,227 patients were treated for obesity by LAGB placement between September 1994 and December 2011 with no occurrence of perioperative mortality for the primary placement or revisional procedures. Overall, an average of 26 kg of weight loss was sustained at 15 years (equivalent to 47.1% excess weight loss).

Revisional procedures were performed for proximal enlargement (26% of cases), erosion (3.4% of cases), and port and tubing problems (21% of cases). However, the frequency of each of these complications reduced over time with the band explanted in 5.6% of cases. There was no difference in weight loss in the group who underwent a revisional procedure when compared with the background cohort. A systematic review of the literature demonstrated that these results were comparable with other LAGB series as well as an alternate bariatric procedure, termed Roux-en-Y gastric bypass.

Outcomes in Diabetics

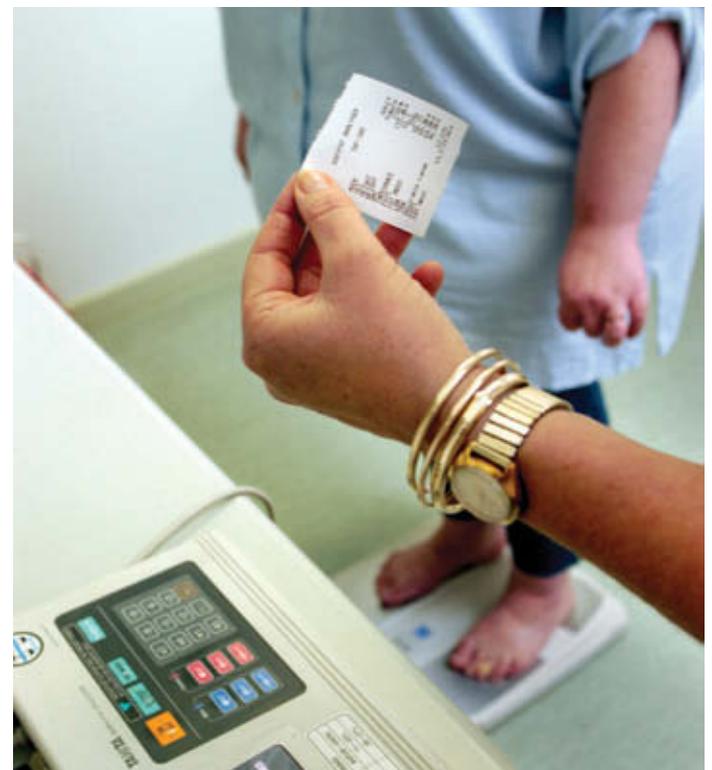
CORE has completed an NHMRC funded study of LAGB as a treatment for obese Indigenous diabetics. Emeritus Professor Paul O'Brien and Professor Dawn DeWitt led this prospective cohort study conducted at the Rumbalara Aboriginal Co-operative health service in Mooroopna and at the Goulburn Valley Hospital in Shepparton. Control data were derived from an earlier randomised controlled trial (RCT). A mean weight loss of 28.2 kg was achieved and body mass index (BMI) reduced from 44.3 to 34.3 kg/m², a change of 10 BMI units. Diabetes remission occurred in 20 (77%) of the 26 individuals who completed the follow up and final assessments. When calculated on the basis of intention-to-treat, which

includes the four who have not completed final assessment, 66% of study participants are known to be in remission.

Other research highlights for 2012 include following up the 10-year outcomes of our first RCT, completion of a longitudinal psychological study and a comprehensive program assessing eating disorders and obesity.

Achievements

- Kylie Murphy and Dr Melissa Hayden were awarded School of Public Health and Preventive Medicine Travel Grants.



A patient has their statistics measured on bioelectrical impedance scales.

Publications

- 8 Journal Articles
- 1 Book Chapter

Sample collection from a participant in the Kerala Diabetes Prevention Program at a mobile clinic in a rural community of Kerala, India.



Global Health

Co-Directors: Professor Brian Oldenburg BSc(Hons), M(Psychol), PhD,
Monash School of Public Health and Preventive Medicine
Professor Mike Toole AM, BMedSc, MBBS, DTM&H,
Burnet Institute

Conferences, Forums and Awards

The 6th AMREP World Health Day Forum was held on 3 April 2012. The topic of 'Healthy Ageing in a Global World: Opportunities and Challenges' reflected the 2012 WHO theme of 'Ageing and Health'. President of the International Diabetes Federation, Professor Jean-Claude Mbanya of the University of Yaoundé, Cameroon, gave the keynote address.

A Saving Lives at Birth Grand Challenges for Development Award was secured by the Burnet Institute in 2012 for their project to assess the performance of an innovative, instrument-free, low-cost, rapid point-of-care CD4 test for accelerating initiation of antiretroviral interventions for HIV-infected pregnant women in resource-constrained settings. The initiative is jointly funded by the US Agency for International Development, the Government of Norway, the Bill and Melinda Gates Foundation, Grand Challenges Canada and the UK Department for International Development.

An Order of Australia Award was bestowed on the Head of Burnet's Centre for International Health (CIH), Professor Mike Toole, in recognition of his significant service to international health, particularly through leadership in medical research.

Research, Teaching and Capacity Building

ASCEND (Asian Collaboration for Excellence in Non-communicable Disease) is a research training and capacity building program funded by the US National Institutes of Health Fogarty International Center. In 2012, the second cohort of 26 ASCEND trainees from Sri Lanka, India, Malaysia and Hong Kong commenced their 18-month research training program administered by Monash University's International Public Health Unit (IPHU). Following their three-week face-to-face teaching block in Colombo, Sri Lanka, trainees returned to their own country to commence a 12-month long research project supported by mentoring and fortnightly online skill-development sessions.

The Kerala Diabetes Prevention Program (K-DPP) is an NHMRC-funded cluster randomised controlled trial of a lifestyle intervention for people at high risk of diabetes in Kerala, India. In 2012, Monash University's IPHU completed a pilot of the recruitment and data collection protocol and a pilot of the intervention was commenced.

Findings from these have been incorporated into the protocol for the main study recruitment to commence in 2013.

Compass Women's and Children's Health Knowledge Hub is an AusAID-funded collaboration between Burnet's CIH, Menzies School of Health Research and the University of Melbourne's Centre for International Child Health. Compass aims to improve the effectiveness of aid for women's and children's health, with a focus on contributing to equitable progress towards Millennium Development Goals 4, 5a and 5b. The Knowledge Hubs for Health initiative contributes to the quality and effectiveness of Australia's engagement in the health sector in the Asia and Pacific regions.

Australian Leadership Awards were secured by the Burnet Institute to facilitate the training of Fellows from five countries. The four awards were for: Developing capacity to respond to use of alcohol in the Solomon Islands; Strengthening district health planning capacity in malaria prone districts, Nepal; Amphetamine type substitutes – supporting responses in South East Asia (Myanmar/Laos); and Maternal and child health services in Afghanistan.

The Monash-Oxfam Australia Partnership, a collaboration between Monash's IPHU and Oxfam Australia, jointly delivers the program 'MON2002: Improving Health Futures in a Global World', which is available to all Monash undergraduate students who want to learn more about the links between global health and development.

China-Australia Health and HIV Facility (CAHHF) is an AusAID-funded project that has been a direct partnership between the Burnet and China's Ministry of Health (MoH) to inform health system reform in China. Research findings have contributed to 75 new health policies, half of which were at the national level. The MoH has identified CAHHF as an exemplary model of bilateral partnership, one with practical lessons for future health programming.

An Australian-Sri Lankan Public Health Program has been delivered to mid-career Sri Lankan medical and dental practitioners by Monash's School of Public Health and Preventive Medicine for many years. The program involves a 12-month research placement in Australia, sponsored by the Sri Lankan MoH. In 2012 there were several new public health professionals from Sri Lanka participating in this training and research development program.



*Students work on new ways
to assess back structure by MRI.*

Rheumatology (Musculoskeletal Epidemiology)

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

Overview

The Rheumatology Unit investigates novel approaches to the treatment and prevention of musculoskeletal diseases. This year, work continued in understanding the pathogenesis of knee osteoarthritis (OA) as well as back-related pain. We aim to understand the role of common lifestyle factors including diet, obesity and physical activity. Our focus is on unravelling the complex mechanisms by which these factors act and then identifying and testing new approaches for the prevention and treatment of these conditions. This is underpinned by the development of novel and sensitive methods for assessing the joints.

Knee Muscle and Joint Health

It is still unclear whether strengthening knee muscles is beneficial or detrimental for the health of the knee joint. We investigated whether an increase in size of knee muscles had beneficial effects on knee pain, whether it was associated with reduced cartilage loss, a sensitive marker of progression of knee OA, and the risk of knee replacement in subjects with symptomatic knee OA. Reduced knee muscle size was associated with higher levels of knee pain at baseline and an increase in muscle size over two years was associated with less cartilage loss over two years and fewer knee replacements over four years. This was an interesting finding, particularly as our study population was not engaging in any specific activity that might be expected to increase muscle size.

Further analysis revealed that the strongest predictor of the increase in muscle size was a reduction in knee pain. Since our study population was selected to have symptomatic knee OA, it is likely they had already experienced some muscle loss due to pain and reduced activity. The observed increase in muscle size was most likely due to alleviation of knee pain and the associated increased activity as knee pain tends to fluctuate in people with OA. This study highlights the importance of managing knee pain in order to improve both patient quality of life as well as knee joint health. We have a number of studies now under way to test novel approaches to managing knee pain.

Physical Activity and Knee Cartilage

An important issue in the area of knee OA is whether physical activity is good or bad for the joint. Emerging evidence suggests that this, in part, depends on the health of the underlying joint. We examined the association between vigorous physical activity over a decade and the subsequent changes in knee cartilage among healthy older adults in study that recruited 297 healthy adults aged 50 to 79 years. We also looked at whether changes in knee cartilage differed in those with and without bone marrow lesions, as an indicator of early knee damage. Physical activity was assessed via questionnaire at baseline between 1990-94 and follow-up between 2003-04, which allowed for a score for persistence of vigorous physical activity to be calculated. Each subject underwent knee magnetic resonance imaging (MRI) between 2003-04 and 2006-07. Measures of cartilage health were determined from MRI (cartilage volume and defects) and bone marrow lesions were measured using validated methods.

Persistent participation in vigorous physical activity was associated with worsening knee cartilage defects; however, this only occurred in those with bone marrow lesions. We have previously shown in healthy children and adults that physical activity is good for joints, with associated increases in knee cartilage. This suggests that the long-term effects of vigorous physical activity depend on the pre-existing health of the joint and that in those who have some pre-existing joint damage, the type of activity may need to be modified in order to prevent OA.

Awards

- Professor Flavia Cicuttini was a finalist in the 2012 Telstra Business Women's Awards in the Nokia Business Innovation category for recognition of research into the prevention of OA. The nomination acknowledges the development of a new use of MRI for non-invasively assessing joints, which is now used extensively in Australia and in international studies. The technique has facilitated research into the prevention of early OA, attracting a cumulative \$10 million in research funding.

Postgraduate Students

3 PhD Students

Publications

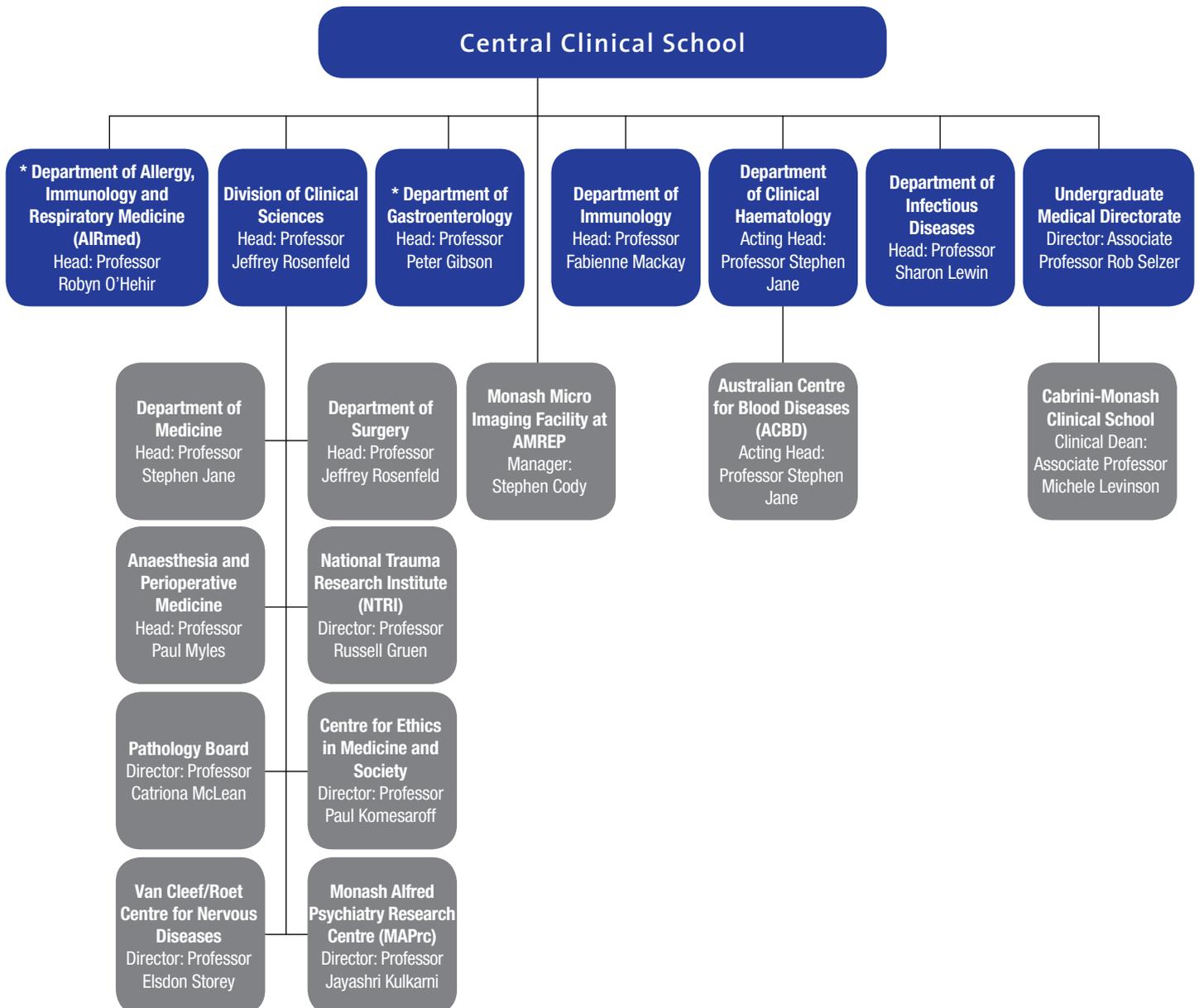
24 Journal Articles
1 Book Chapter

Monash University's Central Clinical School is an integral part of AMREP. The School offers undergraduate and postgraduate study programs and is a core hub for translational research and medicine covering a breadth of subject areas.



Monash Central Clinical School

Head: Professor Stephen Jane



* Included in the Alfred Health section of this report.



Sir Gustav Nossal AC, CBE (L) and Professor Hatem Salem AM (R), previous Director of ACBD. Hatem was awarded the 2011 David de Kretser Medal in 2012 for his exceptional contribution to the Faculty of Medicine, Nursing and Health Sciences.

Australian Centre for Blood Diseases

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

The Australian Centre for Blood Diseases (ACBD) is a leading national and international blood diseases centre with research, treatment, and educational programs for blood diseases. The ACBD is affiliated with Monash University, Alfred Health, 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

Non-Malignant Haematology

Thrombosis Research Unit

Head: Professor Shaun Jackson

This group investigates mechanisms regulating platelet reactivity, in the context of diabetes and the metabolic syndrome, with the aim of developing new approaches to reduce thrombotic risk in these conditions. We focus on the biochemical and biophysical regulators of platelet reactivity, including the influence of specific signalling pathways on these processes. We investigate pathways controlling pro-inflammatory function of platelets, and the cell death pathways regulating platelet function and survival, processes that may have relevance to atherothrombosis and cardiovascular disease.

Systems Haematology Unit

Head: Associate Professor Robert Andrews

Three publications described mechanisms that modulate circulating platelet reactivity and platelet pro-thrombotic responses. PhD student Mohammad Al-Tamimi demonstrated that shear-sensitive pathways regulate metalloproteinase shedding of the platelet collagen receptor GPVI, and plasma from patients with stenosed coronary vessels contained elevated soluble GPVI ectodomain (Al-Tamimi *et al.*, *Blood* 2012). Ligand engagement of GPVI or the Fc receptor FcγR1a was shown to elevate intracellular reactive oxygen species (Arthur *et al.*, *J Thromb Haemost* 2012). PhD student Jianlin Qiao investigated GPVI defects associated with myelodysplastic syndrome (Qiao *et al.*, *Acta Haematol* 2012).

Fibrinolysis and Plasminogen Modulation

Head: Dr Paul Coughlin

The group is investigating ways to improve the efficiency of the body's blood clot dissolving system. Together with collaborators from

Monash University and the Australian Synchrotron, we solved the X-ray crystal structure of plasminogen, the key enzyme involved in blood clot dissolution (Law *et al.*, *Cell Rep* 2012). The structure provides molecular details on how plasminogen is activated to plasmin, which may facilitate development of next generation fibrinolytic agents.

Cancer and Immune Cell Signalling

Head: Professor Steven Gerondakis

The laboratory investigates how the NF-κB signal transduction pathway controls the development and function of Foxp3+ CD4 regulatory T-cells (Tregs). We identified a number of novel target genes controlled by the Rel transcription factor in Tregs and showed that the RelA transcription factor, like Rel, is required for Treg development.

Fibrinolysis and Gene Regulation Unit

Head: Professor Robert Medcalf

We discovered that tissue-type plasminogen activator (t-PA) promotes traumatic brain injury (TBI) by increasing blood-brain barrier permeability, which occurs when it is bound to its cognate inhibitor PAI-1. We obtained evidence that this occurred in human TBI patients. *In vitro* studies to determine how t-PA opens blood-brain permeability showed that both t-PA and its substrate plasminogen were needed to bind to specific cell surface receptors to alter cell function. We identified a signalling pathway that was essential for t-PA to promote permeability.

We also discovered that t-PA-mediated plasmin formation is an integral process for the removal of misfolded proteins. We identified a unique protein aggregation event termed 'nucleocytoplasmic coagulation' that occurs at late stage cell death. This provides binding sites to allow t-PA and plasminogen to assemble to generate plasmin, which in turn removed the protein aggregates. The work was a collaboration with Professor Stephen Bottomley, Department of Biochemistry, Monash University.

Malignant Haematology and Stem Cell Transplantation: Division of Blood Cancers

Myeloma Research Group

Head: Professor Andrew Spencer

A number of compounds (HDAC, β-catenin, HSP90, MEK/ERK, JAK, AKT and bromodomain inhibitors) were identified in our small molecule

inhibitor development program, which has led to the identification of biomarkers and gene-signatures associated with drug resistance. This resulted in the creation of investigator-initiated clinical trials and ongoing collaborations with drug companies to undertake further evaluation of these compounds with a view to generating future clinical trials. Investigations into β -catenin and heat shock proteins as novel targets for therapy showed these molecules were dysregulated in multiple myeloma (MM). Evaluations into inhibiting these targets using chemical agents and genetic manipulation are ongoing. We also investigated the impact of CD45 expression on drug resistance and disease progression in MM.

Leukemia Research Group

Heads: Dr Andrew Wei and Dr Mark Guthridge

The primary objective of the laboratory is to develop new targets, approaches and therapies for the diagnosis, prognosis and treatment of cancers such as acute myeloid leukemia (AML). We identified mechanisms by which cytokines and growth factors promote specific phosphorylation events to control the axis between cell death and cell survival. In collaboration with Associate Professor Paul Ekert, WEHI, we demonstrated that cytokine activation of the kinase IKK results in the phosphorylation of the pro-death BH3-only protein, PUMA (Sandow *et al.*, *Cell Death Differ* 2012). In collaboration with Dr Quenten Schwarz, Centre for Cancer Biology, South Australia, we demonstrated that the 14-3-3 family of scaffold proteins plays critical roles in growth factor-mediated signalling to control neuronal cell survival (Cheah *et al.*, *Mol Psychiatry* 2012). These studies have important implications for how corruption of intracellular signalling promotes malignant transformation. For example, we have shown that the phosphatidylinositol 3-kinase (PI3K) pathway is widely activated in cancer and that blockade of PI3K has anti-leukaemic activity both *in vitro* and in preclinical mouse models.

Stem Cell Research Unit

Heads: Associate Professor David Curtis and Dr Stephen Ting

The goal of the unit is to understand the regulation of self-renewal, a unique property of hematopoietic stem cells and their leukaemic counterparts, with the aim of targeting these processes for *ex vivo* expansion of normal stem cells and killing of leukaemic stem cells. The Curtis group studies two types of blood cancers: T-cell acute lymphoblastic leukaemia and myelodysplasia (MDS). Dr Christopher Slape demonstrated that apoptosis is not always a protective process and can paradoxically promote the development of cancer (Slape *et al.*, *Blood* 2012).

Dr Ting's group uses live cell microscopy to study the role of endocytosis in self-renewal of stem cells. Following the discovery that overexpression of AP2A2, a subunit of the endosomal clathrin-complex, significantly enhances stem cell activity (Ting SB *et al.*, *Blood* 2012), we have been developing tools (BAC transgenic and conditional knockout mice) and techniques (co-localisation imaging of endocytic pathways) to understand how Ap2a2 controls self-renewal.

The Red Cell Group

Heads: Professor Stephen Jane and Associate Professor David Curtis

This group investigates the regulation of red cell production, with a particular focus on globin 'switching'. In collaboration with the Cancer Therapeutics CRC, the group examined the therapeutic potential of small molecule inhibitors of the enzyme PRMT5 to activate foetal globin expression in order to treat hereditary haemoglobin disorders and cancers, including lymphoma. Development of small molecule inhibitors progressed during 2012, with fruitful discussions occurring with several global pharmaceutical companies. We also developed conditional Prmt5 knockout and knockdown mice, which will advance

understanding of how Prmt5 causes cancers and the therapeutic potential of small molecule inhibitors.

The other major focus of the group is the use of ENU mutagenesis to discover critical regulators of red cell production. In 2012, two new mouse models of β thalassemia were identified by PhD student Fiona Brown.

Eastern Clinical Research Unit (ECRU) Translational Research Division (TRD)

Head: Dr Anthony Dear

Outcomes from research projects in 2012 include: further characterisation of a novel therapeutic approach for HIV infection (with Professor Sharon Lewin, Burnet Institute); identification of a vasculo-protective effect of a glycaemic treatment used for type 2 diabetes (with Novo Nordisk and Pharmacology, Monash University, Gaspari *et al.*, *Diab Vasc Dis Res* 2013); characterisation of a novel mechanism of action of a new small molecule treatment for diabetes; identification of a potentially novel biomarker of response to epigenetic treatment in MDS and AML (with Professor Andrew Spencer); and identification of a novel treatment and mode of delivery in the management of peripheral arterial disease.

Achievements

Grants and Fellowships

- NHMRC funding awarded in 2012 to commence in 2013 includes nine Project Grants, a Principal Research Fellowship for Professor Robert Medcalf and a Career Development Fellowship for Dr Stephen Ting.
- ECRU TRD was awarded a Monash Strategic Research Grant for 2013 to advance research investigating treatment of peripheral arterial disease in collaboration with Professor David Kaye (Baker IDI), Professor Patrick Perlmutter (Chemistry, Monash University) and Dr David Jones (Bio21 Institute, University of Melbourne).
- Postdoctoral researcher Dr Maithili Sashindranath secured a grant from the Alzheimer's Foundation and a strategic grant from the Faculty of Medicine.
- Dr Anita Horvath was awarded a CASS Foundation Science/Medicine Grant to commence in 2013.

Prizes, Awards and Other Achievements

- Dr Zane Kaplan, PhD candidate and Alfred Haematology consultant, was awarded the Australian Society for Thrombosis and Haemostasis 2012 Scientific Medal.
- Dr Simone Schoenwaelder was promoted to Associate Professor (Research).
- PhD student Jianlin Qiao received a research prize at the 2012 Australian Health and Medical Research Congress.
- Cindy Lin was awarded the 'Best Young Scientific Investigator' for her presentation at the 2012 Haematology Society of Australia and New Zealand Annual meeting.
- Dr Durga Mithraprabhu and Cindy Lin received travel grants to attend the 2012 European Haematology Association Annual Meeting 2012.

Postgraduate Students

16 PhD Students
1 Masters Student

Publications

64 Journal Articles
1 Book Chapter



Professor Jeffrey Rosenfeld AM, OBE, Head of the Division of Clinical Sciences and the Monash Department of Surgery.

Division of Clinical Sciences

Head: Professor Jeffrey Rosenfeld AM, OBE, MBBS, MD, MS, FRACS, FRCS(Edin), FACS, FRCS(Glasg)Hon, FCNST(Hon), FRCST(Hon), FACTM, MRACMA, RAAMC

The Division of Clinical Sciences within the Central Clinical School was created in 2011. Its emphasis is the integration of clinical practice with basic scientific research. The Division is closely affiliated with Alfred Health, with many staff holding joint appointments as practising clinician-researchers, making it well placed to expedite the clinical translation of its research projects into innovative treatments. The Division has 490 staff, including adjuncts, affiliates and higher degree research students.

The Division includes:

- Department of Anaesthesia and Perioperative Medicine
- Centre for Ethics in Medicine and Society
- Department of Medicine
- National Trauma Research Institute
- Pathology Board
- Department of Surgery
- Van Cleef/Roet Centre for Nervous Diseases
- Monash Alfred Psychiatry research centre (MAPrc)*

Research projects investigate disease processes, applications and treatments. They 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. By drawing on novel technological advances and collaborations with other disciplines, the Division enables fresh approaches to solving problems and improving current treatment options for patients.

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, the Division's work contributes to the body of knowledge for researchers and clinicians worldwide.

The Division also provides quality education to MBBS undergraduates and research opportunities to university graduates and medical practitioners from a variety of disciplines. 2012 was an outstanding year for awards, publications (228), grants (\$5.5 million) and PhD completions (6). A highlight for 2012 was MAPrc joining the Division. Each of the Centres and Departments within the Division of Clinical Sciences has a number of research projects and this report highlights major initiatives in each area.

*For the Monash Alfred Psychiatry research centre (MAPrc), see page 43.

Anaesthesia and Perioperative Medicine

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

www.med.monash.edu.au/cecs/anaesthesia-board/research/

The Department of Anaesthesia and Perioperative Medicine at The Alfred hospital is amongst the largest in Australia, consisting of 29 full-time and over 50 visiting specialist anaesthetists, as well as 40 registrars in training. In 2012, its research unit coordinated five multicentre international trials and participated in several other trials including randomised clinical trials (RCTs), audits and surveys. Its expected income is approximately \$14 million over the duration of the trials.

Professor Paul Myles is CIA on the RELIEF (Restrictive versus Liberal Fluid Therapy in Major Abdominal Surgery) study, for which the NHMRC has awarded a Project Grant of almost \$2.4 million for commencement in 2013. The project received an outstanding Category 7 score from the NHMRC, one of only three out of 3,700 project grant applications to do so. Other chief investigators for the RELIEF study are Professor Rinaldo Bellomo (CIB), Professor Christopher Christophi (CIC), Associate Professor Tomas Corcoran (CID), Associate Professor Philip Peyton (CIE), Professor Andrew Forbes (CIF) and Associate Professor David Story (CIG). Before receiving NHMRC funding, a pilot study was funded by the Australian and New Zealand College of Anaesthetists.

The aim of the RELIEF study is to investigate the effectiveness and safety of a restrictive intravenous (IV) fluid regimen in patients undergoing major abdominal surgery. It is a large, multicentre, randomised, single-blind trial in 2,800 high-risk patients undergoing elective major abdominal surgery. Major surgery can result in serious complications, some of which lead to permanent disability and early death. All patients undergoing major surgery require IV fluids



Cardiac anaesthesia: Dr Mark Buckland (L), Head of Cardiothoracic Transplant Anaesthesia at The Alfred, and Dr Chris Duffy (R), Cardiothoracic Transplant Anaesthetist.

to maintain healthy circulation, but too much fluid can cause tissue swelling (oedema) and 'drown' the vital organs. There are probable benefits of a restrictive IV fluid regimen, which could have major benefits to patients having surgery.

Anaesthetists usually manage perioperative hypotension with extra IV fluids. If persistent or more profound hypotension occurs, an IV vasoconstrictor (typically metaraminol bolus PRN) is used. Liberal fluid administration may correct or avoid hypotension but can also increase tissue oedema leading to wound breakdown, pulmonary oedema, sepsis and multi-organ failure. Fluid restriction typically necessitates vasoconstrictor or inotropic support. As yet, it is not known whether a 'wet' or 'dry' approach to perioperative fluid management improves surgical outcome.

Publications

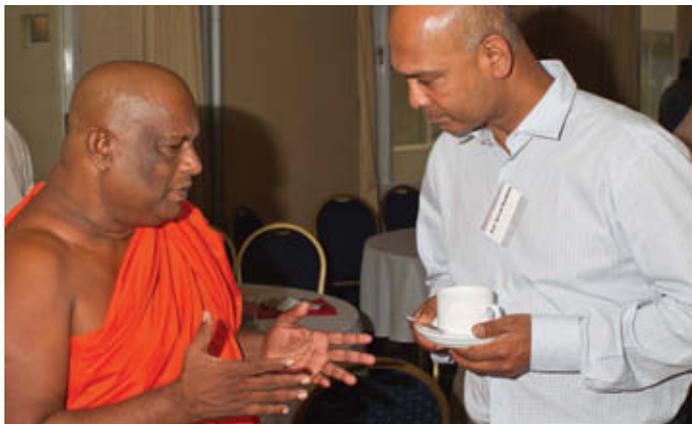
25 Journal Articles
1 Book Chapter

Centre for Ethics in Medicine and Society

Head: Professor Paul Komesaroff BSc(Hons), MA(Politics), PhD, MBBS, FRACP

www.cems.monash.org

Ethics underpins all areas of human activity and is explicitly required in research and clinical practice. The Centre for Ethics in Medicine and Society (CEMS) is responsible for the development, coordination and conduct of teaching at undergraduate and postgraduate levels; fosters research in ethics and values in relation to medicine and society; and facilitates international reconciliation through ethical practices and dialogue.



In 2012, CEMS facilitated the reconciliation workshop 'Ancient cultures, new futures: Sri Lankans moving forward together'. The Venerable Batapola Nanda Thero (L) and Associate Professor Suresh Sundram (R) of the University of Melbourne at the Colombo Reconciliation Forum.

The specific objectives of the Centre are: (1) to stimulate a culture of reflection, debate, dialogue and awareness of ethical issues in the medical community and the faculty; (2) to deliver high quality teaching products; (3) to conduct research; and (4) to apply ethical theory to the development and enrichment of practice. The Centre runs a popular biannual Intensive Research Ethics Course. It runs overseas reconciliation projects applying ethical concepts to the development of constructive dialogues in areas of conflict or deprivation through Global Reconciliation, a large, high profile international NGO that it was influential in establishing.

The Centre is engaged in a wide range of research projects including end-of-life issues, consent and competency, the care of elderly people, the social and ethical consequences of new technologies, the ethical implications of obesity and its management and the experience of illness.

In 2012, the Centre contributed to the establishment of the International Health Workforce Society of Australia, an organisation for the training and review of practices for international health workers. The Centre is also in partnership with the Australian Health and Development Alliance. This organisation aims to contribute to the ethical, efficient, coordinated provision of health care assistance from the Australian community to communities elsewhere in the world, thereby enhancing dialogue, communication and mutual understanding between these communities. It also formed a national framework to promote the quality use of complementary medicines, dedicated to the scientific analysis of content of complementary medicines.

Department of Medicine

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

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

The Department of Medicine has a broad ranging program of research, including dermatology, development biology, endocrinology, neuroscience, oncology, pathology and skin cancer.

Oesophageal cancer is one of the most deadly but least studied cancers worldwide. In Australia, the annual incidence of oesophageal cancer is projected to be 1,400 new cases a year with a projected annual mortality rate of 1,100. It is a hard to treat cancer, because by the time it is detected, it is already in a late stage, chemotherapy is not effective and surgical possibilities are restricted. A variety of lifestyle factors including smoking, excessive alcohol consumption, tobacco chewing and oral sex (papilloma virus infection) increase the risk of this disease, which is more common in men than women. Symptoms include difficulty in swallowing, fatigue, weight loss, heartburn and indigestion. Identification of this disease at an early stage is important in the success of therapy.

Dr Smitha Georgy, a Senior Research Officer in the Epidermal Development Laboratory, has taken on the challenge of teasing out the factors involved in the initiation and progression of oesophageal cancer. Dr Georgy is interested in identifying the molecular changes in oesophageal cancer cells, with the aim of promptly diagnosing this cancer. She won a \$100,000 grant from the Cure Cancer Australia Foundation to further investigate the mechanisms of oesophageal cancer progression, in particular identifying the signalling pathways that lead to unlimited proliferation of cells. The research builds on the group's earlier discovery of a gene, Grainyhead-like 3 (GRHL3), which acts as a tumour suppressor in human skin cancer. It is hoped that the research will ultimately be linked to future drug designs to effectively treat oesophageal cancers.

Postgraduate Students

52 PhD Students
4 MD Students

Publications

72 Journal Articles
1 Book Chapter



Dr Smitha Georgy, a Senior Research Officer in the Department of Medicine's Epidermal Development Laboratory, investigates the molecular mechanisms of oesophageal cancer progression.

National Trauma Research Institute

Head: Professor Russell Gruen MBBS, PhD, FRACS

www.ntri.org.au

The National Trauma Research Institute (NTRI) aims to improve care of the injured through more effective treatments, higher quality care and better trauma systems.



Professor Russell Gruen, Director of NTRI, integrates clinical practice and research to achieve best outcomes for trauma patients. In 2012, Professor Gruen secured \$1.6 million in NHMRC funding for the PATCH study, a clinical trial to assess treatment for patients at high risk of acute traumatic coagulopathy.

NTRI Forum Program

The NTRI Forum is a three-year program funded by the Victorian Transport Accident Commission that aims to improve the care of traumatic brain injury (TBI) and spinal cord injury (SCI). The program identifies important clinical, research and policy topics in TBI and SCI and addresses each topic through a series of four activities:

- **Defining the major challenges:** First, we consult with key stakeholders – representatives of health care and service delivery organisations, research funders, researchers, clinicians, policy-makers and patient representatives – to define the key challenges and understand the nature and complexities of each.
- **Gathering and summarising all relevant information:** Second, we search for, identify and synthesise from publications and further consultation the information necessary to properly consider each challenge, and present it to stakeholders as a briefing document.
- **Convening stakeholder dialogues:** Third, we convene stakeholder dialogues to connect the relevant information with the people who can make change happen, harnessing expertise and different perspectives, and inspiring participants through collective problem solving. The dialogue is the centrepiece of the NTRI Forum.
- **Supporting improvements:** Fourth, we prepare a dialogue summary, and brief the organisations and individuals that can effect change about their roles in developed strategies.

The NTRI Forum was inspired by and now collaborates closely with the McMaster Health Forum, an established Canadian initiative that focuses on supporting evidence-informed health systems in Canada and internationally. More details and reports from completed NTRI Forums can be found at www.ntriforum.org.au.

The PATCH Study

In October 2012, Professor Russell Gruen and colleagues were awarded \$1.6 million of NHMRC funding to conduct the PATCH (Pre-hospital Anti-fibrinolytics for Traumatic Coagulopathy and Haemorrhage) study, a clinical trial of tranexamic acid (TXA) in trauma patients over the next four years. This RCT involves the pre-hospital administration of TXA to seriously injured patients at high risk of acute traumatic coagulopathy. Paramedics attending the scene will assess eligibility of patients for the trial and those enrolled will be given TXA (or an identical matched placebo). Upon arrival at the Emergency Department, patients will be

given a further dose of TXA or placebo. The primary outcome of the trial will be the proportion of patients with favourable outcomes at six months (moderate disability or good recovery). Importantly, this study also aims to contribute to understanding the molecular mechanisms of TXA on fibrinolysis and inflammation in trauma patients. The PATCH study will initially be based in Victoria and then extended to participating sites across Australia and New Zealand. The trial will commence in 2013 and is being coordinated by Dr Veronica Pitt.

Postgraduate Students

10 PhD Students
2 Masters Students
1 MD Student

Publications

23 Journal Articles
5 Book Chapters
1 Book

Pathology Board

Head: Professor Catriona McLean BSc, MBBS, FRCPA, MD, FFS(FCPA)

www.med.monash.edu.au/cecs/p-board/

Professor McLean is Head of The Alfred Department of Anatomical Pathology, Chair of the Pathology Board for the Monash University MBBS and a collaborator in many clinically based research projects with colleagues at The Alfred, the Melbourne Brain Centre and Cancer Council Victoria.

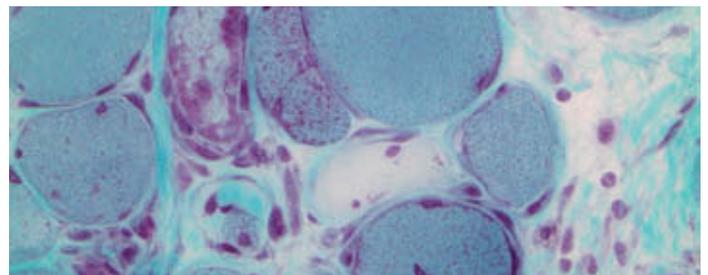
Professor McLean is also a co-investigator on NHMRC-funded projects with Professor Christina Mitchell and Professor Tony Tiganis from the School of Biomedical Sciences, Monash University. Professor McLean is Head of the Australian Brain Bank Network, which involves diagnosis of and research into rare neurodegenerative diseases, and also heads the State-funded Victorian Neuromuscular laboratory. She is an honorary consultant neuropathologist for the Australian National Creutzfeldt-Jakob Disease Registry and for the Australian Phenomics Network. Within the last three years, she has published in high impact factor journals including *Nature Genetics*, *Nature Medicine*, *PNAS*, *Brain* and *Journal of the National Cancer Institute* adding to her publication total of 210 with an additional ten book chapters.

In 2012, Professor McLean continued her work on rare muscle diseases in collaboration with ten preeminent researchers involved in the NHMRC-funded establishment of an Australian Centre for Research Excellence into Neuromuscular Disorders. This \$2.5 million endeavour, focusing on advancing the diagnosis and treatment of patients with neuromuscular disorders, requires a multicentre, multidisciplinary approach to research and translation, and significant collaboration between researchers, clinicians and patient organisations, nationally and internationally.

In 2012, Professor McLean secured two NHMRC Project Grants as CIB, which are related to the development of liver and breast cancer.

Publications

24 Journal Articles



Professor Catriona McLean researches the pathogenesis of neuromuscular disorders. The figure shows trichome-stained degenerating muscle fibres in disease.

Department of Surgery

Head: Professor Jeffrey Rosenfeld

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

The Monash Department of Surgery (DoS) research program focuses on endocrine surgery and thyroid cancer, colon cancer, burns, brain and spine trauma, cardiothoracic surgery, bionic vision, gastroesophageal disorders and prostate cancer. This year's report highlights cardiothoracic surgery, epidemiology of spine trauma and thyroid surgery.

Associate Professor Silvana Marasco, Acting Head of Cardiothoracic Surgery at The Alfred, has just completed a five-year RCT comparing operative fixation of fractured ribs in flail chest injury to conservative management. The study showed a five-day reduction in Intensive Care Unit stay and a significant cost saving in those patients treated surgically. She is now developing an absorbable rib fixation prosthesis, for which she has received government funding. Her other area of interest is in surgical innovation. She has commenced a minimally invasive mitral valve surgery program at The Alfred, and is soon to commence the implantation of 'suture-less' aortic valves.

Professor Frank Rosenfeldt, senior cardiothoracic surgery researcher, is leading the development of a technique for increasing the viability of donor hearts for transplant. The research has shown in animals that the safe ischaemic time – the time of reduced blood flow while the heart is being maintained outside its donor and before transplant – can be extended from four hours to up to 12 hours in normal hearts. This technique of low temperature, low pressure and low flow of micronutrients to resuscitate and perfuse the heart in transit if applied in donation after cardiac death (DCD) hearts may make it possible to increase heart donation rates by up to 30%. So far, two human DCD hearts have been resuscitated and have shown good function on a bench-top evaluation rig.



Professor Frank Rosenfeldt, senior cardiothoracic surgery researcher, is leading the development of a technique for increasing the viability of donor hearts for transplant.

Professor Jonathan Serpell and the Monash University Endocrine Surgery Unit have developed a thyroid cancer registry resulting in advances in treatment for patients with thyroid cancer. Research into monitoring of recurrent laryngeal nerve function during thyroidectomy has revealed that split nerves occur in 23% of cases and that the motor branches to the larynx are located in the front branch. Supportive evidence also shows that most recurrent laryngeal nerve palsies are temporary.

Dr Jin Wee Tee is a PhD student working with the Department of Neurosurgery and the Trauma Service at The Alfred to investigate the epidemiology of morbidity and mortality in the population with spinal cord and spine column trauma. The study delineates those variables that can guide therapy, public health policy and efficient resource allocation for the management of spine trauma.

A highlight for the year was the publication by Elsevier of a textbook, *Practical Management of Head and Neck Injury*, written by Professor Jeffrey Rosenfeld and other members of DoS.

Postgraduate Students

8 PhD Students
2 MD Students

Publications

94 Journal Articles
20 Book Chapters

Van Cleef/Roet Centre for Nervous Diseases

Head: Professor Elsdon Storey MBBS, DPhil, FRACP

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

The Unit's cerebellar ataxia research continued along several lines. A study on symptomatic treatment of incoordination in spinocerebellar ataxia type 1 mice was published with NHMRC funding secured to continue this work. An investigation of cerebellar structure and function in transgenic gluten-sensitive mice was published, and the human part of the gluten ataxia project analysed. Part-time PhD student, Lyn Lindsay, continued development of a portable electronic battery of upper limb coordination tasks, in conjunction with Dr Mark Symmons of Monash University. Dr David Szmulewicz (University of Melbourne PhD candidate, and former Alfred Neurology Registrar) continued collaborative work on characterisation of the newly described late-onset recessive ataxia – CANVAS.

The Movement Disorder Team continued its research interests in clinical and pathological aspects of Parkinson's disease (PD), progressive supranuclear palsy (PSP) and other movement disorders. We have been major contributors to an international study of davunetide for treatment of PSP (David Williams, Sue Varley, Kelly Bertram and Will Lee). Our PhD research identified patterns of cognitive dysfunction that are specific to PSP compared to PD (Claire Lee). Work on the pathological basis for levodopa dyskinesias in PD has progressed, and has included successful collaborations with the University of London and the University of New South Wales, including pathological and genetic studies that have been accepted for publication (Perdita Cheshire).

We are researching the impact of sleep on movements in PD, and have been recruiting patients as well as validating a tool for assessment of disease severity (Will Lee). We have published data comparing health resource use in patients with PD who are treated in rural Victoria compared with those treated in metropolitan Victoria (Michal Lubomski). In 2012, we initiated a study using transcranial magnetic stimulation to measure neurodegeneration in PSP, in collaboration with the team at the University of Rome. We have already discovered unique findings that separate PSP from PD, and are recruiting for an ambitious three-year longitudinal study that is designed to identify a biomarker of disease progression in PSP (Kelly Bertram).

PhD candidate Judy Allen-Graham finished her project on functional redundancy between the Alzheimer's protein APP and its homologue APLP2, which she presented at an international meeting.



Judy Allen-Graham completed her PhD thesis entitled 'Inhibition of APP and APLP2 using siRNA to investigate protein function and Alzheimer's disease'.

Professor Storey's involvement as an 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) sub-studies.

Postgraduate Students

8 PhD Students
2 MD Students

Publications

17 Journal Articles
2 Book Chapters



Professor Fabienne Mackay, Head of the Department of Immunology, was one of 12 Australian researchers honoured in 2012 with a Thomson Reuters Australia Citation Award in recognition of research excellence.

Immunology

Head: Professor Fabienne Mackay BBiomedEng, PhD

The Monash University Department of Immunology is internationally renowned for its combined expertise in research, teaching and service delivery in immunology and immunopathology. There are extensive research programs in basic and translational immunology, including highly successful collaborations with The Alfred hospital and other AMREP partners.

The department's research activities target diseases including allergy, asthma, autoimmunity, inflammation, diabetes, lupus, organ fibrosis, cancer and malaria. The department also focuses on engineering novel treatments such as nanoparticle-based vaccines in cancer and infection, as well as therapeutic proteins and monoclonal antibodies. Researchers are funded by NHMRC, ARC, a Cooperative Research Centre program and other research grants, and have a strong publication output, patent portfolios and biotech activity.

Head of Department Professor Fabienne Mackay works enthusiastically with the department's teaching staff to ensure delivery of the most comprehensive and cutting-edge immunology program in the country. Promotion of immunology to students and encouragement of progression to Honours and postgraduate research studies have been a major focus of her activity. In 2012, the department was ranked second at Monash University for outstanding postgraduate mentoring and supervision.

The department has extended its research activities on the Clayton campus, establishing an effective link between basic science / target discovery from Clayton campus and AMREP, and translation / clinical trials on The Alfred side. As part of that process, the department has recruited world-renowned scientists on both sides. The department regularly organises a scientific retreat to promote scientific integration and spearhead new intradepartmental collaborations. The retreat includes a very successful mentoring program for young researchers aimed at providing important scientific strategies to prepare their transition from postdoctoral researchers to independent laboratory heads.

Selected Research Highlights

White Blood Cell Traffic: Tetraspanins

Associate Professor Mark Wright, Head of the Leukocyte Membrane Protein Laboratory, studies a family of proteins termed tetraspanins. Tetraspanins are formed on white blood cell (lymphocyte) surfaces and organise traffic through the cell membrane.

Associate Professor Wright's group has benefited from Monash University's 'near-miss' funding scheme, which provides support for projects that the NHMRC considered worthy of funding, but for which insufficient NHMRC funds were available. The group was awarded \$100,000 in 2012 from Monash University for the project 'Homing in on the function of the tetraspanin CD53'. The project, to commence in 2013, will investigate CD53, a cell surface protein that controls the lymphocyte patrols needed to direct lymphocytes to the right part of the body to fight infection.

The journal *Nature Immunology* profiled a review of Associate Professor's Wright's research on plasma cell survival, which was published in a 2012 edition of *Science Signalling**. This research is on the role of a protein called CD37. CD37 is closely related to CD53, and is found on the surface of B-cells where, together with many other tetraspanins, it organises the cell surface. There are hundreds of different types of cell surface proteins and cells require these to communicate with their environment in order to develop and survive. The CD37 protein organises many of these other important proteins to behave as required for the plasma cell's health and survival. Plasma cells, which are derived from antibody-producing B-cells, are themselves antibody-producing factories that can confer long-term protection from foreign threats to our bodies.

*van Spriël AB, de Keijzer S, van der Schaaf A, Gartlan KH, Sofi M, Light A, Linssen PC, Boezeman JB, Zuidschewoude M, Reinieren-Beeren I, Cambi A, Mackay F, Tarlinton DM, Figdor CG, Wright MD. The tetraspanin CD37 orchestrates the $\alpha\beta_1$ integrin-Akt signaling axis and supports long-lived plasma cell survival. *Sci Signal* 2012;5(520):ra82.



Associate Professor Mark Wright (back row, 3rd from left), Head of the Leukocyte Membrane Protein Laboratory, with a group of Honours students.

Autoimmune Disease: Lupus

Systemic lupus erythematosus (SLE), more simply known as lupus, is an autoimmune disease where the body makes antibodies against its own DNA. It may involve a variety of genes, follow a variety of genetic pathways and damage a variety of cell types. In lupus, the immune system attacks connective tissue in the joints, lungs, kidneys and heart, causing joint and skin diseases in most patients, and organ and blood disorders in about half of lupus sufferers. In many cases, the consequence is impairment of kidney function called glomerulonephritis. Such a 'moving target' is difficult to pinpoint, track and ultimately treat, as one treatment may work for one particular genetic group, but not another.

Reducing Kidney Damage Caused by Lupus

Associate Professor Margaret Hibbs, Head of the Leukocyte Signalling Laboratory, investigates what underlies the disease and what interventions can halt the disease process. In the mid-1990s, she developed a mouse model of SLE, which shows the same clinical, pathological and biochemical features seen in the human disease. The model, now employed by researchers worldwide, is Lyn deficient, which means it lacks a particular protein involved in the regulation of cell activity.

Insufficient Lyn allows increased activation of another signalling molecule, PI3K, which is involved in many cell processes. Associate Professor Hibbs' research identified the role of a form of PI3K, called p110 δ , which is only found in the immune system. A paper published by her team in 2012 showed that once production of p110 δ PI3K was slowed down, but not stopped altogether, the disease processes also slowed down.* The mice produce less autoantibodies, show less inflammation and experience less damage to their kidneys. The paper has been cited several times as the research shows that targeting production of p110 δ PI3K may be a successful approach to moderating the disease.

*Maxwell MJ, Tsantikos E, Kong AM, Vanhaesebroeck B, Tarlinton DM, Hibbs ML. Attenuation of phosphoinositide 3-kinase delta signaling restrains autoimmune disease. *J Autoimmun* 2012;38(4):381-91.

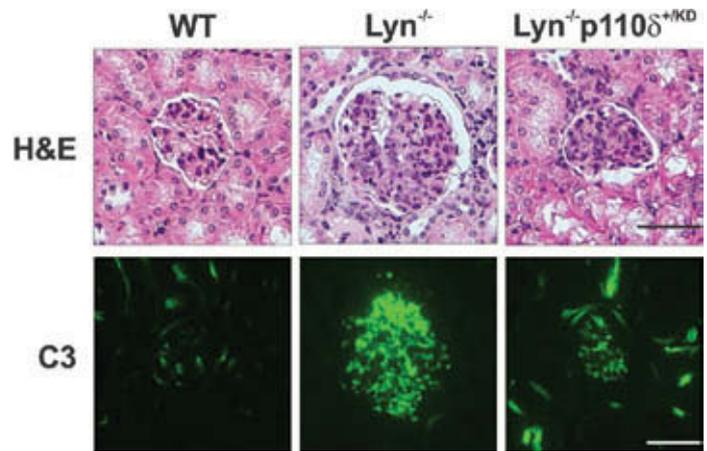


The Leukocyte Signalling Group. (L-R): Dr Anne Kong, Maverick Lau, Associate Professor Margaret Hibbs, Tim Gottschalk, Dr Evelyn Tsantikos, Erika Duan and Dr Mhairi Maxwell.

Development of Therapeutic Agent for Lupus

Professor Fabienne Mackay was one of 12 Australian researchers honoured in 2012 with a prestigious Thomson Reuters Australia Citation Award in recognition of research excellence. Professor Mackay played a crucial role in the world's first major lupus treatment breakthrough in 2011, a discovery that led directly to the development of a new preventive medication, belimumab.

Professor Mackay's research identified the role of the molecule BAFF that is essential for the survival of B-cells which fight infection by making antibodies. Professor Mackay and her group made this breakthrough in 2000. This research was featured with a front cover story in *Nature Reviews of Immunology*. They were the first to show that when BAFF occurs in high amounts, it drives autoimmune diseases such as lupus, rheumatoid arthritis and Sjögren's syndrome. This work



Research from Associate Professor Hibbs' group has demonstrated that attenuation of PI3K signalling restrains autoimmune disease, such as lupus, in which kidneys are damaged. The figure shows histology of kidney sections from a mouse model of lupus.

was the first indication that blocking or neutralising BAFF might be a new therapy for autoimmune diseases, sparking the development of BAFF inhibitors worldwide as a treatment for lupus. GlaxoSmithKline, manufacturer of the new therapy, designed their clinical trials in line with the insights from Professor Mackay's experimental data.

Translation to Clinical Practice

Allergic Diseases

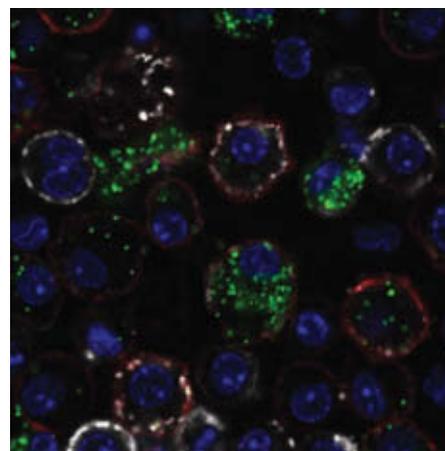
- Emeritus Professor Jennifer Rolland and Professor Robyn O'Hehir lead allergy research. Both clinical trials and *in vitro* studies are used to investigate mechanisms of allergen immunotherapy and optimal strategies for downregulation of the adverse T-cell response to allergens in allergic individuals.

Nanovaccines

- Professor Magdalena Plebanski is involved with nanovaccine clinical trials in chemotherapy patients and is working on an ovarian cancer vaccine.

Leukemia

- Clinical trials are being conducted in patients with chronic lymphocytic leukemia and acute myeloid leukemia in conjunction with Dr Andrew Wei (Australian Centre for Blood Diseases, Monash University).



This confocal microscopy image shows the effective uptake of 500 nm polystyrene nanoparticles (green) by dendritic cells (CD11c/MHC II dendritic cells: red and grey with blue nucleus) cultured with GM-CSF/IL4. De L Karlson T, Kong YY, Hardy CL, Xiang SD, Plebanski M. The signalling imprints of nanoparticle uptake by bone marrow derived dendritic cells. *Methods* 2013;60(3):275-83.

Postgraduate Students

28 PhD Students

Publications

33 Journal Articles
1 Book Chapter



Infectious Diseases

Head: Professor Sharon Lewin MBBS(Hons), FRACP, PhD

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, influenza, drug resistant organisms, antibiotic use, infection prevention and hospital epidemiology.

HIV

Our research in HIV ranges from basic laboratory studies through to clinical research and public health. Using our laboratory model of HIV latency, we identified new drugs that could potentially reverse latent HIV infection. The work is part of a National Institutes of Health (NIH) funded program involving eight international laboratories. In collaboration with the Burnet Institute, we are also investigating whether HIV employs different strategies to hide in T-cells and brain cells.

Together with Dr Julian Elliott and The Alfred clinical research team, we completed the first multidose study of the cancer drug vorinostat to test if the drug could 'flush' out virus hiding in resting cells of HIV-infected patients receiving antiretroviral treatment (ART). Vorinostat efficiently 'woke up' sleeping virus in 80% of patients; however, we did not see an overall reduction in the total number of infected cells. Professor Lewin is now collaborating with a research group based in Denmark looking at the effects of a more potent cancer drug, panobinostat, in HIV-infected patients receiving ART.

Chronic Diseases and HIV

Professor Jenny Hoy and Associate Professor Edwina Wright conduct clinical studies to better understand the aetiology and management of non-AIDS complications of HIV, including heart disease, bone disease and dementia. PhD student Dr Janine Trevillyan, together with Professor Jennifer Hoy, recently published that certain antiviral agents significantly increase the risk of heart disease in HIV-infected patients (Trevillyan JM, Cheng AC, Hoy J. *Sex Health* 2013;10(2):97-101). They have established a collaboration with Baker IDI and the Australian Centre for Blood Diseases to identify the mechanisms by which HIV and antiviral drugs contribute to heart disease.

The recently established Melbourne HIV Cohort Study, operating across the major HIV clinics in Melbourne, recruits both people living with HIV and HIV-negative men who have sex with men. The study, led by Dr Julian Elliott and Dr Michelle Giles, aims to better understand how HIV medications and health behaviours contribute to the higher risk of chronic disease in HIV patients.

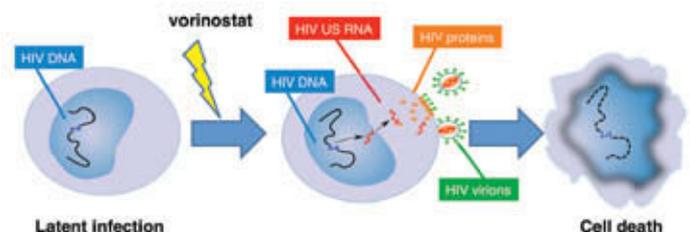
HIV Co-infections

Co-infections with pathogens such as hepatitis B virus (HBV) cause significant morbidity in patients with HIV, particularly in low-income countries. Dr Megan Crane and Dr Jennifer Audsley, together with co-investigators in Sydney, Bangkok and the US, are investigating why HBV-related disease is worse in patients infected with HIV. In collaboration with colleagues at the NIH, Dr Crane recently identified unique changes in gene expression in patients with HIV-HBV co-infection that differ from patients infected with HIV alone, even when replication of both viruses is under control.

Infections in the Immunosuppressed Host

Dr Michelle Yong (Infectious Diseases physician and PhD student), together with Professor Lewin and Dr Paul Cameron, is evaluating the role of a new test developed by an Australian company to determine which bone marrow transplant recipients are at greatest risk of a severe viral illness caused by cytomegalovirus (CMV). Dr Yong will spend most of 2013 at the Hôpital Pitié Salpêtrière in Paris with Professor Brigitte Autran, a world leader on immune responses to CMV, to further this project.

Dr Orla Morrissey published a study with the potential to significantly change the future management of invasive aspergillosis in the clinical setting. A randomised controlled trial examining the clinical utility of new diagnostic tests for invasive aspergillosis has demonstrated that *Aspergillus* galactomannan detection and PCR improve our ability to diagnose and treat invasive fungal infections (Morrissey O *et al.*, *Lancet Infect Dis* 2013;13(6):519-28).



Postulated mechanism of action of the drug vorinostat to treat HIV infection: HIV can lay dormant in resting CD4+ T-cells, which is referred to as latent infection. Vorinostat kick-starts the production of HIV RNA and proteins that together create new viruses. The activated cell then dies via one of two mechanisms: the virus leaving the cell or by activation of an immune response.

Influenza

Our unit leads the Influenza Complications Alert Network, a hospital-based surveillance program for severe influenza conducted at 15 hospitals around Australia. Findings from our evaluation support the use of the influenza vaccine in at-risk patients. Influenza appeared to be responsible for at least 3,000 admissions to hospitals in Australia in 2011, while influenza vaccine was associated with a 37% reduction in the risk of hospitalisation with influenza.

Drug Resistant Organisms and Antimicrobial Prescribing

The Infection Prevention and Epidemiology Team evaluated the role of topical disinfectants in eliminating carriage of multidrug resistant organisms (MDRs), in particular, vancomycin-resistant *Enterococcus* (VRE). We implemented a web-based antibiotic approval system in Alfred Health to facilitate review of non-policy conforming prescribing practice by an antimicrobial stewardship team, which should aid in reducing the incidence of VRE.

Infection Prevention

A hospital-wide collaboration, together with an intensive education campaign on the wards, has achieved a reduction in the rates of central line associated bloodstream infections, with only one infection reported in the last half of 2012. An educational intervention also achieved a modest reduction in hospital-acquired urinary tract infections. Ongoing projects are examining the potential adverse effects of contact precautions, and the duration of carriage of MDRs.

Victorian Spleen Service

The Victorian Spleen Service (VSS) aims to prevent overwhelming sepsis in people after splenectomy or a diagnosis of hyposplenism via education, immunisation and preventive antibiotics. The VSS has registered more than 3,000 people who have undergone splenectomy ranging from three weeks to 89 years of age. The recommended immunisation regimes for these individuals have needed revision with the availability of new vaccines against pneumococcus and meningococcus. The VSS is participating in an NHMRC-funded research project to determine optimal immunisation schedules. VSS has also been pivotal in the development of a new test (IgM memory B-cells) to measure spleen function. See www.spleen.org.au.

Achievements

Selected Grants

- Professor Sharon Lewin and Professor Stephen Kent are co-investigators on an NHMRC Program Grant of \$12.6 million awarded to a team of seven groups in Sydney and Melbourne led by Professor David Cooper (University of New South Wales) for the study 'HIV cure and immune mediated control' (2014-2018).
- Together with collaborators from Denmark (Lars Ostergaard, CIA), Professor Lewin received a grant from the Danish Medical Council worth \$1.5 million to test the drug panobinostat for purging HIV-1 from the latent reservoir (2012-2015).
- Dr Paul Cameron (CIA) and Professor Sharon Lewin (CIB) were awarded an NHMRC Project Grant of \$489,927 to commence in 2013 to study HIV latency and regulation of HIV life cycle.
- Dr Julian Elliott and Professor Sharon Lewin were awarded a grant from the American Foundation for AIDS Research of US\$312,070 to investigate the use of disulfiram, a drug commonly used to treat alcoholism, to 'wake up' dormant HIV.

- Professor Sharon Lewin and Dr Paul Cameron were awarded a grant of \$250,000 from the NIH to expand their work as part of a large international collaboration on HIV latency and cure.
- Professor Suzanne Crowe AM (CIB), Dr Paul Cameron (CIC) and Dr Julian Elliott (CID) are co-investigators on a \$598,938 NHMRC Project Grant with the Burnet Institute's Associate Professor Anthony Jaworowski (CIA) to establish a longitudinal study of natural killer cell function in HIV-infected individuals initiating therapy commencing in 2013.
- Professor Suzanne Crowe AM and Burnet Institute colleagues were awarded a \$1.2 million grant from UNITAID for the manufacture and development of their rapid point-of-care CD4 test in India (2013-2016).
- Professor Suzanne Crowe AM and Burnet Institute colleagues received a Saving Lives at Birth: Grand Challenges for Development Award of \$250,000 for their point-of-care CD4 test.

Fellowships

- Professor Sharon Lewin was awarded a five-year NHMRC Practitioner Fellowship commencing in 2013 to support her research program 'Improved health outcomes for people living with HIV'.
- Professor Suzanne Crowe AM was awarded an NHMRC Principal Research Fellowship commencing in 2013 for her program of research 'Translating research into HIV outcomes in the developing world'.

Awards and Prizes

- Professor Sharon Lewin received a Lifetime Achievement Award at the HIV Congress in Mumbai, India.
- Associate Professor Allen Cheng received the 2012 Frank Fenner Award for Advanced Research in Infectious Diseases from the Australasian Society for Infectious Diseases (ASID).
- Associate Professor Anton Peleg was presented with the Young Physician Leaders Award at the World Health Summit in Berlin, Germany.
- Dr Joe Doyle received the 2012 ASID Council Scholarship to attend the society's Annual Scientific Meeting.
- Dr Christina Chang received a Young Investigator Award (YIA) to attend the 19th Conference on Retroviruses and Opportunistic Infections in Seattle, USA. She also received the 2nd prize of the Burnet Prizes for Infectious Diseases Research and International Health at Alfred Week 2012.
- Dr Hao Lu received a 2012 Australasian Society for HIV Medicine Conference Young Investigator Award.
- PhD student Nitasha Kumar received an International AIDS Society (IAS) and a French National Agency for AIDS Research YIA at the 2012 IAS Conference in Washington, USA.
- PhD student Gabriela Khoury won the Best 'Science Bite' prize at the 2012 Victorian Infection and Immunity Network Young Investigator Symposium. She also won a scholarship to attend the 2012 International Workshop on HIV and Hepatitis Virus Drug Resistance and Curative Strategies in Sitges, Spain.

Postgraduate Students

12 PhD Students

Publications

85 Journal Articles
6 Book Chapters



Professor Jayashri Kulkarni (front centre) with members of the MAPrc team.

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. The research covers all ages, many different mental illnesses and is integrated with clinical practice. MAPrc has a multidisciplinary group of researchers with a research agenda that meets clinical and social needs and has a short one to five year timeline to real clinical impact.

There are five key streams of research including Women's Mental Health, Psychiatric Neurotechnology, Psychopharmacology, Cognitive Psychiatry, and Service Evaluation Research. MAPrc has a multidisciplinary team of 170 staff including postgraduate students and affiliated researchers, drawn from medicine, nursing, psychology, allied health, science, engineering and health information services. At our premises we have 60 staff. With this rich mix of skills and expertise, there is constant cross-pollination of ideas and problem solving. MAPrc is perfectly positioned to play a leading role in innovative mental health research and the centre is currently conducting 127 clinically focused projects.

Women's Mental Health

The use of hormone treatments for women experiencing psychotic disorders and depression forms a major part of the work of the Women's Mental Health (WMH) research team; in 2012, two NHMRC grants were obtained. The first grant will explore the use of tibolone in women with peri-menopausal depression. The second grant involves extrapolating results from a study that examined a selective estrogen receptor modulator (SERM) in women with psychosis to testing the same SERM in men with schizophrenia.

The translation of our hormone research happens on a regular basis in the MAPrc WMH Clinic. The clinic, which grew out of our research in psychoneuroendocrinology, was set up in 2010 and runs as part of MAPrc. In particular, this clinic has a focus on special aspects of mental disorders affecting women and is serviced by both psychiatry and endocrinology clinicians. The unique approach to providing diagnostic opinions and translating research findings into novel treatments is extremely valued by patients and other clinicians. The clinic also involves students and has an important clinical teaching focus.

Brain Stimulation in Mental Disorders

The Psychiatric Neurotechnology research team utilises cutting edge neuroscience techniques to develop innovative psychiatric brain stimulation treatments. We currently have ten active clinical trials and 18 experimental research studies running on site at MAPrc. In 2012, researchers from the team received an NHMRC Project Grant for \$480,000 to investigate a novel accelerated treatment course of transcranial magnetic stimulation (TMS) in depression. In addition, the team received two ARC grants, a beyondblue grant and funding from a US foundation, the National Alliance for Research on Schizophrenia and Depression (NARSAD).



The MAPrc Psychiatric Neurotechnology Team.

In 2012, the team launched the first TMS Depression Clinic enabled by a \$1.015 million New Technology grant received in 2011 by Professor Paul Fitzgerald from the Department of Health. It is a clinical service for the provision of TMS for patients with treatment resistant depression. This is the culmination of over a decade of dedicated and exceptional research into the effectiveness, safety and optimisation of TMS for patients who have been unable to find relief from their depression. The establishment of a clinical service to provide a specialised treatment to those patients experiencing treatment resistant depression is anticipated to have a positive impact on both the health outcomes for individual patients and the wider community.

New Approaches to Autism

The brain basis of autism is unclear; however, a recent theory suggests that autism spectrum disorder (ASD) might be underpinned by dysfunction of 'mirror neurons'. Mirror neurons are brain cells that fire during both the performance and observation of behaviour and they have been linked to social understanding, the impairment of which is the hallmark of ASD.

Employing modern brain stimulation and neurophysiological techniques, we conducted the largest study to date of the mirror neuron system in ASD. Individuals diagnosed with ASD (n = 34) and matched controls (n = 36) completed a TMS experiment designed to assess premotor mirror neuron activity during the observation of goal-directed behaviour. Those with ASD displayed a significant reduction in mirror neuron activity in the premotor cortex during the observation of others' behaviour. Furthermore, within the ASD group, social and communicative symptom severity was greater among those who failed to show any evidence of mirror neuron activation. This study provides support for a role for mirror neurons in the neuropathophysiology of ASD and this system may be a useful treatment target in the development of new biomedical and behavioural interventions. The study was published in 2012 in the journal *Biological Psychiatry**.

*Enticott PG, Kennedy HA, Rinehart NJ, Tonge BJ, Bradshaw JL, Taffe JR, Daskalakis ZJ, Fitzgerald PB. Mirror neuron activity associated with social impairments but not age in autism spectrum disorder. *Biol Psychiatry* 2012;71(5):427-33.

Community Psychiatry

Linking Local Police and Alfred Psychiatry Service

Difficulty in coping during an acute phase of a mental illness can result in a crisis situation that places the person or those around them at risk of harm. Police often respond to these situations that occur in the community; however, without specific mental health training, this may not result in the best outcomes for the unwell person. A recent trial implemented by Victoria Police and Alfred Psychiatry involved a joint police and mental health clinician response unit that was available to respond to mental health crises occurring in the community. The joint response allowed the police to manage any safety issues while the clinician was able to conduct an immediate mental health assessment to rapidly determine whether mental health treatment was needed and where that could best be delivered (e.g. at home, in hospital), or

whether non-mental health assistance (e.g. for substance issues or homelessness) was a more pressing need.

An evaluation of the joint initiative conducted by Dr Stuart Lee, senior researcher at MAPrc, collected feedback from 11 Crisis Mental Health Clinicians and 66 Victoria Police members. The model was effective in improving collaboration between police and mental health services, provided more sensitive and timely care to affected people, helped reduce the inappropriate transporting of people to hospital emergency departments for mental health care, and helped improve the mental health expertise of local police members. Supported by the evidence collected during this trial, funding for an ongoing implementation of the model has now been secured.

Awards

- MAPrc and Alfred Health received a highly commended mention for the Women's Mental Health Clinic in the 2012 Victorian Public Healthcare Awards for an Outstanding Achievement by a Team in Mental Healthcare.
- Professor Jayashri Kulkarni was a finalist in the City of Melbourne Awards.
- Dr Peter Enticott received an Australian Institute of Policy and Science Tall Poppy Award and a 2012 NARSAD Young Investigator Award from the US-based Brain and Behaviour Research Foundation.
- Professor Paul Fitzgerald received the 2012 Eli Lilly Oration Award from the Australasian Society for Psychiatric Research.
- Dr Kate Hoy won the Central Clinical School Early Career Researcher Symposium Oral Presentation Prize.
- Dr Roisin Worsley was awarded the 2012 Australian Diabetes Society Best Clinical Poster Prize for her work on gestational diabetes in women taking antipsychotics in pregnancy. She also won the 2012 Alfred Week Psychiatry Poster Prize.

Postgraduate Students

14 PhD Students
1 Doctor of Clinical Psychology

Publications

68 Journal Articles
2 Book Chapters

The
ALLFRIED

Service and Career





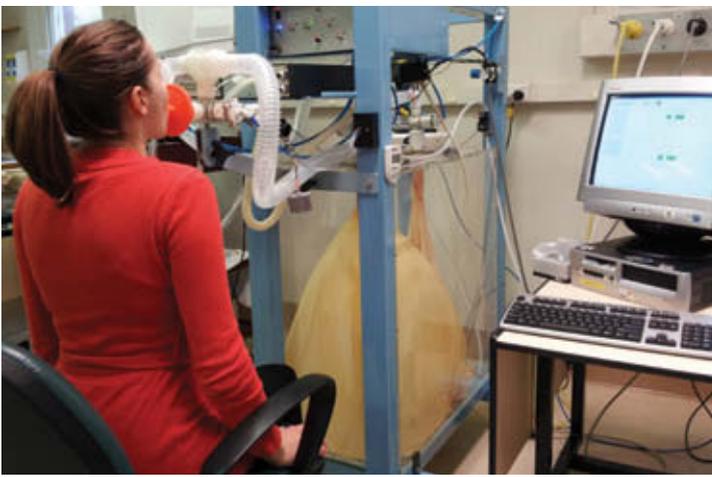
Alfred Health Departments Conducting Research

Chief Executive Alfred Health: Andrew Way

Director of Research: Professor Stephen Jane

*Medical and Surgical Departments	Medical Services	Nursing
Allergy, Immunology and Respiratory Medicine Head: Prof. Robyn O’Hehir	Diagnostic and Interventional Radiology Head: Prof. Ken Thomson	Nursing Services Head: Janet Weir-Phyland
Cardiothoracic Surgery Acting Head: Assoc. Prof. Silvana Marasco	Nuclear Medicine Head: Prof. Victor Kalf	Allied Health
Cardiovascular Medicine Head: Prof. Anthony Dart	Pathology Services Head: Assoc. Prof. Hans Schneider	Head: Lyndell Keating
Emergency and Trauma Centre Head: Dr De Villiers Smit	Pharmacy Head: Prof. Michael Dooley	Nutrition and Dietetics Head: Assoc. Prof. Ibolya Nyulasi
Endocrinology and Diabetes Head: Prof. Duncan Topliss	Information Development	Occupational Therapy Head: Jacqui Morarty
Gastroenterology Head: Prof. Peter Gibson	Health Informatics Head: Dr Chris Bain	Patient and Family Services Head: Bridget Wall
General Surgery Head: Prof. Jonathan Serpell		Physiotherapy: Head: James Sayer
Intensive Care Head: Prof. Carlos Scheinkestel		Psychology Head: Lynda Katona
Medical Oncology Head: Prof. Max Schwarz		Speech Pathology Head: Janine Mahoney
Melanoma (Victorian Melanoma Service) Head: Assoc. Prof. John Kelly		
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		
Sexual Health Head: Prof. Christopher Fairley		

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



Measurements of small airway are performed on a patient using the multiple-breath nitrogen washout system.

Allergy, Immunology and Respiratory Medicine

Director: Professor Robyn O’Hehir BSc, MBBS, FRACP, PhD, FRCP, FRCPath

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 (CF) State Centre of Excellence, bronchiectasis, pulmonary vascular disease and adult and paediatric lung transplantation.

AIRmed emphasises integration of 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 in the laboratories of Monash University at AMREP. AIRmed has a very active clinical and biomedical research focus with considerable success in NHMRC, ARC, Cooperative Research Centre and other competitive research funding. 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.

Peripheral Lung Function in Asthma

Monitoring the function of the small airways down to the acinus is increasingly viewed as important in a number of respiratory conditions. Exacerbations of asthma are thought to be caused by airflow obstruction resulting from airway inflammation, bronchospasm and mucus plugging. Histological evidence suggests the small airways, including acinar air spaces, are involved; however, this has not been corroborated *in vivo* by measurements of peripheral small airway function. It is also unclear whether asthma severity is linked to small airway function.

We have NHMRC funding for a number of studies to investigate the physiology of the small airways in patients with asthma. Our previous work clearly demonstrated that the small airways in patients with asthma have greater heterogeneity, increased airway closure, increased stiffness and increased closing volume compared to

healthy subjects. These abnormalities are associated with patient-centred outcomes of disease severity and control, and the failure to respond to treatment.

Our most recent work suggests that asthma is a combined disease of the acinar and conductive airways. We demonstrated that impaired function within the acinus, in particular, was associated with airflow obstruction and treatment requirement in patients with acute severe asthma. We found it is the acinar airways within the acinus and not the small conducting airways that determine asthma severity, defining an important additional target for therapy in patients with asthma.

Recent publications related to our work in asthma:

- Downie SR, Salome CM, Verbanck SA, Thompson BR, Berend N, King GG. Effect of methacholine on peripheral lung mechanics and ventilation heterogeneity in asthma. *J Appl Physiol* 2013;114(6):770-7.
- Thompson BR, Douglass JA, Ellis MJ, Kelly VJ, O’Hehir RE, King GG, Verbanck S. Peripheral lung function in patients with stable and unstable asthma. *J Allergy Clin Immunol* 2013;131(5):1322-8.

Pulmonary Arterial Remodelling

COPD patients who develop pulmonary hypertension have increased mortality, increased hospitalisations and decreased functional status. However, efforts to treat this secondary pulmonary hypertension with selective pulmonary vasodilators have not resulted in improvements in meaningful clinical outcomes. We explored heart-lung interactions in advanced COPD to better understand the mechanisms of pulmonary hypertension in these patients and to provide insights into therapeutic strategies.

Our first study examined pulmonary arterial remodelling in advanced COPD. We demonstrated that there is profound remodelling in all patients with advanced COPD and that the distribution of remodelling is complex and lobe-dependent. Furthermore, we identified that areas of increased perfusion were associated with increased pulmonary arterial remodelling. Further study is required to better understand the drivers for pulmonary arterial remodelling and the association between pulmonary arterial remodelling, pulmonary vascular resistance, pulmonary hypertension and clinical outcomes.

Our second study examined the physiology of heart-lung interactions in COPD patients during mechanical ventilation. We demonstrated that increased positive airway pressure increases pulmonary vascular tone and reduces right ventricular function. These findings suggest that

mechanical ventilation negatively impacts cardiac function, not only via reduced venous return but also through increased afterload pressures upon the heart. Further study is required to ascertain whether we can manipulate ventilator settings in order to improve cardiac function during mechanical ventilation.

Clinicians Online

Federal Minister for Broadband, Communication and the Digital Economy, the Hon Senator Stephen Conroy, and Victorian Minister for Health and Ageing, the Hon David Davis MLC, recently announced funding for the implementation of a 'telehealth' connection service at The Alfred to support remote clinical consultations for CF patients.

The Clinicians Online project is to receive \$1.5 million in Commonwealth Government funding and \$1.85 million from the Victorian Government and its project partners to deliver video-based CF consultations between respiratory experts at major metropolitan hospitals and regional patients. Led by the Victorian Department of Health and the CF service at The Alfred, in conjunction with Monash University, rural health alliances and VicTrack (a state-owned enterprise), the Clinicians Online project will utilise the high-speed broadband provided by the National Broadband Network, effectively improving access for rural CF patients who would normally travel great distances to a major metropolitan hospital for an appointment. Head of the CF service at The Alfred, Professor John Wilson, led a team of researchers in the development of the Clinicians Online initiative.



\$3.35 million of funding was announced for the initiation of the Clinicians Online project, a telehealth connection service to support remote clinical consultations for cystic fibrosis patients. (L-R): Professor John Wilson (Head of Cystic Fibrosis, The Alfred), the Hon David Davis MLC (Minister for Health and Ageing, Victoria), Helen Shardey (Chair, Alfred Health Board), Senator Stephen Conroy (Minister for Broadband, Communication and the Digital Economy), Georgie Crozier MLC (Member for Southern Metropolitan Region) and Dr Alan Finkel AM (Chancellor, Monash University).

Achievements and Awards

- Dr Belinda Miller was appointed as Adjunct Clinical Associate Professor of Medicine, Monash University, in recognition of her strong tradition of excellence in teaching and clinical care.
- Associate Professor Bronwyn Levvey was elected onto the Board of Directors of the International Society of Heart and Lung Transplantation.
- Professor Michael Abramson accepted an invitation to be Associate Editor of the *International Journal of Tuberculosis and Lung Disease*.
- Associate Professor Tom Kotsimbos was appointed as an Associate Editor of the *European Respiratory Journal*.

- Dr Jeremy Wrobel received two awards at the Thoracic Society of Australia and New Zealand (TSANZ) Annual Scientific Meeting (ASM): a Boehringer Ingelheim/Pfizer American College of Chest Physicians Travel Award and a Janet Elder International Travel Award. Dr Wrobel was also elected to the Victorian Royal Australasian College of Physicians State Committee.
- Associate Professor Anne Holland won the Physiotherapy Special Interest Group Prize at the 2012 TSANZ ASM for her paper 'Impaired chronotropic response to exercise predicts shorter survival in interstitial lung disease' with co-authors Ian Glaspole, Nicole Goh, Catherine Hill and Christine McDonald.
- Dr Kirk Kee won a Monash University PhD research prize for his presentation entitled 'Reduced gas transfer for carbon monoxide predicts exercise capacity in heart failure via increased dead space ventilation'. Dr Kee also won Best Poster/Audience Choice Prize at the Central Clinical School Annual Postgraduate Symposium.
- Professor John Wilson was recently appointed as Adult President Elect for the Royal Australasian College of Physicians.
- Dr Rob Stirling and colleagues received a highly commended The Alfred Health Chairman of the Board Award for Patient Safety and Quality Improvement for 'The development of a population-based lung cancer registry'.
- Associate Professor Bruce Thompson won a prize at the TSANZ Airway Inflammation and Remodelling meeting held in Melbourne for his poster titled 'BOS Op shows a predominant abnormality of perfusion not ventilation in lung transplant recipients'.
- Dr Sara Prickett, Senior Research Fellow, Allergy Laboratory Immunology/AIRmed, won the Central Clinical School Travel Grant 2012 and a Monash University Gender Equity Award to support presentation of her research on a peanut allergy vaccine at the European Academy of Allergy and Clinical Immunology Congress in Geneva, Switzerland, in June 2012.
- Jodie Abramovitch (Allergy Laboratory Immunology/AIRmed) was awarded the Nairn prize for top Immunology honours student for 2011. Jodie also won an Australian Postgraduate Award and a Faculty Postgraduate Excellence Award to undertake her PhD on shellfish allergy.

Major Grants

- Professor Robyn O'Hehir, Emeritus Professor Jennifer Rolland and Dr Sara Prickett were awarded an Alfred Health Grant (2012-2014; \$378,800) for their research on 'Novel peanut allergy vaccine with translation to phase 0/1 clinical trial'.
- Associate Professor Tom Kotsimbos (CIC) and Professor Greg Snell (CID) are co-investigators with Professor David de Kretser (CIA), Dr Karen Dwyer (CIB) and Associate Professor Mark Hedger (CIE) on the NHMRC Project Grant (2013-2015; \$517,097) entitled 'Activin A and follistatin are potential key regulators of organ transplant dysfunction and graft survival'.
- Professor Matt Naughton (CIC) is a co-investigator on an NHMRC Development Grant (2012-2014; \$584,700) entitled 'Treatment of sleep disordered breathing in patients with heart failure' with Philip Berger (CIA). Professor Naughton is also a co-investigator on a BUPA Health Foundation grant (2012-2014; \$299,800) for research on 'Addressing the growing burden of sleep apnea – a screening pathway'.

Postgraduate Students

8 PhD Students
1 MD Student

Publications

65 Journal Articles



Dietitian Suzy Jackson shows a sample of foods from the Mediterranean diet.

Allied Health

Director: Lyndell Keating

Nutrition

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

The Nutrition Department provides acute and chronic disease management services. Our research includes the aetiology and impact of nutritional disorders in disease, the metabolic syndrome and improved targeting of nutrition interventions. Intensive care, infectious diseases and respiratory medicine, including cystic fibrosis (CF), are our most active areas. Research is also continuing into the impact of a Mediterranean diet on nutritional outcomes. We have research collaborations with Monash University and La Trobe University.

Emma Ridley and Audrey Tierney lead Intensive Care Unit (ICU) nutrition research, focusing on the use of indirect calorimetry in nutrition prescribing and monitoring. In 2012, Emma visited Canada, Israel, Switzerland and Italy, funded by a Churchill Fellowship, to investigate the use of indirect calorimetry and the development of nutrition research programs in intensive care. Emma continues her role as ICU Nutrition Research Fellow with the Australian and New Zealand Intensive Care Research Centre, and has commenced a multicentre study investigating nutritional requirements in patients receiving extracorporeal membrane oxygenation.

Indirect Calorimetry in the ICU

Over recent years, nutrition therapy for critically ill patients has gained momentum as an essential part of patient care. Research has demonstrated that providing the right amount of nutrition in general, and of specific nutrients in particular disease states, can affect the patient's hospital journey. In 2012, we completed a study that examined methods of measuring resting metabolic rate in the ICU patient to estimate energy requirements. We demonstrated that there was close agreement between the current estimation method, the Schofield equation with an added stress factor, to the gold standard method of indirect calorimetry.

Cancer Survivorship

Elizabeth Viner-Smith is currently involved in the Positive Change for Life Survivorship Project, which aims to provide ongoing multidisciplinary support to community based patients who have survived a stem cell transplant. The nutrition component follows the COACH model of intervention, in which patients' nutritional status is initially assessed face-to-face in clinic with phone call follow-up at various stages throughout a 12-month period. To date, 45 out of a

target of 50 patients have been recruited. The project aims to identify if earlier dietary intervention can prevent or reduce nutrition related complications and to develop models of care that will address longer term nutrition risks for stem cell transplant survivors.

Paediatric Lung Transplant

The Alfred has the only paediatric lung transplantation program in Australia, and Amanda Cane is undertaking a retrospective audit examining nutritional outcomes in these patients. Nutritional status is being assessed in 21 children, aged seven to 17, pre-transplant and for three years post-transplant. Data collection for the three-year outcomes is ongoing with results to date indicating that most children resumed normal growth patterns within six months following transplantation. A higher incidence of post-transplant diabetes is observed in children with CF compared to those undergoing transplant for other indications. Results are guiding the management of paediatric lung transplant with potential outcomes expected to optimise quality of life and function for these children, whose survival continues to improve.

Achievements

- Natalie Shalit was awarded an Alfred Research Trusts Small Project Grant to investigate factors that influence dietary intake in adults with chronic obstructive pulmonary disease.
- Joanna Peter received a poster prize at the International Congress of Dietetics for work evaluating a model of care involving nutrition assistants in aged care wards.
- Julia Price spoke at the Australasian HIV/AIDS Conference in Melbourne on the topic 'Evaluating cardiovascular risk algorithms in HIV'.
- Andrea Elliott presented at the European Society for Clinical Nutrition and Metabolism Congress in Barcelona, Spain, on the impact of coding for malnutrition on diagnosis-related group assignment and hospital reimbursement.
- Dr Susannah King supervised two Honours students from La Trobe University, who completed projects focusing on nutritional status and dietary intake in adults with CF.
- Associate Professor Ibolya Nyulasi continues in her roles on the European Society for Clinical Nutrition and Metabolism Faculty and as President of the Australasian Society for Parenteral and Enteral Nutrition.

Postgraduate Students

1 PhD Student

Publications

8 Journal Articles

Occupational Therapy

Head: Jacqui Morarty BAppSc(OT), MOT

The Occupational Therapy (OT) Service aims to enhance people's quality of life by enabling them to participate in their chosen life roles and meaningful occupations, including self-care, leisure, study and/or work. In 2012, research activities focused on the evaluation of the quality and safety of OT delivery and the development and implementation of interventions to improve patient outcomes. Areas of research strength expanded to include ageing and rehabilitation along with the established research areas of hand therapy and neurotrauma.

Major Research Findings

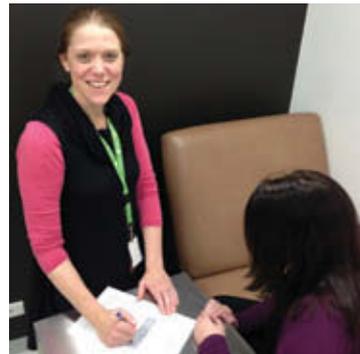
- A pilot study to assess fatigue management education, aimed at improving daily living activities in patients receiving chemotherapy and radiotherapy, found no difference in fatigue or activity levels between intervention and control groups.
- A national study revealed that case management of adult traumatic brain injury (TBI) is not well supported by research evidence or clinician-reported outcomes, with Australian case managers unlikely to have received specific training in working with complex brain injury clients. Ongoing specialised support in the workplace is also lacking.
- Collaborating with La Trobe University students, a systematic review of the relationship between six different assessments of self-care in Alfred Health clearly indicated strengths of the Barthel Index, the Functional Independence Measure and the Functional Autonomy Measure, while clinical utility evaluation varied across the streams of the OT Service.
- Our systematic review of the validity of cognitive assessments for elderly trauma inpatients indicated a gap between pen-and-paper cognitive assessments and functional assessments, with the former having significantly greater psychometric properties.
- A study that compared trauma patients aged over 65 receiving a targeted OT service and a Functional Conditioning Program to historical controls found that the intervention group's mean length of stay was two days less than the control group ($p = 0.04$). A higher proportion of the intervention group was also discharged to home, but this was not significant.
- A retrospective cohort study measured the impact of initial screening and treatment by a hand therapist of people referred for elective surgery for common hand conditions. A comparison between attendance ($n = 164$) and non-attendance ($n = 60$) to a hand therapy screening clinic demonstrated that 40.8% of the conservative treatment group and 65% of the no treatment group progressed to surgery, which was statistically significant ($p = 0.02$).

Current Projects

- Investigating the clinical- and cost-effectiveness of OT pre-discharge home visiting for older persons across both The Alfred and Sandringham Hospital;
- Hand therapy research, including studies in the conservative management of wrist pain and splinting for complex intra-articular finger fractures;
- A research program examining care costs and long-term outcomes of patients with TBI to provide guidance on life planning, goal setting, discharge planning and cost of attendant care;
- Study of the routine evaluation of occupational performance across the OT service, as well as a study in trauma aimed at understanding the relationship between pen-and-paper cognitive assessments and self-care assessments.

Achievements

- Associate Professor Natasha Lannin (CIG) is part of a team led by Associate Professor Dominique Cadilhac (National Stroke Research Institute) who received a \$1.2 million NHMRC Partnership Grant entitled 'STROKE 123: a collaborative, national effort to monitor, promote and improve the quality of stroke care in hospitals and patient outcomes' (2012-2014).
- Associate Professor Natasha Lannin was appointed Convenor of the 2013 Occupational Therapy Australia National Conference and Exhibition.
- Dr Lisa O'Brien was appointed to the Scientific Committee of the 2013 Australian Hand Therapy Association National Conference.
- Overall, the department had 16 oral and five poster presentations at national and international conferences.



Associate Professor Natasha Lannin administers the Cognistat (cognitive assessment test) to a patient.

Postgraduate Students

- 1 PhD Student
- 3 Masters Student
- 1 Doctor of Clinical Science

Publications

14 Journal Articles

Patient and Family Services

Head: Bridget Wall MSW, GradDipEval

The Department of Patient and Family Services includes: Social Work; Interpreters and Multicultural Services; Pastoral Care; a Volunteer Program; and Aboriginal Hospital Liaison Officers. The Social Work Service has continued to develop academic links with the University of Melbourne via a consultancy with Associate Professor Lou Harms. Associate Professor Harms' guidance has facilitated the progression of a number of research projects. Pastoral Care has continued to work on the project 'The spiritual dimensions of the experience of illness' with a pilot project nearing completion.

Chronic Illness

In collaboration with Lynda Katona of the Psychology Department, Senior Social Worker Sue De Bono continues work on two stem cell transplant related projects. One project, which also involves PhD doctoral student Brindha Pillay, assesses the relationship between sense of coherence and level of psychological distress and quality of life in haematopoietic stem cell transplant patients. The other project is 'Development of a Stem Cell Transplant Self Help Manual'.

Trauma

Preliminary work has commenced on research into supporting children visiting the Intensive Care Unit (ICU) in the context of a traumatic admission of a parent or significant family member. The purpose of the project is to understand the experiences of carers who are supporting children to visit a close family member in the ICU environment. Social workers regularly support carers in preparing children for these visits and in managing the impact of the visit. The aims of the project are to:

(i) identify the psychosocial support needs of carers of children visiting the ICU; (ii) improve the psychosocial support of children's visits to the ICU environment and (iii) develop written material for carers to assist them in their support of children visiting the ICU.

Work has commenced on a joint social work project with the Epworth Hospital around the prevalence of 'relocation stress' for patients and families moving from an acute setting to rehabilitation.



Sue De Bono, a senior social worker in Patient and Family Services, undertakes research projects in collaboration with the Psychology Department.

Physiotherapy

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

The Alfred Physiotherapy Department's areas of research strength are in physical activity and rehabilitation of hospitalised patients and people with chronic illness. We have active research programs investigating new models of rehabilitation for people with respiratory disorders, early mobilisation following surgery, physical activity in chronic disease and physiotherapy in intensive care.

Trauma

A study examining the effects of an intensive physiotherapy program for patients following trauma, led by physiotherapists Sara Calthorpe and Elizabeth Barber, found that patients who received an additional physiotherapy session every day achieved independent walking more quickly than those undergoing the regular physiotherapy program. This study, which was funded by the RACV Sir Edmund Herring Memorial Scholarship, provides some of the first robust evidence regarding the impact of physiotherapy in the acute hospital setting following trauma.

Bronchiectasis

Dr Annemarie Lee led a multisite trial examining the impact of exercise training for people with bronchiectasis. This trial, conducted at Alfred Health and Austin Health in Melbourne and Sir Charles Gairdner Hospital in Perth, found that people who undertook an eight-week exercise program had fewer pulmonary exacerbations in the year following training than those who did not do supervised exercise training. The findings of the trial were presented at the European Respiratory Society meeting in Vienna in 2012.

New Grants Awarded

Home-based Pulmonary Rehabilitation

Associate Professor Anne Holland was awarded an NHMRC Project Grant in 2012 to conduct the project 'Benefits and costs of home-based pulmonary rehabilitation in chronic obstructive pulmonary disease' with co-investigators Professor Christine McDonald (Institute for Breathing and Sleep) and Professor Ajay Mahal (Monash University). An Alfred Health and Austin Health initiative, this randomised controlled trial will compare the effects of a new, low cost model of home-based pulmonary rehabilitation with a traditional hospital-based pulmonary

rehabilitation program. It will be the first trial of home-based pulmonary rehabilitation to include an economic analysis. If successful, this new model of pulmonary rehabilitation could improve access to this important treatment for many people with chronic lung disease, who cannot currently access centre-based programs due to disability or geography.

Physiotherapy Services in the Emergency Department

In 2012, the musculoskeletal physiotherapy team, led by James Sayer and Paula Harding, was awarded \$329,000 from Health Workforce Australia and \$140,000 from the Victorian Department of Health to conduct a multisite project examining expanded scope of practice for physiotherapists in Emergency Departments (EDs). This project, in which The Alfred was appointed as a lead site, aims to implement the Alfred Health Advanced Musculoskeletal Physiotherapy service model of care in the EDs of five implementation sites across Australia. It is expected that the results of this project will evaluate the impact of advanced musculoskeletal physiotherapy services in the ED to reduce waiting times for patients, improve patient flow, and contribute to the achievement of the four-hour national access target.



Dr Annemarie Lee (R) and a participant in a multisite trial of exercise training for people with bronchiectasis.

Postgraduate Students

3 PhD Students
1 Masters Student

Publications

28 Journal Articles

Psychology

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

The Psychology Department, comprising clinical and neuropsychology services, provides best practice evidence-based services to improve the quality of life (QoL) of patients and their carers. Clinical psychologists who are attached to the Cystic Fibrosis, Oncology and HIV Services, the Hospital Admission Risk Program (HARP) as well as Alfred Psychiatry, are involved in the assessment and treatment of patients who present with psychological problems such as depression, anxiety and adjustment issues.

Black Saturday Survivors

In February 2009, Victoria experienced one of its worst natural disasters, the Black Saturday Bushfires. Seventeen people with severe burn injuries received comprehensive burns treatment at the Victorian Adult Burns Service. In conjunction with colleagues at The Alfred Burns Unit, Clinical Psychologist Dr Birgit Pfitzer investigated the level of persistent psychological distress and unmet psychosocial needs in these burns patients and their family members three years after Black Saturday.

The team found that of the bushfire survivors, 31% were still experiencing heightened levels of general psychological distress, while about a quarter displayed post-traumatic stress disorder, depression and anxiety symptoms and reduced QoL. In these persons, the course of the distress tended to persist, with higher levels of distress and poor functioning three months after the fires maintained for the following three years. Similar results were found for family members, indicating that a significant proportion of both burns patients and family members face a risk of chronic impairment in health and functioning outcomes.

A qualitative analysis of patient and family member interviews illustrated factors underpinning this chronic impairment, identifying a range of long-term issues and differences in coping strategies, supports, and meaning attributed to being a bushfire burns survivor or involved in their care. This study highlights the need for routine psychosocial screening to identify burns patients and family members at risk of long-term impairment in psychological and physical functioning. Moreover, the results stress the importance of long-term follow up beyond hospital admission.

Haematopoietic Stem Cell Transplant

Haematopoietic stem cell transplantation (HSCT) is a highly invasive procedure that is used to treat haematological cancers. Despite the well-documented psychological consequences of transplant, there has been less focus on protective factors within patients that might promote better psychosocial functioning. Lynda Katona and colleagues conducted a study to determine if various clinical risk factors, demographic factors and sense of coherence (SOC) were predictive of level of psychosocial distress in patients undergoing HSCT. Interim analyses indicated that SOC was significantly negatively associated with depression and anxiety prior to transplant and two to three weeks after transplant.

We are now conducting an adjunct study to examine the experience of HSCT patients in using a workbook provided to them prior to undergoing the transplant. Data for this pilot project will be collected through semi-structured, in-depth interviews with approximately ten patients at three months post-transplant. The findings of this study will allow feedback to be garnered about the clinical utility of the workbook as well as the clarification of possible barriers that may be encountered in the implementation of this type of intervention within a HSCT population.



Lynda Katona (Manger of Psychology) and Daniel Rylatt (Senior Clinical Psychologist, Acute Psychiatry) discuss an upcoming presentation for the International Conference on the Study and Treatment of Personality Disorders.

Postgraduate Students

1 Doctor of Clinical Psychology
1 Masters Student

Publications

6 Journal Articles
1 Book Chapter

Speech Pathology

Head: Janine Mahoney BAppSc(SpPath)

The two major areas of research for the department in 2012 have been a collaborative project with the Endocrine Surgery Department looking at voice changes following thyroid surgery and a study investigating swallowing outcomes in patients with head and neck cancer.

Head and Neck Cancer: Swallowing

A pilot study investigating the relationship between the level of compliance with a swallowing exercise program and swallowing outcomes for patients with head and neck cancer undergoing (chemo)/radiotherapy was funded by the Southern Melbourne Integrated Cancer Service. Previous studies have suggested that commencing swallowing exercises to stretch and strengthen muscles during and following (chemo)/radiotherapy may result in improved swallowing function and quality of life.

To examine the efficacy of an exercise program, 26 patients with head and neck cancer were recruited and given a swallowing exercise program two weeks prior to commencing their (chemo)/radiotherapy to be continued three months post completion of their treatment. Levels of compliance with the exercise program demonstrated that this population did not complete exercises to the prescribed intensity. Post-treatment video-fluoroscopic swallowing assessments have been completed and the effect and practicality of the exercise program on swallowing function and quality of life is yet to be analysed.

The findings of the compliance aspect of the study were presented by Amanda Dwyer at The Inaugural Conference of the Victorian Integrated Cancer Services in May 2013. The results of the completed study are due to be presented at the Australian and New Zealand Head and Neck Society Scientific Meeting in August 2013.

Thyroid Surgery and Voice Changes

A collaborative project with Professor Jonathan Serpell of the General Surgery Department, which is examining the relationship between voice changes following thyroid surgery with changes in the diameter of the recurrent laryngeal nerve during this surgery, has recruited 70 patients. Miriam Voortman, the Speech Pathology lead researcher for this project, has recorded voice profiles of each participant using objective measures obtained via the lingWAVES voice analysis system. These profiles have been obtained before surgery and one day post surgery.

A smaller cohort of 18 participants has completed a three-month post surgery assessment and a long term follow up of participants one year post surgery is about to be commenced. The participants' subjective assessment of their voice measured using a standardised scale will be compared with the objective data and clinician ratings of voice using the CAPE-V (Consensus Auditory-Perceptual Evaluation of Voice) method. The Speech Pathology Department plans to compare and analyse the ratings from each source to examine the concurrent validity of these measures.



Speech Pathologist Amanda Dwyer interprets a video-fluoroscopy swallowing study from a patient who was treated with radiotherapy for head and neck cancer.



Cardiothoracic Surgery

Acting Director: Associate Professor Silvana Marasco MBBS, FRACS, MSurg, MBioeth, GradCert(HSM)

The Department of Cardiothoracic Surgery focuses on two main research areas: improving organ preservation and reducing the incidence of primary graft failure in heart and lung transplantation. Research includes exploration of new ways to preserve donor hearts in order to improve the time the heart can be stored prior to implantation. The other area of research interest is in major chest trauma and here we report on the results of a recently completed five-year randomised controlled trial (RCT) on operative rib fixation in patients with flail chest.

Rib Fixation in Flail Chest

At the end of 2011, we completed a five-year prospective RCT comparing operative fixation of fractured ribs in ventilator-dependent patients with flail chest injury to conservative management. Operative fixation led to a five-day reduction in Intensive Care Unit stay and a \$14,000 cost saving per patient compared with outcomes observed for conservative management. The operative group also had a lower incidence of pneumonia and tracheostomy requirement. In our hospital, operative fixation has become the standard of care in patients with severely displaced fractured ribs and ventilator dependent flail chest injury. A clinical trial will commence in 2013 investigating whether operative fixation offers benefits to non ventilator-dependent patients with flail chest injury. Development of a resorbable rib fixation prosthesis is under way and has attracted significant funding.

Heart Preservation for Transplantation

An extreme shortage of donor hearts available for transplantation provides the motivation for research into methods of increasing the viability of potential donor sources. A previously untapped source of donor hearts is from patients who have died and from whom organs can be obtained in a timely fashion. This process has been particularly successful for lung donation, with 64 lung transplants at The Alfred between 2011 to 2012, of which 34% were from donation after cardiac death (DCD) donors. Currently, heart transplants from DCD donors are not performed in our unit or elsewhere in the world. DCD sources are unsuitable for heart transplants because of rapidly sustained damage to the heart after death compounded by the inadequacy of the current preservation technique of storage on ice.

Our unit has developed a technique of preserving the DCD heart by perfusion with an oxygenated nutrient-containing solution at a low temperature, which prevents further damage and potentially renders the heart suitable for transplantation. This technique has successfully been employed for eight DCD heart transplants in greyhounds. A world first achievement in late 2012 was the reanimation of an unused human DCD heart. We observed good function over a 12-hour period in the laboratory and this convinced us that DCD heart transplantation will be possible. A commercial company has been founded and government grants requested to support this work.

Cardiac Massage Therapy

A prospective randomised trial of massage therapy following cardiac surgery to reduce pain, tension and anxiety was carried out in 2011-2012, under the supervision of Dr Lesley Braun and Professor Frank Rosenfeldt. A report of this trial showing that massage reduced postoperative pain by 50% was published in the *Journal of Thoracic and Cardiovascular Surgery* (Braun *et al.*, *J Thorac Cardiovasc Surg* 2012). Following the success of the clinical trial, a massage program was established at The Alfred, which was available to relieve postoperative pain, anxiety and stress as well as improving recovery after surgery. Massage was also made available to other patients in the cardiac and other wards in the hospital. Massage was provided free of charge to the hospital by the Endeavour College of Natural Medicine academic staff and senior students.

Achievements

Professor Frank Rosenfeldt received the Royal Australasian College of Surgeons Surgical Research Award, an honour which recognises the contribution of a pre-eminent surgical scientist who has made significant contributions to surgical research.

Postgraduate Students

1 PhD Student

Publications

13 Journal Articles

Cardiologist Dr Andris Ellims reviews a cardiac MRI scan of a patient from the Hypertrophic Cardiomyopathy Clinic at The Alfred.



Cardiovascular Medicine

Director: Professor Anthony Dart BA, DPhil, BM, BCh, FRCP, FRACP, FAHA

The Department of Cardiovascular Medicine provides a full range of adult cardiology investigations and treatments with active research in all subspecialty areas. In view of the continued growth in clinical procedures and research into structural heart disease, Dr Tony Walton was appointed to a new position as Head of the Structural Heart Program. Associate Professor Andrew Taylor heads Non-Invasive Investigations, which includes Cardiac MRI (magnetic resonance imaging) and Cardiac CT (Computed Tomography), both increasingly important services for clinical and research activities. Dr James Shaw is responsible for supervision of the trainees within the department, in addition to his contribution to Alfred Health's Research Review Committee. This year, we established the first specialised clinic in Victoria for patients with hypertrophic cardiomyopathy. This clinic, headed by Dr Andris Ellims, not only fulfils an important clinical need, but has great potential for integrating our genetic, imaging and clinical research in this area.

The department has close research collaborations with several other Alfred departments as well as AMREP partners. We maintain a close interaction with Baker IDI and a significant proportion of the clinical research undertaken by Baker IDI researchers is within our department, with many staff having joint appointments. Collaborations with other departments include: ICU, particularly in relation to sudden cardiac death; AIRmed, in relation to pulmonary hypertension and sleep pathophysiology; Infectious Diseases and the Burnet Institute, particularly in relation to cardiovascular complications of HIV; Cardiothoracic Surgery; and the Biochemistry Unit of Pathology Services and the Emergency Department in relation to biomarkers.

Structural Heart Disease

Areas of interest include investigation into transcatheter aortic valve implantation using the CoreValve device. A program for occlusion of the left atrial appendage commenced using the Coherex device for patients who have atrial fibrillation (AF) and are at high risk of stroke and intolerant to Warfarin. New procedures for the treatment of refractory diastolic heart failure are being evaluated including the creation of an atrial septal defect to offload the left atrium during absence of heart failure. Follow-up continues for the PC trial involving closure of the patent foramen ovale in young patients with cryptogenic stroke.

Renal denervation for refractory hypertension continues to be a major area of interest with a Victorian Policy Advisory Committee on Technology grant of \$1 million received by Heart Centre investigators, Dr Tony Walton and Professor Markus Schlaich, for continuing treatment and research in this patient group.

Acute Coronary Syndromes

The General Cardiology Unit remains extremely busy with acute coronary syndrome (ACS) presentations. Data from the ongoing Melbourne Interventional Group (MIG) registry, which now has 19,000 entered patients and in which The Alfred has participated since 2005, show that 70% of percutaneous coronary interventions (PCI) are in patients with ACS. The Alfred has also agreed to participate in the newly formed Victorian Cardiac Outcomes Registry (VCOR). Dr Stephen Duffy is on the Steering Committees for the MIG and VCOR registries.

The department continues to participate in important international trials of novel antiplatelet and anticoagulant therapies in stable and unstable coronary artery disease. Dr Shaw and colleagues are participating in investigator-led studies of vitamin D and its relationship to coronary disease and vascular function. Other studies by Professor David Kaye and Dr Duffy include a novel device that can reduce the amount of X-ray contrast given to patients undergoing PCI, particularly in the setting of ACS. X-ray contrast can have adverse effects on renal function, with contrast-induced nephropathy (or acute kidney injury) occurring in 10 to 15% of patients.



Dr Dion Stub, a Cardiac Interventional Research Fellow at The Alfred, recently completed a PhD through Baker IDI and Monash University. Dr Stub won a 2012 Victoria Fellowship, which will see him travel to the University of Washington – Harborview Centre for Prehospital Emergency Care in Seattle, USA, to work alongside international leaders in researching cardiac emergency care.

Out-of-hospital cardiac arrest is a common cause of mortality. Over the last decade, several clinical trials have highlighted the importance of post-resuscitative care in optimising survival and neurological recovery. Recently, there have been significant advances in management including recommendations related to regional systems of care, application of therapeutic hypothermia and the utilisation of investigative procedures including emergent coronary angiography, cardiac support devices and other tools which provide prognostic information. Dr Dion Stub has recently completed his PhD studies in this area and has published extensively on how better outcomes can be achieved by improved systems of care. His publications include a position paper advocating for Cardiac Arrest Centres in Australia, along the lines of trauma centres, to optimise patient outcomes in this extremely ill group of patients (Stub D *et al.*, *Intern Med J* 2012;42(11):1173-9).

Non-invasive Imaging

Projects have continued in all the imaging modalities including cardiac MRI, CT coronary angiography and echocardiography. The department has a particular focus on cardiac MRI and a number of projects have been completed or published in 2012. Many of these have been concerned with the detection and significance of myocardial fibrosis. Although AF is primarily an abnormality of the atria, diffuse left ventricular fibrosis was identified in patients with AF, providing new insights into the association between AF and adverse ventricular remodelling. Other studies have demonstrated that following an acute myocardial infarction (AMI), there are changes not only in the infarcted region but also throughout the rest of the left ventricle, which suggests a new paradigm for adverse cardiac remodelling following AMI. Fibrosis is known to occur in left ventricular hypertrophy including in patients with primary hypertrophic disease such as hypertrophic (obstructive) cardiomyopathy. Whilst generally thought to represent the consequences of local changes, studies by Professor Tony Dart and Dr Karen Lu Fang have shown that these patients also have abnormalities in circulating white blood cells, which may contribute to the fibrotic process.

Obesity, Diabetes and Hypertension

Investigations documenting the importance of the sympathetic nervous system and its role in cardiovascular and cardiometabolic disease continued throughout 2012. Dr Nora Straznicky demonstrated that baseline sympathetic activity was predictive of successful weight loss in subjects with the metabolic syndrome and continued her investigations examining neuroadrenergic dysfunction along the diabetic continuum. In related work, Professor John Dixon outlined the clinical predictors of glycaemic response to gastric bypass surgery in patients with type 2 diabetes. Additionally, in association with sleep and surgical colleagues on campus, an investigation evaluating surgical versus conventional therapy for weight loss on obstructive sleep apnoea was completed and published in the *Journal of the American Medical Association* (Dixon JB *et al.*, *JAMA* 2012;308(11):1142-9).

Therapeutic studies on the sympathetic nervous system related to the effects of renal sympathetic denervation, following on from the pioneering initial studies of Dr Tony Walton, Professor Murray Esler and Professor Henry Krum, published in *The Lancet*. In a series of further investigations, Professor Markus Schlaich and others are investigating the physiological consequences of this procedure and its possible role in related diseases such as chronic renal disease and, with Associate Professor Peter Kistler, atrial fibrillation.

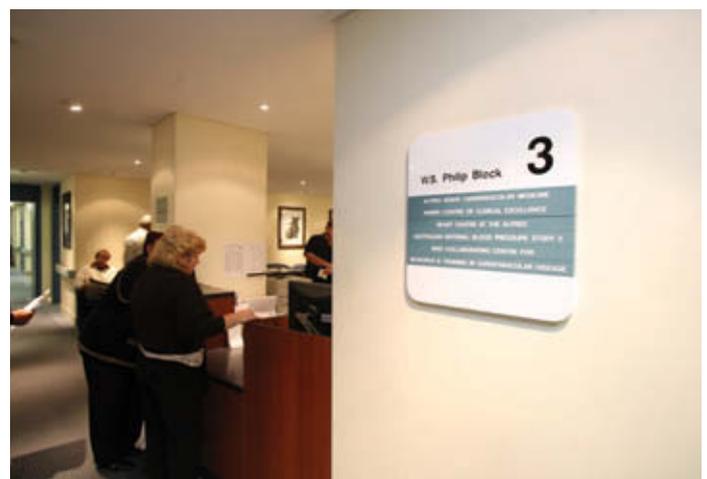
Vascular Disease

Studies by Professor Bronwyn Kingwell and Dr Peter Blombery in collaboration with other colleagues have shown that treatment with the ACE inhibitor ramipril improves the distance able to be walked by patients with narrowing of their peripheral arterial circulation. The findings have been published in the *Journal of the American Medical Association* (Ahimastos AA *et al.*, *JAMA* 2013;309(5):453-60). Professor Kaye, in collaboration with clinicians at the Royal Melbourne Hospital, commenced a world first trial of antibiotic delivery via a novel technique termed isolated limb perfusion for patients with severe limb infection. This study draws upon the successful development of a regional drug system by Professor Kaye, in collaboration with Osprey Medical which he co-founded.

Other studies have examined the role of lipid abnormalities and alterations in immune activation in the development of carotid artery disease in patients with HIV, and the role of inflammation in modifying peripheral vascular properties in patients with rheumatoid arthritis and inflammatory bowel disease. These studies have been possible through close collaboration with the relevant clinical departments as well as other AMREP institutions.

Awards and Prizes

- Professor David Kaye became the department's second NHMRC Senior Principal Research Fellow (2013-2017).
- Dr Nay Htun and Dr Alex McLellan were awarded NHMRC Postgraduate Fellowships to commence in 2013. Dr McLellan's fellowship will be co-funded by the Heart Foundation.
- Dr Will Chan and Dr Geoff Lee secured NHMRC Neil Hamilton Fairley Fellowships allowing them a period of overseas research training to be followed by a period of supported research within the department.
- Dr James Hare delivered the 14th WCC Research Investigatorship Lecture entitled 'Advances in tissue characterisation with cardiac MRI' at the 2012 Cardiac Society of Australia and New Zealand (CSANZ) 60th Annual Scientific Meeting in Brisbane.
- Professor David Kaye was awarded the 2012 Australian Museum Eureka Prize for Medical Research Translation for his developmental work on cardiac devices.



Postgraduate Students

12 PhD Students
1 MD Student

Publications

69 Journal Articles
1 Book Chapter



TheAlfred



Professor Ken Thomson received the Gold Medal from the American Society of Interventional Radiology as international recognition for his leadership, contribution and pioneering work in interventional radiology.

Diagnostic and Interventional Radiology

Head: Professor Kenneth Thomson MD, FRANZCR, FRCR

The Radiology Department delivers diagnostic and interventional procedures using state-of-the-art facilities, including robotic digital radiography, low radiation dose computed tomography (CT) and 4D obstetric scanning. Routine, specialist and research services span all medical disciplines including emergency/trauma, intensive care, cancer services, respiratory medicine, neurosurgery and psychiatry.

Imaging has an essential role for diagnosis, monitoring of subsequent therapy and for performing minimally invasive procedures.

Consequently, a broad range of research including collaborative projects with other Alfred departments and commercially sponsored device trials are conducted in the department. Research focuses on improving patient care and clinical practice through evidence based medicine, working with the biomedical industry to facilitate and expedite innovation and translational research into clinical practice as well as promoting improvements in health service delivery.

In 2012, we welcomed bioengineer Dr Robert Neal II to the Radiology Research Unit. Dr Neal has been funded for two years through the Whitaker International Fellows and Scholars Program in the United States and brings his pioneering work and expertise in irreversible electroporation (IRE).

Focal Treatment of Tumours

IRE is a minimally invasive procedure used for the targeted ablation of focal tumours that cannot be removed surgically or with other standard ablation procedures. Removal of the tumour can be achieved without damaging adjacent vital structures with minimal side effects. Post-procedure recovery is usually within 24 hours with minimal pain relief needed. A study performed in collaboration with the Hepatology team revealed that the efficacy of IRE was at least equivalent to standard ablations for hepatocellular carcinoma. Efficacy of the technique has also been shown in a case of hepatic epithelioid hemangioendothelioma. We have also commenced a study investigating the use of IRE for prostate cancer.

Interventional Radiology

Collaborative research projects include: the management of pulmonary embolus in the trauma setting and use of vena cava filters; splenic artery embolisation; uterine artery embolisation; and non-traumatic subarachnoid haemorrhage in current neurosurgical practice is being reviewed. Two first in man commercially sponsored device trials have been conducted, one on an inferior vena cava filter with a dissolvable component and a fully resorbable non-metallic stent for vascular disease in the superficial femoral artery.

Diagnostic Imaging

Two studies are being conducted evaluating the benefit of magnetic resonance imaging (MRI) and its impact on clinical management. One study is assessing the accuracy of MRI in predicting whether best outcomes would be achieved with non-surgical clinical management or surgical intervention for posterolateral corner ligamentous injuries of the knee. The other study is assessing the role of MRI in the detection of facet joint injuries.

Radiation Safety

Reducing the radiation dose exposure to patients undergoing imaging procedures or regular scans to monitor disease is an ongoing area of research in the department. In 2012, dose reference levels in angiography were determined and benchmarked. We also investigated new CT imaging protocols of the chest-abdomen-pelvis for cancer patients having scans to monitor response to therapy and disease progression. It is predicted that the new protocol will reduce the radiation dose by 25% per scan.

Achievements and Awards

In 2012 Professor Ken Thomson was recognised locally and internationally for his leadership, pioneering work and contribution to radiology. He was named a Distinguished Fellow of the Cardiovascular and Interventional Radiology Society of Europe for exceptional contributions to the practice and science of Interventional Radiology. He was awarded the 2012 Gold Medals of both the Asian Oceanian Society of Radiology and the Asia Pacific Society of Cardiovascular and Interventional Radiology for excellence and lifetime achievement in interventional radiology. Professor Thomson has also been selected to receive the Gold Medal of the American Society of Interventional Radiology for 2013.

Postgraduate Students

5 Masters Students

Publications

12 Journal Articles
1 Book Chapter



Emergency Physician and PhD student Dr Gerard O'Reilly (L), Research Nurse Emma Newton-Brown and BMedSc Honours student Daniel Epstein discuss the Australian Thoracic and Lumbar Spine (ATLAS) study.

Emergency and Trauma

Director: Dr De Villiers Smit MBChB, FACEM

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.

The ETC concentrates on research in the areas of pre-hospital care, emergency medicine and trauma resuscitation focusing on improving safety, satisfaction and quality. There is an emphasis on education towards research methods, evidence-based medicine and international development of emergency medicine.

The ETC is a participant in the Monash Partners Academic Health Sciences Centre under the critical care, trauma and perioperative medicine theme.

Research Highlights

- The Safe Elderly Emergency Discharge (SEED) project, funded by The Alfred Research Trusts, commenced enrollment in 2012 and follow-up of patients remains on schedule. The study aims to determine whether current models of emergency care ensure safe discharge, facilitate optimal health outcomes for older patients and develop a tailored evidence-based care framework applicable to Australian and international settings.
- The RINSE study, which compares pre-hospital rapid infusion of cold normal saline given during cardiopulmonary resuscitation versus standard management (i.e. hospital cooling in patients suffering out-of-hospital cardiac arrest) continued recruitment in 2012.
- The Transfusion Research Improving Outcomes (TRIO) project has resulted in the development of new clinical registries and existing registry linkages, statistical modelling of community needs and transfusion practice quality, mapping of the human factors associated with transfusion medicine practice and management of acute traumatic coagulopathy (ATC). TRIO has been funded by an NHMRC Partnership Grant with the Victorian Department of Health and in-kind support from Monash University and the Australian Red Cross Blood Service.
- The ETC has recruited patients for both the ARISE and POLAR studies. ARISE is an Australasian multicentre, randomised controlled trial (RCT) of the effect of early goal-directed therapy compared to standard care in patients presenting to Emergency Departments (EDs) with severe sepsis. POLAR is an RCT investigating if early therapeutic cooling of patients with severe (GCS<9) traumatic brain injury is associated with better outcomes at six months.

Key Publications

- A team led by Professor Peter Cameron reviewed measures of trauma team performance and published findings in the *British Journal of Surgery*. The team continues to develop an agreed set of valid, reliable and evidence-based standardised performance indicators.
- A team led by Dr Smit visited EDs in the UK and published valuable insights and comparative reports with the Australian system in the *Medical Journal of Australia*. This work laid the foundation to changes in the model of care for emergency services at Alfred Health.
- Dr Judy Lowthian's work on the SEED project resulted in multiple publications towards improving care of the elderly emergency patient.
- Dr Biswadev Mitra's work on the TRIO project resulted in multiple publications in the field of ATC, including an invited editorial in *The Lancet*.
- Dr Helen Ackland published work on the management of trauma patients with cervical spine injury. Her work outlines strategies aimed at improving physical and psychological function, which may optimise long term recovery, reduce health resource costs and maximise economic productivity through early return to work.
- Dr Gerard O'Reilly continued work on development and effective governance of global trauma systems, highlighting the disparity in trauma registry activity between the most and least developed countries.

Achievements

- Dr Conor Deasy and Dr Biswadev Mitra were awarded PhDs by Monash University.
- Professor Russell Gruen was awarded a \$1.6 million NHMRC Project Grant for the PATCH (Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage) study to investigate the effect of pre-hospital tranexamic acid on severely injured patients.
- A trial of the safety of haemoglobin-based oxygen carriers in the pre-hospital setting to be led by Associate Professor Mark Fitzgerald received an industry grant from OPK Biotek of \$250,000.

Postgraduate Students

1 PhD Student
5 Masters Students

Publications

51 Journal Articles
1 Book Chapter

CT scans showing dramatic decreases in thyroid cancer metastases in the lung after treatment with lenvatinib.

Before



After



Endocrinology and Diabetes

Director: 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 in the areas of diabetic complications and regulation of growth factor activity.

Mechanisms of Diabetic Complications

Professor Leon Bach

Patients with diabetes develop complications including damage to the blood vessels, eyes, nerves and kidneys. Although high glucose levels are necessary for the development of these complications, the precise mechanisms remain incompletely understood. Professor Leon Bach's laboratory is studying the role of proteins that are modified by glucose (AGEs). In particular, his laboratory has identified a novel interaction between AGEs and the ezrin, radixin and moesin (ERM) proteins that are important for maintaining cell shape and function. Current studies are aimed at identifying the role of this interaction in mediating diabetes-induced tissue damage. In 2012, the group studied the role of ERM proteins in podocytes, which are cells within the filtering apparatus of the kidney.

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 disease states, including growth disorders, diabetic complications, and cancer. A family of six IGF binding proteins (IGFBPs) regulates the actions of IGFs. For many years, the laboratory has been focusing on the biological role of IGFBP-6, particularly its role as an IGF-II inhibitor in cancer. These studies may lead to a new class of therapies aimed at modulating the IGF system. The group has previously shown that IGFBP-6 promotes migration of cancer cells but decreases blood vessel growth in an IGF-independent manner. In 2012, the group pursued a number of key interactions that may underlie these IGF-independent actions of IGFBP-6.

Clinical Trials in Diabetes and Thyroid Care

Professor Duncan Topliss

- **ADVANCE-ON** is a long term follow-up of participants in the now concluded **ADVANCE** trial in type 2 diabetes. It seeks to provide evidence of a late benefit (legacy effect) of tight glycaemic control versus standard control in macrovascular disease prevention.
- The **ORIGIN** study tested the effect of early insulin therapy using the new long-acting analogue glargine insulin to prevent macrovascular disease in type 2 diabetes. Trial results presented in 2012 demonstrated that there was no cardiovascular benefit from early insulin therapy. However, strong evidence of the safety of long-term glargine insulin was obtained, which is of relevance since some epidemiological studies had previously suggested a possible cancer risk.
- The **HOPE** study (Phase 2), which concluded in 2011, examined the effects of a novel vascular endothelial growth factor/multikinase inhibitor (E7080; lenvatinib) in advanced thyroid cancer and suggested benefit. We are now one of three Australian trial sites for **SELECT**, a Phase 3 randomised placebo-controlled trial of this agent, currently in progress.

Diabetes in Lung Transplant Recipients

Dr Kathryn Hackman and Professor Leon Bach

In collaboration with Professor Greg Snell, Head of the Lung Transplant Unit, we documented a surprisingly high incidence of diabetes in patients on the lung transplant waiting list. We have further shown that diabetes is associated with worse outcomes in transplant patients.

Achievements

Professor Leon Bach was awarded a Diabetes Australia Research Trust grant for his research 'The role of ezrin in podocyte damage due to glycosylated proteins'.

Postgraduate Students

1 MD Student

Publications

15 Journal Articles



PhD students Simone Peters (L) and Emma Halmos at the 2012 Australian Gastroenterology Week. Emma received the 2012 Douglas Piper Young Investigator Award.

Gastroenterology

Director: Professor Peter Gibson MD, FRACP

The Gastroenterology Department engages in four major areas of research, namely, hepatology, endoscopy, inflammatory bowel disease and translational nutritional science. Hepatology focuses on the optimisation of the management of chronic liver disease (especially chronic viral hepatitis and primary liver cancer), including the clinical utility of Fibroscan and outcomes of radioablation in hepatocellular cancer. A large clinical trial program is ongoing for chronic hepatitis C.

Endoscopy focuses on improving safety and quality of colonoscopic practice, colorectal neoplasia in cystic fibrosis and safety and quality in polypectomy. Inflammatory bowel disease research includes studies on optimising thiopurine therapy, with a focus on the use of allopurinol to improve efficacy and counteract side effects, and on the clinical utility of measurement of anti-TNF drug levels and intestinal ultrasound. The Translational Nutritional Science Group studies diet as a therapy in chronic intestinal disorders and implementing new approaches in the community.

Translational Nutritional Science

Low-FODMAP Diet

A major randomised controlled cross-over study of the low-FODMAP (fermentable oligosaccharides, disaccharides, monosaccharides and polyols) diet in patients with irritable bowel syndrome (IBS) was completed. Previous studies and clinical practice had suggested effectiveness in the majority of patients with IBS and this study provided high quality evidence to confirm the low-FODMAP diet as an effective strategy for the treatment of IBS. Long term safety aspects of the diet were also assessed by examining effects of low-FODMAP on the colonic microenvironment. The bacterial profile of the colonic contents changed to one that might hypothetically have health implications in the longer term, highlighting that the strict diet is not recommended for life and FODMAPs should not be avoided for health reasons other than having troublesome gut symptoms.

Implementation of the low-FODMAP diet to the community was enhanced by the release of the Monash University low-FODMAP diet smartphone app that enables patients and health providers to access information on how to follow the diet and the latest data from our laboratory-based food analysis. This was a major advance in the ability to use the diet in practice across the world.

Is Gluten Associated with Gut Symptoms?

A major study addressing the question of whether gluten can cause gut symptoms in people without coeliac disease was completed. Jessica Biesiekierski and Simone Peters led a randomised controlled trial, in which those who self-reported marked improvement in their symptoms on a gluten-free diet were put on diets for one week each that contained high gluten, low gluten or no gluten in a sequential manner. The key result was that there was no evidence of gluten-specific stimulation of gut symptoms. This is likely to create major controversy across the world since enthusiasm for the concept of 'non-coeliac gluten sensitivity' is growing, based on marketing of ideas rather than science. It is only the second scientifically valid clinical trial performed in this important area with the first pilot study also emanating from our group.

Hepatology

In a joint collaboration with the Department of Radiology, Professor Stuart Roberts led a study into the new technique of irreversible electroporation as treatment for unresectable hepatocellular cancer. The paper published on this was the first exploration of the safety and feasibility of this technique and provides key evidence for it to become established as a means to deal with difficult tumours that have a rising incidence in our community.

Achievements

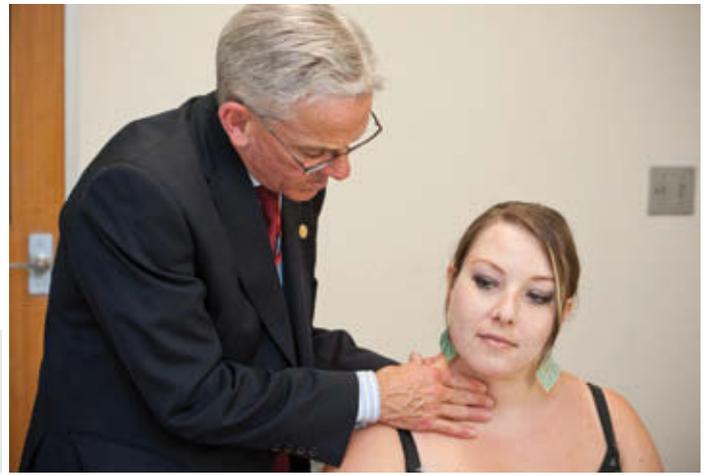
- Professor Peter Gibson (CIA) and Dr Jane Muir (CIB) secured an NHMRC Project Grant commencing funding in 2013 to study the use of enzymes as an adjunct to the low-FODMAP diet.
- PhD student Emma Halmos was presented with the 2012 Douglas Piper Young Investigator Award for clinical research at the Australian Gastroenterology Week of the Gastroenterological Society of Australia for her lead role in the low-FODMAP diet research.
- PhD student Simone Peters won the Best Poster Award and PhD student Jessica Biesiekierski won the Best Oral Presentation at the 2nd International Science of Nutrition in Medicine Conference.
- CK Yao won a New Conference Presenter Award at the International Dieticians Congress.

Postgraduate Students

8 PhD Students
1 MD Student

Publications

27 Journal Articles
2 Book Chapters



Professor Jonathan Serpell examines a patient with a thyroid condition.

General Surgery

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

The General Surgery Department is committed to clinical and translational research, databases, clinical registries, clinical trials and audit and quality assurance processes.

Breast, Endocrine and General Surgery Unit

The unit undertakes research into breast cancer, oncoplastic breast surgery and endocrine surgery including thyroid, parathyroid and adrenal surgery. The unit has a dedicated thyroid cancer registry and databases on parotid surgery and soft tissue tumours.

Recurrent Laryngeal Nerve (RLN) anatomy and physiology is the research focus of the Endocrine Unit. Our studies have shown a significant incidence of bifurcation of the RLN and that the motor fibres to the larynx are in the anterior branch of the nerve. Changes observed in RLN diameter during thyroid surgery are unrelated to the temporary changes in voice following thyroidectomy. Five-year analysis of RLN palsy rates have shown a low incidence and confirm the increased likelihood in re-operative surgery for benign conditions and for primary malignancy.

Thyroid Cancer (TC) diagnosis, including cytology and management is the Endocrine Unit's second major area of interest. Several studies indicated an increased incidence of papillary TC in patients with Graves' disease, an association of thyroid antibodies predicting TC in benign nodules by cytology, and an analysis of thyroid nodules with suspicious cytology and the likelihood of subsequent TC.

Elective Surgery outcomes in organ transplant patients were investigated and elective surgery was found to be safe in this patient group with no significant increased risk of morbidity or mortality compared to non-transplant patients undergoing similar surgery.

The Upper Gastrointestinal (UGIS) Unit

The UGIS Unit has databases in hepatectomy, pancreatic surgery, oesophagectomy, gastrectomy and bariatric surgery. The unit has a specific interest in tracking and assessing surgical quality. The unit collaborates with investigators from Monash University Physiology, Baker IDI and Monash School of Public Health and Preventive Medicine.

- In 2011, the UGIS Unit began objectively grading surgical complications using the Clavien-Dindo classification system and results were presented at the 2012 annual audit.
- The Hepatobiliary surgeons were involved with a multicentre trial of a novel haemostatic agent to be used in liver surgery.
- The Oesophagogastric Cancer Database led to two presentations at national conferences by our Fellow and Registrar, one focusing on the quality of surgery and the other on the appropriateness of preoperative staging.

- The bariatric multidisciplinary clinic commenced with a novel pre-hospital, pre-conditioning program. Outcomes of this program are being prospectively evaluated. The Alfred was also the initial pilot site for the binational bariatric surgery register.

The Colorectal Unit

The unit has developed an international reputation for expertise in transanal endoscopic microsurgery and we recently reported a case of segmental rectal resection with rectosigmoid anastomosis using this technique. The video of this procedure has been adopted by the American Society for Colorectal Surgeons as a formal educational tool in their online CREST program.

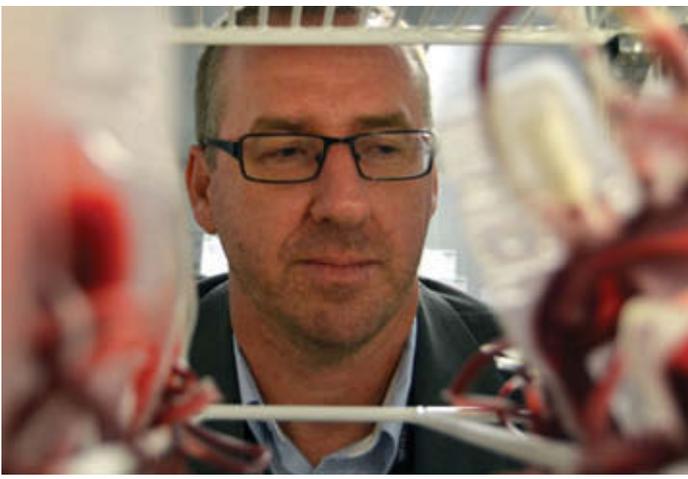
The Colorectal Unit had two papers accepted for presentation at the American Society for Colorectal Surgeons meeting in 2013. The first is an epidemiological study of colorectal cancer incidence in Victoria over the last ten years, which reports that there has been a significant increase in the incidence of colorectal cancer in younger age groups. The second paper reports an increased incidence and virulence of *Clostridium difficile* infection of the colon in hospital and community patients in Melbourne. A survey of health workers demonstrated that an educational program improved management and reduced cross-infection of the infection in hospital patients.

Awards

- Professor Jonathan Serpell was the distinguished and invited lecturer for Endocrine Surgery at the Annual Scientific Congress of the Royal Australasian College of Surgeons in Kuala Lumpur in 2012 and delivered four invited keynote lectures.
- Dr Holly Keane was awarded the Henry O'Hara Surgical Research Award to investigate the management of positive sentinel lymph nodes in breast cancer.
- Registrar Dr Geraldine Ooi won the Obesity Surgery Society of Australia and New Zealand Young Investigator prize for her paper entitled 'Management of symmetrical pouch dilatations after laparoscopic adjustable gastric banding surgery'.
- Fellow Dr Adam Chicowitz won the Alfred Health DS Rosengarten Surgical Trainee Research Prize for his paper entitled 'Nodal yield after oesophageal surgery'.

Publications

7 Journal Articles
1 Book Chapter



Dr Chris Bain, Director of Health Informatics, has been involved in the Clinical Outcomes Prediction Project, a collaboration between Alfred Health and Austin Health.

Health Informatics

Director: Dr Chris Bain MBBS, MIT, MACS, FACHI

The Health Informatics (HI) Department at Alfred Health was established in early 2011 and is one of the four departments that make up the Information Development Division. One of the key objectives of the department is to ensure that the organisation achieves full value from one of its key corporate assets – its data. In keeping with this objective, the department is involved in research of its own, as well as acting as a provider of key and unique data sets in support of the research of other hospital departments.

As the core function of the HI Department is to maintain and expand upon the corporate ‘info-structure’, this renders it uniquely placed to assist other departments with their endeavors in the research domain. Future directions in this regard include building a stable, accessible platform for data access for research.

Clinical Outcomes Prediction Project

The Clinical Outcomes Prediction Project has been run in conjunction with the Austin Hospital, the University of Melbourne, and the Intensive Care Unit (ICU), Emergency and Pathology Departments at Alfred Health. This project is a good example of leveraging existing corporate data for greater benefit. The project has examined how a handful of common laboratory test results, along with age, allow the prediction of imminent (in the next 24 hours) adverse outcomes in hospital patients – including death, unplanned ICU admission and the occurrence of a MET (medical emergency) call. Two peer reviewed papers published in the journals *Resuscitation* (Loekito *et al.*, *Resuscitation* 2013;84(3):280-5) and *Emergency Medicine Australasia* (Loekito *et al.*, *Emerg Med Australas* 2013;25(2):132-9) have resulted from the work. The theoretical work has extended to the trial of an operational alert system at Austin Health.

Health Informatics Visualisation Engine

The Health Informatics Visualisation Engine project is a collaborative effort between the HI Department, the Clinical Performance Unit and the CSIRO, and was approved by the Alfred Human Research Ethics Committee in 2012. The project aims to produce unique data visualisations by examining common, routinely collected data sets, to in turn obtain greater insights into the lessons held within the data. It is expected to assist in gaining quality and efficiency insights in relation to high volume and high cost patient groups.

Research Fellow in Health Informatics

In 2012, the first Research Fellow in Health Informatics was appointed: Dr Choi Kwan, a practising GP and postgraduate student in IT. Choi's project work has been conducted in conjunction with the Emergency

and Radiology Departments. Choi's project was designed to produce a white paper looking at radiology ordering practices and ‘yield’, specifically in the area of abdominal imaging in Emergency patients. He has also benchmarked against services at the Royal Melbourne Hospital and the Austin Hospital.

Health Informatics Intern

Christian Simon visited the department as an intern in Health Informatics. He is an advanced Medical Informatics student from the Mannheim University of Applied Sciences in Germany and his project involved examining ‘bridging technologies’ for data capture into electronic documents. Examples included scanning, optical character recognition, smart pens and smart electronic forms deployed on iPads. Christian also produced a prototype smart Microsoft Word document system to demonstrate a proof of concept to clinicians and other stakeholders.

Rehabilitation and Aged Care Service

The department participated in an evaluation of one of its developed technologies – the Rehabilitation and Aged Care Service Dashboard. The evaluation was performed by advanced IT students from Monash University under the direction of Professor Frada Burstein. The evaluation team was led by Morgan Preistnall and it expected that it will be published in 2013.



Postgraduate Students

1 PhD Student



Professor Jamie Cooper in
the Intensive Care Unit.

Intensive Care and Hyperbaric Medicine

Director: Professor Carlos Scheinkestel MBBS, FRACP, FCICM

Head of Research: Professor Jamie Cooper BMBS, MD, FRACP, FCICM

Research conducted by The Alfred Department of Intensive Care and Hyperbaric Medicine includes traumatic brain injury, trauma, sepsis, resuscitation, acute lung injury, transfusion, nutrition, renal failure, extracorporeal membrane oxygenation (ECMO) and Intensive Care Unit (ICU) outcomes. In 2012 research publications focused on cardiac arrest and resuscitation, nutrition, ECMO and hypothermia therapy, with ten of the department's consultants publishing research papers.

The department benefits from the AMREP co-location and linkage with the Australian and New Zealand Intensive Care Research Centre within the Monash School of Public Health and Preventive Medicine (SPHPM) and with the Monash Central Clinical School through the Monash Partners Academic Health Science Centre. In 2012, the department had one NHMRC Practitioner Fellow and two Alfred-Monash Practitioner Fellows.

Significant Findings

- A pilot study established feasibility of a 5000 patient randomised controlled trial comparing standard issue transfusion to fresher red blood cell use in intensive care (TRANSFUSE-RCT). The trial is now in progress and it is expected that the findings will have immediate relevance for translation into practice.
- Intracranial hypertension was found to be the cause of increased mortality after albumin resuscitation of head injury patients.
- An automated cardiopulmonary resuscitation (CPR) device was tested and found to have immediate clinical application.

Awards and Prizes

- Associate Professor Stephen Bernard received the 2012 Frank McDermott Award for the study 'Pre-hospital rapid sequence intubation improves functional outcome for patients with severe traumatic brain injury: a randomised, controlled trial' (Bernard S *et al.*, *Ann Surg* 2010;252(6):959-65). The award recognises a research study completed and published in the last ten years that is judged to have led to the greatest improvements in care of severely injured patients in Australia or New Zealand.

- In The Alfred ICU Trainee Research Awards, Dr Cécile Aubron (Austin Hospital) was awarded first prize for her presentation 'Does the duration of blood storage impact on the prognosis of critically ill patients - a multicentre observational study?' and second prize was awarded to Dr Paolo Calzavacca (Austin Hospital) for the study 'Regional perfusion and oxygenation of the kidney in an ovine model of severe sepsis with hypotension and kidney injury'.
- Professor Jamie Cooper received the 2012 AMREP Research Prize as the lead author of the study 'Decompressive craniectomy in diffuse traumatic brain injury' published in the *New England Journal of Medicine* in 2011. The prize is awarded to an original research paper published in the previous year in the journal with the highest impact factor.

Major NHMRC Grants

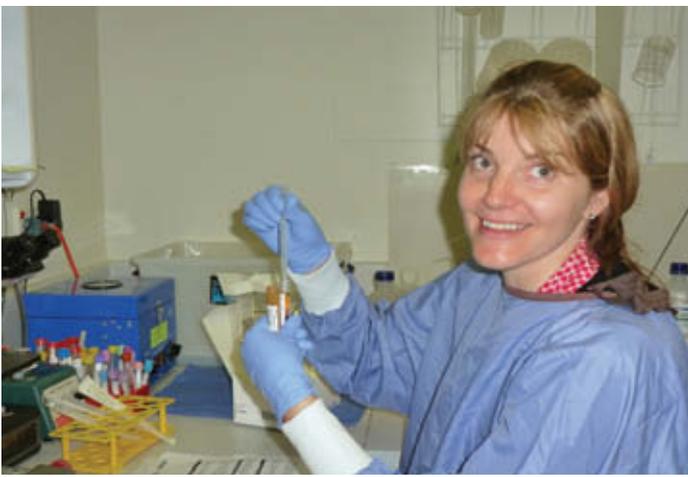
- A \$2.5 million Centre of Research Excellence for Patient Blood Management in Critical Illness and Trauma was awarded to Professor Jamie Cooper (CIA) and co-investigators L Phillips, R Bellomo, P Cameron, M Reade, J Isbister, C French, P Myles, S Webb and J McNeil (2012-2017). The grant will support research trials of fresh red blood cells, blood component therapies, measures to optimise blood usage and a national register to monitor practices and translation of new findings.
- A \$2.7 million Project Grant for TRANSFUSE-RCT was awarded to Professor Jamie Cooper (CIA) and co-investigators A Nichol, C French, A Street and R Bellomo (2012-2015).
- A \$1 million Project Grant for PHARLAP-RCT, a multicentre RCT of open lung strategy including permissive hypercapnia, alveolar recruitment and low airway pressure in patients with ARDS, was awarded to Associate Professor Alistair Nichol and co-investigators AR Davies, CA Hodgson, A Bersten, J Fraser and DJ Cooper (2012-2015).
- A \$1.6 million Project Grant for the PATCH (Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage) study was awarded to Professor Russell Gruen and co-investigators B Mitra, S Bernard, I Jacobs, R Medcalf, M Reade and H Tran (2013-2017).

Postgraduate Students

6 PhD Students

Publications

74 Journal Articles
7 Book Chapters



Research Nurse Hayley Burrige processes a patient's trial bloods to be sent for screening to a central laboratory in Singapore as part of a melanoma trial.

Medical Oncology

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

The Medical Oncology Unit incorporates a large clinical service with active research programs and provides a coordinated multidisciplinary approach to care of patients with malignancies. An important component of this care is clinical trials and research. The Medical Oncology Unit's main areas of research are in melanoma and gastrointestinal malignancies. The department also continues to conduct clinical trials investigating new drug therapies such as chemotherapy and targeted systemic therapies for patients with cancer.

Below we report on three studies, two in melanoma and one in pancreatic cancer, which are likely to result in changes to clinical practice and benefit future Alfred Health patients.

Clinical Trials

Melanoma

Our department was a major recruiter for two large Phase 3 melanoma studies that have recently reported positive outcomes. The first was an open-label, multicentre, Phase 3 trial of ABI-007 (abraxane) versus dacarbazine in previously untreated patients with metastatic melanoma. Treatment with ABI-007 achieved a statistically significant improvement in progression free survival of patients with metastatic melanoma compared to standard dacarbazine chemotherapy.

The Alfred was a major contributor to this study and our principal investigator Dr Andrew Haydon is co-author on a manuscript which will be published in the *Journal of Clinical Oncology* in 2013.

The second important melanoma study that we conducted in 2012 was a Phase 3, randomised, open-label study comparing the MEK inhibitor trametinib to chemotherapy in treatment-naïve, BRAF mutation-positive melanoma patients. This was the first study to show an overall survival improvement with the use of a MEK inhibitor and has led to further studies evaluating the efficacy of combination therapy with a MEK inhibitor and BRAF inhibitors.

We are currently recruiting to melanoma trials in both the advanced and adjuvant settings. Open trials include: (i) a Phase 3, randomised, open-label study comparing the combination of BRAF inhibitor dabrafenib and the MEK inhibitor trametinib to the BRAF inhibitor vemurafenib in subjects with advanced (stage IIIc) or metastatic (stage IV) BRAF V600E/K mutation-positive melanoma and (ii) a Phase 3, randomised, double-blind study of dabrafenib in combination with trametinib versus placebo in the adjuvant treatment of high risk BRAF mutation-positive melanoma after surgical resection.

Pancreatic Cancer

We were involved in the IMPACT study, another important study that has reported positive findings. This was a Phase 3, randomised trial of weekly ABI-007 plus gemcitabine versus gemcitabine alone in patients with metastatic adenocarcinoma of the pancreas. The trial demonstrated a statistically significant improvement in overall survival for patients with metastatic pancreatic cancer treated with ABI-007 in addition to gemcitabine compared with single agent gemcitabine. Results were reported at the American Society of Clinical Oncology Gastrointestinal Cancer Symposium in January 2013.



Publications

5 Journal Articles



TheAlfred



Associate Professor John Kelly (back row, 3rd from right) with the Victorian Melanoma Service Team.

Melanoma Service

Head: Associate Professor John Kelly MBBS, MD, FACD

The Victorian Melanoma Service is one of Australia's major multidisciplinary tertiary referral treatment centres for melanoma and has been running at The Alfred for 19 years. We conduct a clinical trials program for melanoma in surgery, radiation and chemotherapy. An active research program is supported by an extensive database of 7,000 patients and a tissue banking program for genetic and molecular research.

A key focus of our research program is to shed light on a group of less common melanomas with unusual presentations that frequently become advanced because of failure of diagnosis. We have recently shown that these melanomas are responsible for half of the deaths from melanoma in Victoria. A better understanding of these tumours has the potential to prevent many deaths from melanoma.

Melanoma Mitotic Rate and Prognosis

Accurate identification of patients at risk of developing aggressive melanomas that carry poor prognosis is important. Recent attention has turned to the significance of tumour cell division (mitotic activity) as a predictor of clinical outcomes. Dr Sarah Shen has been investigating the associations and significance of high mitotic rate melanoma. Her study found that high mitotic rate melanoma was predominantly nodular in type, affecting mainly older men and occurring mostly on the head and neck. These tumours were most likely to be first detected by patients themselves. High mitotic rate tumours were correlated with poor prognosis and the role of mitotic rate in relation to other prognostic markers was explored.

Low mitotic rate melanomas were predominantly 'superficial spreading' in type and are more likely to be seen in patients with a family history of melanoma. A better understanding of the patients who are at risk of developing aggressive melanomas is gained from the current study. This carries implications for how we can accurately detect and optimally manage this group of patients. The study provides a better capacity to predict outcome for individual patients with melanoma.

Diagnosis of Rarer Melanoma Subtypes

The Victorian Melanoma Service sees a range of patients with both common variety superficial spreading melanomas as well as rarer melanoma subtypes such as nodular and desmoplastic melanoma. Recent work at the Victorian Melanoma Service from PhD student Dr Victoria Mar has shown that these rarer subtypes make a disproportionately large contribution to melanoma mortality in Australia. They also have atypical clinical features that can make them challenging to diagnose. At present, diagnosis is frequently delayed, leading to a large number of potentially preventable deaths.

Dr Matthew Lin has been investigating the accuracy of clinicians in diagnosing these rarer melanoma subtypes. This study found that rates of misdiagnosis of nodular and desmoplastic melanoma were high and that this was partly explained by the strong association of these subtypes with lack of pigmentation. While only 23% of superficial spreading melanomas were misdiagnosed, 59% of nodular melanomas and 79% of desmoplastic melanomas were misdiagnosed. Unfortunately, relatively little attention has been given to the distinctive clinical presentations of nodular and desmoplastic melanoma. This study provides support for the role of increased clinician education, awareness and experience in improving the accuracy of diagnosis for rarer melanoma subtypes.

Ongoing and New Awards

- Dr Sarah Shen was awarded an Australian Postgraduate Award through Monash University (2012-2013) for her MPhil to conduct research on the significance of mitotic rate in primary melanoma.
- Dr Victoria Mar continued research addressing 'Clinical and molecular characteristics of nodular melanoma' as part of her NHMRC Postgraduate Scholarship, which commenced in 2011.
- Dr Martin Haskett and Dr Sarah Hannam received a grant for 2012-2013 from the Victorian Department of Human Services for a Melanoma Survivorship Study.
- The Victorian Melanoma Service continued as a partner in the \$3.5 million Victorian Cancer Agency funded Melbourne Melanoma Project: Translating Advances in the Science of Melanoma to Better Patient Outcomes (2009-2013).

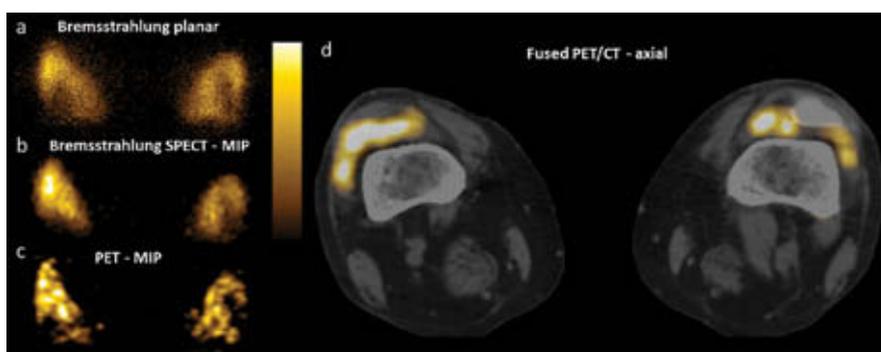


Postgraduate Students

- 1 PhD Student
- 1 Masters Student

Publications

- 4 Journal Articles



This image of a novel PET/CT scan of the knees post ⁹⁰Y administration was awarded 'Image of the month' by the European Journal of Nuclear Medicine and Molecular Imaging in May 2012.

Nuclear Medicine

Head: Professor Victor Kalff BMedSc(Hons), MBBS, FRACP, FACC

The department's long standing and continued objective has been to provide a comprehensive and timely clinical nuclear medicine service. A wide range of clinically relevant studies are available including bone, lung, cardiac and ¹⁸F-FDG-positron emission tomography (PET) scans. The department has a strong teaching role in training nuclear medicine specialists, radiology registrars and technologists and is the second busiest accredited training site for nuclear medicine in Australia. The department's full time nuclear medicine physicians are Professor Victor Kalff, Dr Kenneth Yap, Dr Martin Cherk and Dr Thomas Barber.

There is continued involvement in research, not only in the field of nuclear medicine and PET, but also in other specialities via collaboration with various departments of the hospital and Baker IDI Heart and Diabetes Institute. Collaborative research areas include cardiovascular disease, rheumatology, psychiatry, haematology and oncology. Techniques employed in collaborative studies span conventional to advanced gamma camera and PET imaging techniques.

Research Projects

Comparison of PET / computed tomography (CT) and bremsstrahlung imaging following ⁹⁰yttrium radiation synovectomy

This study, led by Dr Thomas Barber, demonstrated that PET/CT provides superior image quality compared to the more traditional bremsstrahlung imaging techniques when imaging the intra-articular distribution of ⁹⁰yttrium following radiation synovectomy. This new technique may play a role in assessing possible extra-articular radiopharmaceutical activity and was the first reported series using PET/CT in this patient group. The study generated a paper in the *Journal of Medical Imaging and Radiation Oncology* in 2013. A follow-up project is under way examining the prognostic value of this imaging method.

Early assessment of response to chemotherapy / tumour targeted therapy in metastatic breast cancer using sequential ¹⁸F-FDG PET

This project, led by Dr Martin Cherk, examines the benefit, if any, of PET/CT in predicting therapy response prior to changes observed on conventional CT.

Optimising surgical outcome in rectal cancer following neoadjuvant therapy: a randomised study

Dr Kenneth Yap is a co-investigator on this study, which is an ongoing collaboration with the Peter MacCallum Cancer Institute.

Pilot study of non-invasive assessment of acute graft versus host disease of the gastrointestinal tract following allogeneic haemopoietic stem cell transplantation using FDG-PET

This long term study, which is led by Dr Martin Cherk, began in 2010 and is nearing completion. Approximately 75% of the patients required have been assessed.

Incremental advantage of contemporaneous diagnostic CT over PET/CT in patients for staging or restaging of colorectal carcinoma

Dr Kenneth Yap is the lead AMREP investigator for this ongoing collaboration with the Peter MacCallum Cancer Institute.

An open label pilot trial of accelerated multi-coil repetitive transcranial magnetic stimulation for treatment-resistant depression

Dr Martin Cherk and Dr Kenneth Yap are co-investigators for this new collaboration with the Department of Psychiatry.

Incremental value of SPECT/CT (single photon emission computed tomography and regular CT) in the delineation of thyroid tissue along the thyroglossal tract following ¹³¹iodine therapy

In this study, led by Dr Thomas Barber, the state of the art SPECT/CT system recently acquired by The Alfred Nuclear Medicine Department will facilitate more accurate definition of the location and extent of residual thyroid tissue in patients following thyroid cancer surgery.

Awards

A novel PET-CT scan of the knees post ⁹⁰Y administration (pictured image), which appeared in a publication* authored by Dr Tom Barber, Dr Kenneth Yap and Professor Victor Kalff, was named Image of the Month by the *European Journal of Nuclear Medicine and Molecular Imaging*.

*Barber T, Yap K, Kalff V. *Eur J Nucl Med Mol Imaging* 2012;39(5):917-8.

Publications

4 Journal Articles



Oncology Clinical Nurse Specialist Dr Emma Cohen completed her PhD entitled 'Patient participation in symptom management in an acute oncology setting' in 2012.

Nursing Services

Chief Nursing Officer: Janet Weir-Phyland RN, BScN, MBA

The Alfred/Deakin Nursing Research Centre and the La Trobe Alfred Clinical School, which are co-located at The Alfred, together contribute to the Nursing Services program of research.

The core research activities of the Alfred/Deakin Nursing Research Centre have focused on the active doctoral research program that has continued under the direction of the centre staff. The PhD projects in progress are investigating symptom management in the oncology context, patient participation and preferences for participation in recovery after cardiac surgery, and the quality of care of frail elderly patients in acute care to reduce functional decline.

The La Trobe Alfred Clinical School is a collaboration between Nursing and Allied Health disciplines at Alfred Health and La Trobe University. It provides opportunities for jointly developed curriculum, mutually beneficial programs of research and exploration of effective clinical supervision models. Major areas of research include wound management, time critical interventions, rehabilitation and acquired brain injury.

Patient Participation in Symptom Management

Emma Cohen completed her PhD in 2012 with a program of research focusing on the preferences and participation of hospitalised cancer patients in symptom management. The study involved a mixed methods design with repeated measures to explore the complex relationships between symptom burden, patients' preferences for participation and process of care factors that enable or inhibit participation in the acute care context.

Patients surveyed in the study experienced a high symptom burden with a mean of 12.1 (SD 4.9) symptoms in the 24 hours prior to interview. Patients' preference for participation in their symptom management was variable. Although the majority of patients preferred to share decision-making with their clinicians, one-third of patients preferred to leave all symptom management decisions to their doctors and nurses, and 8% preferred total control over their symptom management decisions. Repeated measures of symptom burden and control preference showed stability over a number of days. Patients' participatory behaviours did not appear to be influenced by their control preferences suggesting that other external factors influenced whether or not patients participated in their own care. Demographic characteristics of patients did not appear to influence their preferences for participation.

Patients identified a number of barriers and facilitators for their participation in acute care. While the majority of patients were satisfied with their symptom management, patients with a preference for active participation were dissatisfied with the information provided. An analysis of processes of care related to symptom management identified that interactions of clinicians with patients were high frequency and low duration. This clinician interaction factor made it difficult for patients to fully participate in symptom management decision-making.

Emma's findings highlighted the many difficulties with measuring patient participation in acute care. The study also suggested a need for a review of the relative roles of patients and clinicians in acute care as well as redesign of current structures and processes of care. The findings have implications for policy and practice, and highlight the need for a future research agenda that aims to provide greater clarity of current definitions of patient participation. In order for patient participation to become a realistic objective in acute health, we need care delivery systems that have the potential to facilitate care provision that is flexible and responsive to patients as participants. The establishment of indicators of the quality of care delivery that reflect the success of accommodating patients in care at their desired level of participation would also be required.

Does Laser Therapy Resolve Wound Pain?

The La Trobe Alfred Clinical School undertook a proof of concept study 'Resolving chronic wound pain using low-intensity laser therapy (LILT)'. The study reported that chronic wound pain is debilitating for patients suffering from a variety of wound aetiologies. Some patients reported a benefit from LILT; however, no significant difference was evident between patients randomly assigned to active laser therapy or the sham arm.

Postgraduate Students

5 PhD Students
27 Masters Students

Publications

8 Journal Articles
4 Book Chapters



A subcapital fracture of the left neck of femur.

Orthopaedic Surgery

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

The Department of Orthopaedic Surgery provides a full range of general and sub-specialised orthopaedic clinical services. The Alfred is a Level 1 Trauma Centre and our department has a strong research interest in orthopaedic trauma and is a contributor to the Victorian Orthopaedic Trauma Outcome Registry (VOTOR) overseen by Monash University. Collaborations across the participating centres have led to a number of clinical projects. The department also participates in a number of international multicentre randomised controlled trials (RCTs).

Clinical Trials and Registries

In 2012, we continued to recruit into two of three international multicentre RCTs led by McMaster University in Canada. We continue to be the lead recruiter for FLOW (Fluid Lavage of Open Wounds) and overall the study will reach the target of 2,300 patients worldwide in 2013. The trial is comparing normal saline to normal saline plus pure soap for irrigation and assessing the most efficacious pressure to deliver the irrigation – high pressure (pulsatile lavage), low pressure (pulsatile lavage) or gravity feed (bag on an intravenous pole).

Recruitment into the FAITH (Fixation using Alternative Implants for the Treatment of Hip fractures) trial is continuing. Having contributed to the

pilot trial of HEALTH (Hip fracture Evaluation using the ALternatives of Total hip arthroplasty versus Hemi-arthroplasty), we are now planning for the start of the definitive trial after a successful grant application to the Canadian Institutes of Health Research, on which Associate Professor Liew is one of the co-investigators.

We continue our involvement with VOTOR, with two papers being published involving Associate Professor Elton Edwards*.

*Kimmel LA, Holland AE, Edwards ER, Cameron PA, De Steiger R, Page RS, Gabbe B. Discharge destination following lower limb fracture: development of a prediction model to assist with decision making. *Injury* 2012;43(6):829-34.

*Wang K, Edwards ER. Intramedullary skeletal kinetic distractor in the treatment of leg length discrepancy: a review of 16 cases and analysis of complications. *J Orthop Trauma* 2012;26(9):e138-44.

Training

Associate Professor Edwards and Associate Professor Liew supervised Simon Flower's BMedSc project 'Outcomes after biologic plating of distal femoral fractures in an Australian major trauma centre', for which Simon received a distinction.



The FAITH (Fixation using Alternative Implants for the Treatment of Hip fractures) trial compares methods to treat hip fractures. (L): Three cancellous screws used to fix the neck of femur. (R): A sliding hip screw, augmented with one cancellous screw, used to fix the neck of femur.



Publications

12 Journal Articles
2 Book Chapters



TheAlfred

Haematology scientist April Haberfield performs routine blood film morphology to detect potential blood cell changes indicative of disease.



Pathology Services

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

Microbiology

Head: Associate Professor Denis Spelman MBBS, FRACP, FRCPA, MPH

In addition to heading the Microbiology service laboratory, Associate Professor Denis Spelman is Deputy Director of The Alfred Infectious Diseases Unit. Active research areas for Microbiology include antibiotic resistance surveillance (e.g. VRE – vancomycin resistant enterococci), introduction and role definition of new technology including molecular and mass spectrometry methods with interests in specific organisms (e.g. *Klebsiella pneumoniae*).

The Microbiology laboratory works in collaboration with clinical units in the hospital. A joint study between the Cystic Fibrosis (CF) clinical unit and Microbiology led to a change in the laboratory testing of antibiotic susceptibilities in CF patients, optimising this test both at the bedside and in the laboratory. Another joint study between clinicians and Microbiology laboratory resulted in the development of guidelines for use of the hepatitis B virus DNA test.

The definition of risk factors for VRE acquisition has allowed clinicians to target specific interventions to minimise acquisition. The usefulness of antiseptic impregnated washcloths has been monitored and has informed infection prevention strategies within the hospital.

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 also incorporates a specialist multidisciplinary transfusion medicine team which audits transfusion safety and practice.

Our ongoing research collaborations involve identifying and supplying material for the Transfusion Outcomes Research Collaborative Massive Transfusion Registry; Australia and New Zealand Intensive Care Society TRANSFUSE trial; Clinical Haematology Unit and Trauma Unit clinical trials; the Australian Centre for Blood Diseases; Australasian Leukaemia and Lymphoma Group; and Nucleus Network.

New program development includes expansion of our flow cytometry department and minimal residual disease detection in acute myeloid leukaemia (AML) and myeloma. Introduction of new antibody panels in 2013 will increase our ability to pick up relapsed disease earlier.

We have continued the molecular biology Sequenom project – using multiple genetic markers for prognosis of AML. New assays have been developed to monitor the novel anticoagulants, dabigatran and rivaroxaban, particularly for patients on these agents who are bleeding or whose compliance is uncertain.

BloodTrack

A patient identification (ID) system utilising two-dimensional barcodes, patient safety software and handheld devices was introduced in 2011 to improve transfusion safety, particularly to minimise the risk of incompatible transfusion. Assessment of the technology continued throughout 2012 within the Haematology Oncology clinic. Audits demonstrated that cross-referencing of the patient's ID with their wristband improved from 36% (32/90) to 94% (75/80) and the cross-referencing of patient ID on the compatibility tag to wristbands improved from 48% (43/90) to 99% (79/80). In addition, 100% (80/80) of checks are now conducted at the patient bedside, compared to 76% (68/90) in the pre-implementation audits. We clearly demonstrated the superiority of an automated system compared with routine practice. Expansion to other areas of the hospital and involvement of other hospital networks is the next goal to facilitate wider adoption of safest possible transfusion practice.

Red Cell Folate Audits

The futility of routine folate testing following institution of compulsory folate supplementation of flour in late 2009 has been revealed via auditing of Alfred Pathology tests. We have subsequently commenced a policy of restricting in-patient testing to patients with a high pre-test probability of low folate levels. Since red cell folate appears to have no impact on patient management, it may be time to consider completely abolishing this test at Alfred Health.

Acute Myeloid Leukemia

Dr Andrew Wei (Monash University) was awarded a \$1.1 million NHMRC Project Grant as the lead investigator for a randomised study to optimise clinical outcomes in patients with FLT3-mutant AML. The molecular haematology laboratory performs the FLT3 testing and the study assists in supporting the ongoing routine testing of AML patients. The testing allows risk stratification and specific targeted therapy for a high-risk patient group, which has a poor prognosis with standard therapy.

Publications

25 Journal Articles



Pharmacist and Smoking Cessation Specialist, Emma Dean, provides smoking cessation training to Alfred Health pharmacists.

Pharmacy

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

The Centre for Medication Use and Safety (CMUS) is one of the key research units within the Faculty of Pharmacy and Pharmaceutical Sciences of Monash University. CMUS has two nodes in Melbourne; one within the Department of Pharmacy at The Alfred and the other within the Department of Pharmacy Practice in Parkville. The Alfred-based arm has a research focus on acute health and medication use. The research activities come under the broad banner of evaluating the quality use of medicines, and can be further classified under the themes of medication safety, therapeutics, pharmacy practice research and health outcomes research.

The Alfred Pharmacy 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.

Nicotine Dependency

Our department is participating in a three-year randomised controlled study to investigate the benefits of a pharmacist-led intensive smoking cessation program for hospitalised patients. An ARC Linkage Grant funds the trial and it is anticipated that the target of 200 recruited participants at The Alfred site will be reached in May 2013. Participant follow-up will continue until May 2014.

An Alfred Foundation grant has supported the Pharmacy Department to provide clinical leadership for a smoking cessation program for inpatients throughout Alfred Health. As part of Alfred Health 'Totally Smokefree' principles, a multidisciplinary working party was formed to facilitate key stakeholder consultation to optimise clinical management and formulate collaborative organisation-wide guidelines.

Key features of the pharmacy-led clinical model of care for inpatient nicotine dependency management program include the identification and documentation of patients' smoking status during the medication reconciliation process and assessment of nicotine dependency. Pharmacists provide brief intervention advice and pharmacotherapy may be offered in addition to behavioural management strategies. A specialist pharmacist provides an intensive smoking cessation service for complex dependency. Any healthcare professional involved in the care of the inpatient can make this e-referral.

Pharmacist-Led Dosing of Antibiotics

Aminoglycosides and vancomycin are commonly used antibiotics and display narrow therapeutic indices and interpatient variable pharmacokinetics. Therefore, hospital practice is to perform dose individualisation and therapeutic drug monitoring (TDM), with the aim of achieving and maintaining therapeutic concentrations. TDM and dosing is primarily the responsibility of the prescriber, with variable input from clinical pharmacists.

We conducted a study to determine the impact of pharmacist-led dosing for vancomycin and aminoglycosides across a multisite health service with 150 patients in pre- and post-intervention cohorts. The intervention involved clinical pharmacists ordering drug-levels and independently adjusting doses once therapy was initiated by the treating medical team. Clinical pharmacists were trained, assessed and accredited to provide the service seven days per week. The study included 300 patients – 100 vancomycin and 50 aminoglycoside courses pre- and post-intervention. Patient characteristics, duration of therapy, indication and number of levels were similar across the pre- and post-cohorts.

For patients receiving vancomycin, the time to first therapeutic level was significantly less for the pharmacist-led dosing group (1.9 versus 2.6 days, $p = 0.008$) and the proportion of patients ever reaching therapeutic levels was similar (77% for pharmacist-led versus 72% for physician-led, $p = 0.41$). The proportion of dosing adjustments fully compliant with specific criteria in the guideline was significantly greater in the pharmacist-led dosing group (60% versus 50%, $p = 0.004$). The pharmacist-led service has resulted in a significant improvement in the time to reach therapeutic level and correct dose adjustments. This is now an established service, provided as a routine component of clinical pharmacists' practice and is a model for further expansion.



Postgraduate Students

1 PhD Student
1 Masters Student

Publications

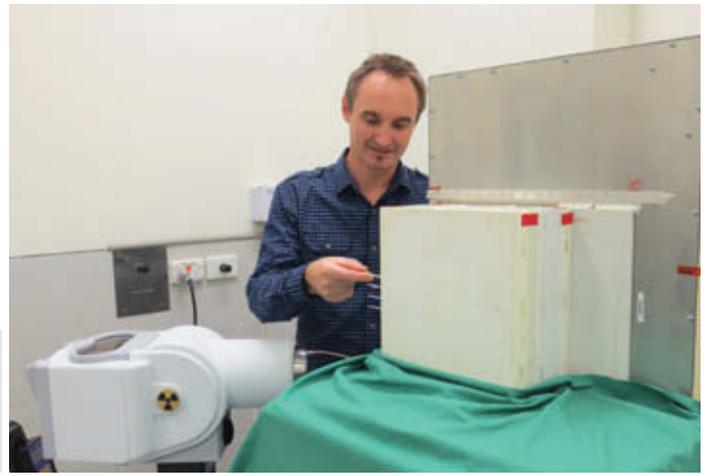
39 Journal Articles
1 Book Chapter



TheAlfred

www.wbrc.org.au

Physicist Ryan Smith carries out his PhD project 'Development of a real time high dose rate brachytherapy treatment verification system'.



Radiation Oncology

Head: Associate Professor Jeremy Millar BMedSc, MBChB, FRANZCR, FACHPM, CertHlthEc, CertBiostat

The William Buckland Radiation Oncology (WBRO) Service is a major Alfred Health Oncology Service comprising treatment facilities at The Alfred and at the Gippsland regional centre in Traralgon. WRBO is the busiest cancer unit in Alfred Health, seeing almost 2,000 new cases each year. The unit engages in undergraduate and postgraduate teaching and has an active research program from basic biology and physics, through to clinical trials and translation into clinical practice. Areas of particular interest include prostate cancer (especially brachytherapy; BT) and stereotactic (ST) or image-guided external beam radiation techniques. We have continued to build our reputation as an internationally recognised training and reference centre for ST treatment.

New Technique to Monitor Radiation

Delivering high dose rate BT comes with the challenge of monitoring radiation dose. Ryan Smith, as part of his PhD project through the Medical Radiation Physics group of RMIT University's Health Innovations Research Institute, is helping to develop a technique to monitor radiation dose more accurately. The technique enables real-time tracking of the radioactive source delivered to the tumour, which can be validated against the treatment plan. The system can detect the three-dimensional dose distribution within the patient and if a discrepancy with planned therapy is detected, treatment can be interrupted. This treatment verification system is the first of its kind in the world, and will provide patients with a higher level of treatment safety, trapping errors that were previously undetectable.

Radiation Therapy Trials

- WBRO has worked in association with the Radiology Department in developing and undertaking a pilot study on the safety and efficacy of irreversible electroporation for the ablation of prostate cancer.
- We developed technologies to participate in BOLART – a multicentre feasibility study of online adaptive image guided radiotherapy (RT) for muscle invasive bladder cancer. This included successfully completing the required credentialing for participation.
- We installed and commissioned technology that allows us to develop ST ablative RT and treat increasing numbers of patients. This included treating the first gated ST liver patient as well as the successful credentialing and activation of a randomised Phase 3 trial of highly conformal hypofractionated image guided RT versus conventionally fractionated RT for inoperable early stage 1 non-small cell lung cancer – CHISEL.
- We successfully completed the intensity modulated RT phantom dosimetry audit as required by the Assessment of New Radiation Oncology Treatments and Technologies (ANROTAT) project

and accepted the invitation to participate in and completed all requirements for the ANROTAT Radiation Oncology Register Pilot study. The final ANROTAT report was submitted to the Australian Government Medical Services Advisory Committee.

Treatment Advances

- Introduced a new planning system for prostate seed BT.
- Acquired new Brainlab software enabling the development of the HybridArc™ volumetric modulated external beam RT technique at The Alfred.

Competitive Funding

External competitive grant funding was obtained from sources including NHMRC, Victorian Cancer Agency and Cancer Council Victoria (CCV). These grants include:

- Circulation tumour DNA as a marker of complete pathological response and long-term outcome for locally advanced rectal cancer treated with pre-operative chemoradiotherapy.
- Cancer of Prostate Translational Research in Victoria (CAPTV) Collaboration.
- Investigation of dose equivalence and therapeutic index for synchrotron microbeam radiation therapy.
- CCV proposal to expand clinical trials access.

Achievements

- Dr Neda Haghighi passed her fellowship exams and was appointed as the ST Research Fellow.
- Kelly Chipperfield submitted her Clinical Psychology Doctorate and Trevor Ackerly was awarded his PhD.
- Jeff Crosbie obtained an NHMRC Early Career Fellowship to study 'Curing cancer with the synchrotron' and has taken a two-year leave of absence to undertake postdoctoral study at the European Synchrotron Radiation Facility in Grenoble, France.
- Anna Seeley successfully completed the short course in Imaging for Advanced Radiation Therapy Practice through Monash University.
- Dr Sarah Elliott achieved accreditation in Radiotherapy Equipment Commissioning and Quality Assurance.
- Associate Professor Sidney Davis was recognised for Outstanding Contribution to the Trans-Tasman Radiation Oncology Group.

Postgraduate Students

2 PhD Students
1 DPsych Student
1 Masters Student

Publications

17 Journal Articles



Dietitian Joanna Peter (L) and Speech Pathologist Clare Douglas (R) are the Principal Investigators on the project 'Clinical use of thickened H₂O: an investigation of adequacy of intake and hydration'.

Rehabilitation, Aged and Community Care

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

Rehabilitation, Aged and Community Care (RACC) at Caulfield Hospital strives to contribute significantly to the implementation of effective translational research and interdisciplinary, person-centred models of care, with links to defined clinical outcomes in areas of greatest need. Collaboration across the hospital between our departments, services and disciplines are essential for our complex patient population and have resulted in significant research growth and diverse research activity.

A major objective over 2012 was ensuring the continuation of excellent research governance across RACC. Working closely with the Alfred Human Research Ethics Committee, we put in place a system to centrally pre-review projects for their impact on RACC patients and staff prior to the ethical review process.

The Research Special Interest Group continued to grow with consistent attendance rates and monthly Research Newsletters distributed to staff. A focus on research during Caulfield Week continued with the Research Poster Display and the Mini Poster Presentation Sessions. The Internal Research Grants Program awarded \$35,000 in grant funding for 2012.

Interdisciplinary Research

Research projects initiated or completed in 2012 with an interdisciplinary focus, particularly involving Allied Health Departments, included:

- Several projects examining return to work/study in an acquired brain injury (Occupational Therapy; OT/Speech Pathology) and cardiac rehabilitation population (OT/Cardiac Rehabilitation).
- Investigation into the effects of the provision of thickened water on adequacy of intake and hydration in dysphagic patients (Speech Pathology/Nutrition and Dietetics/Nursing and Aged Care Medicine).
- Exploring the relationship between hand function and the ability to open medication containers in older individuals (OT/Pharmacy).
- Sexuality and Stroke project to build the confidence and capacity of clinicians for consistent provision of information addressing sexuality after stroke (Psychology/Patient and Family Services).
- Spasticity management (Physiotherapy/OT/Rehabilitation).
- Cardiac Rehabilitation (Rehabilitation/OT/Physiotherapy).

Aged Care Services

A major focus within the service is the Advanced Trainee Program. Projects initiated under this scheme in 2012 included:

- Weight bearing status and clinical outcomes in a subacute population.
- Management of lower respiratory tract infections at residential aged care facilities by a Mobile Assessment and Treatment Service (MATS).
- Assessment of frailty with the Reported Edmonton Frail Scale in a General Medical Unit.
- Correlation between religious practice and risk of depression in the elderly in the subacute setting.
- Prevalence of frailty in the geriatrics subacute population using two frailty assessment tools and its relationship to hospital outcomes and length of stay.
- Relationship between the anti-cholinergic burden of medications and delirium in older post-operative patients.

Completed projects in manuscript preparation included:

- Prevalence, characteristics and assessment of geriatric trauma patients utilising The Alfred Trauma Registry.
- An audit of the prevalence and characteristics of advance care planning for patients from residential aged care facilities referred to the MATS.

Aged Psychiatry

Under the direction of Associate Professor Stephen Macfarlane, main research activities included:

- A Phase 4 investigator-initiated multisite clinical trial investigating the safety and efficacy of a long acting antipsychotic in elderly schizophrenic patients.
- A pre/post study investigating the relationship between program completion and cognition, mental health and markers of physical health (joint project with Cardiac Rehabilitation).
- Three studies of potential disease-modifying medications ongoing in conjunction with Eli-Lilly, Prana Biotechnology and Velacor Therapeutics.

Clinical Innovation and Interdisciplinary Projects (CIIP)

2012 initiatives within the CIIP team included:

- Determining whether information obtained from competent adults completing advance care directives without assistance from health professionals enables substitute decision makers and doctors to correctly identify the adults' preferences for medical treatment in common scenarios.
- Implementation of a suite of electronic interdisciplinary assessment documents in a subacute service.
- Patient survey of an interdisciplinary discharge tool designed to provide information from the treating team to the patient/carer.

Community and Ambulatory Services

Aged Care Assessment Service (ACAS) completed an evaluation into the characteristics of clients who are on the waiting list for a Commonwealth-funded Aged Care Package. Overall, the research suggested further investigations were warranted around waiting time, package acceptance and the influence of cultural and language characteristics.

Cognitive, Dementia and Memory Service (CDAMS)

Manager Elizabeth Rand and Neuropsychologist Liz Mullaly, in collaboration with La Trobe University's Professor Glynda Kinsella and Dr Kerry Pike, have developed and researched a memory strategy program over several years. The La Trobe University and Caulfield Hospital (LaTCH) Australia Memory Management Program is currently supported by Alzheimer's Australia (Victoria).

Commonwealth Respite and Carelink Centre Southern Region (CR&CC)

Honours student Janis Lee completed her thesis entitled 'Associations between coping, strain, carer satisfaction and psychological wellbeing in mental illness caregivers'. This study provided valuable insight into the experiences of mental illness caregivers and evidence to support the model of carer support and education utilised in the CR&CC Carer Support Mental Health program.

A Community Rehabilitation Services collaboration between Caulfield Community Rehabilitation and Port Phillip Community Rehabilitation Centre secured a 2012 Caulfield Major Project Research Grant for the study 'Evaluating the impact of community rehabilitation – how could it be measured, and what predicts successful outcome?'

The Caulfield Pain Management and Research Centre is involved with three NHMRC-funded randomised controlled trials (RCTs) of treatments for chronic pain examining: i) acupuncture to reduce reliance on opioid medications; ii) caloric vestibular stimulation in various neuropathic pain disorders; iii) simple analgesics to reduce pain-related agitation and aggression in aged care residents with dementia. Research continues in the development of better outcome measures for the assessment of chronic pain conditions, development of age appropriate assessment for pain, mood and coping and testing of a nationally recognised minimum data set for pain management programs in Victoria.

Rehabilitation

The Cardiac Rehabilitation Unit conducts collaborative research with a number of Allied Health departments. An RCT in collaboration with OT is evaluating whether routine application of silicone sheeting to newly healed median sternotomy scars in post-cardiac surgery patients is more effective than usual care. A collaboration with Physiotherapy is investigating cardiac rehabilitation outcomes in women with chronic heart failure focusing on mood, fitness and exercise safety.

The Spinal Rehabilitation Unit offers a specialised state-wide interdisciplinary clinical service for individuals with spinal cord injury (SCI) or disease from any cause. Research projects completed in 2012 included: prevalence of non-traumatic SCI in Victoria; mapping of non-traumatic SCI and the development of a data repository; defining barriers to discharge from inpatient rehabilitation following SCI.

Achievements

Grants

- Associate Professor Natasha Lannin received a grant from the Institute for Safety, Compensation and Recovery Research (with Alfred Health team including Associate Professor Peter Hunter, Professor Russell Gruen and Associate Professor Anne Holland) to undertake a program of research aimed at understanding and addressing the long-term outcomes after severe acquired brain injury.
- Natalie Fini was awarded a Heart Foundation Postgraduate Scholarship to investigate physical activity and cardiovascular risk factors following stroke.
- A Department of Health/Health Workforce Australia Grant was secured to investigate the use of emerging technology (iPads) with OT student supervision. This project is being conducted jointly with the Department of OT at La Trobe University.
- Melita Giummarra secured an NHMRC Early Career Fellowship (Clinical) for her research 'Empathy and personal experience of pain when seeing others in pain' to commence in 2012.

Collaborative Grants: Caulfield Pain Management and Research Centre

- ARC Linkage Project – 'Chronic pain and functional impairment following traumatic injury: an investigation into the impact of compensation status and experience' (2012-2015) (N Georgiou-Karistianis, M Giummarra, P Cameron, S Gibson, J Ponsford, J Fielding, P Jennings).
- Victorian Department of Health Project Grant: 'VICPOP – Victorian Persistent Pain' (C Arnold, S Gibson, M Hogg).
- NHRMC and Monash University Equipment Grant: 'Quantitative sensory testing in traumatic persistent pain' (S Miller, T Ngo, M Giummarra, M Gray, S Gibson, A Nunn, N Georgiou-Karistianis).
- NHMRC Project Grant commencing in 2012: 'Is low dose amitriptyline more effective than placebo in the management of chronic, neuropathic low back pain? A double-blind, randomised, placebo-controlled trial with an economic evaluation' (D Urquhart, F Cicuttini, A Wluka, M Sim, M Van Tudler, A Forbes, C Arnold, S Gibson, Y Wang).

Awards

- Joanna Peter was awarded Best Poster at the 2012 International Congress of Dietetics in Sydney for her study 'Evaluation of a model of care incorporating the responsibilities of a Nutrition Assistant on aged care wards for improved patient care'.
- Best Poster Award and Peoples' Choice Poster Award were awarded for the study 'Does a maintenance program confer extra benefits following discharge from cardiac rehabilitation?' (T Odes, J Patrick, R Sheppard, F Wise) presented at the 2012 State Conference of the Victorian Association of Cardiac Rehabilitation in Melbourne.

Postgraduate Students

7 PhD Students
2 Other Doctoral Students
8 Masters Students

Publications

27 Journal Articles



Radiological insertion of a Tenckhoff catheter.

Renal Medicine

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

Renal Medicine provides clinical services across the spectrum of chronic kidney diseases (CKDs) (stages 1 to 5), including maintenance dialysis (approximately 280 patients) and kidney transplantation. Clinical research is a high priority across three themes.

Proteinuria and kidney function in lung and heart transplant populations

- Defining measures of renal insufficiency in these populations, especially lung transplant recipients.
- Defining the spectrum of proteinuria in lung and heart transplant patients. In patients converted to mTOR (mammalian target of rapamycin) inhibitors, developing predictions of benefit versus non-benefit with respect to renal outcomes.

Diabetic chronic kidney disease population

- Evaluation of safety and efficacy of newer agents such as Nrf2 (nuclear factor erythroid 2-related factor 2) stimulators and MRAs (mineralocorticoid receptor antagonists) in slowing progression of diabetic CKD.
- A health based needs analysis to develop an improved model of care for patients with diabetic CKD.

End-stage chronic kidney disease population

- Examination of the utility of interventional radiological insertion of Tenckhoff catheters for patients commencing maintenance dialysis.

Tenckhoff Catheters: Radiological Insertion

The initiation of peritoneal dialysis requires the timely insertion of a reliable Tenckhoff catheter. At most centres, including Alfred Health, Tenckhoff catheters are inserted laparoscopically by surgeons under a general anaesthetic. The laparoscopic route is time consuming and requires precious surgical, anaesthetic and hospital inpatient resources. Alternatively, radiological insertion can be performed as a day case under local anaesthetic and sedation, which potentially allows for improved access to the procedure.

We carried out a retrospective review of the outcomes for all patients who had Tenckhoff catheters inserted radiologically (percutaneously with the assistance of ultrasound and fluoroscopy) over the 12-month period from initiation of the procedure in December 2011. Thirty patients (20 males and ten females) had Tenckhoff catheters inserted radiologically. The mean age (+/-SD) of patients was 56 (+/-14) years and mean body mass index was 25.7 (+/-4.8) kg/m². Peritoneal

dialysis was the initial dialysis modality in 22 (73%) patients and 14 (46.7%) had previously undergone extraperitoneal abdominal surgery. All catheters were inserted successfully as day cases but four patients (13.3%) required hospitalisation. Catheter migration occurred in four patients (13.3%) but only one required surgical intervention. Minor pain issues were noted in six patients (20%) and two patients (6.7%) experienced bleeding around the exit site, which required suturing. There were no cases of peritonitis or exit site infection.

Radiological insertion of Tenckhoff catheters for peritoneal dialysis provided improved access to catheter placement in a timely manner. It had a high technical success rate and was performed safely as a day procedure. Establishing Tenckhoff catheters this way has the potential to improve the uptake and initiation of this important home-based dialysis modality. The total number of patients on peritoneal dialysis more than doubled in a 12-month period and the rate of increase of patients on home-based dialysis therapies at Alfred Health was the highest in the state.

Analysis of Diabetes and CKD Health Care

In Australia, diabetes is the most common cause of CKD and end-stage kidney disease requiring dialysis. Diabetic CKD sufferers have significant morbidity and premature mortality and experience a poorer quality of life. Some studies suggest that substantial gaps exist between recommended practices, treatment targets and the care currently received by people with diabetes and CKD. The extent to which this may be related to inadequate knowledge as well as resourcing in existing health services is uncertain.

An NHMRC project across services in Victoria (including Alfred Health) and New South Wales addresses this gap by exploring and characterising the needs of patients with diabetes and CKD, as well as the location, capacity and performance of existing health services. This study is intended to inform the design of a new integrated and patient-centred health service that will be piloted and evaluated, and ultimately, provide improved care and health outcomes for people with diabetes and CKD.

Publications

6 Journal Articles

1. Get Tested 2. Get Results 3. Get Treated



TESTme is a free service of Melbourne Sexual Health Centre (MSHC) for rural Victorians aged 25 years and younger, rural Victorian men who have sex with men and Aboriginal and Torres Strait Islander people.

WWW.TESTme.org.au

Sexual Health

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

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

Telemedicine Services

We tested the acceptance of a free Melbourne-based telemedicine service, TESTme, which offered a doctor's consultation via telephone or computer-aided video to clients under 26 years of age, living in Victoria at least 150 km from Melbourne. The service included a phone or video consultation followed by a home testing Chlamydia kit sent to clients. After widely advertising the service through flyers, SMS, Facebook, regional newspapers and youth magazines, it was taken up by 25 rural youths aged 15 to 24. We investigated their views via questionnaire and followed up some clients with interviews. A total of 18 participants, all of whom had telephone consultations, returned the questionnaire and four were interviewed. They reported being satisfied with the service; most preferred the telemedicine service to consulting a doctor in person or by video consultation. Online video consultations for sexual health may not yet be an acceptable option to young people in Australia. The TESTme telephone consultation service is now offered at Melbourne Sexual Health Centre and can be initiated via the web (www.testme.org.au) or phone.

HIV: Rate of Testing

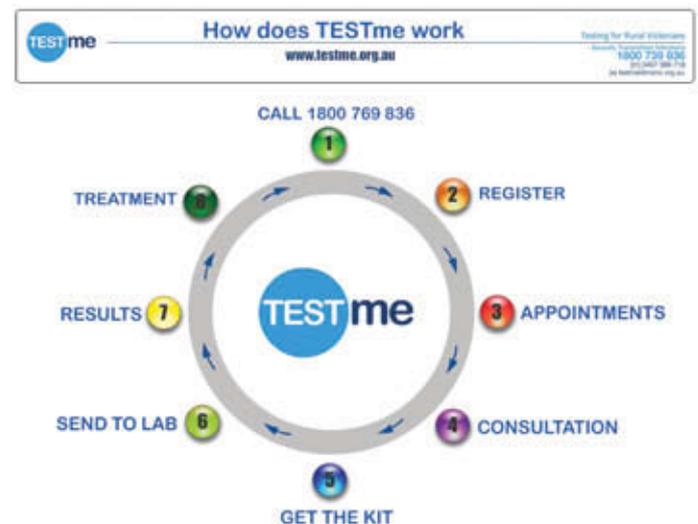
Mathematical modelling suggests that increased frequency of HIV testing among men who have sex with men (MSM) leads to a reduction in new HIV cases. We completed a randomised trial examining HIV testing frequency in MSM offered rapid tests compared to MSM offered normal laboratory based tests. This particular rapid test, approved by the TGA, requires a finger prick blood sample and provides a result in 20 minutes. Participants were followed for 18 months and no significant difference in the rate of HIV testing was found. Those offered rapid tests came in earlier for their first test but this initial increase in testing rate was not sustained over time. We concluded that achieving an increase in the rate of testing would require increasing the convenience of making visits and obtaining test results, rather than simply introducing rapid HIV tests. One consequence of this is that we are now offering HIV results by phone to MSM men.

Anal Cancer

A case series of anal cancer involving records and staff from the William Buckland Radiation Oncology Service revealed that anal cancers are often diagnosed when they are quite large. This suggests that there is scope for an early detection screening program. A pilot study of digital anal examinations offered to 100 HIV-positive MSM demonstrated that these examinations are acceptable and have a low rate of referral of non-cancerous abnormalities. This work is now being extended in a larger ongoing study.

Awards

Professor Christopher Fairley was awarded a silver medal from the International Union against Sexually Transmitted Infections (IUSTI) in recognition of his efforts on the Union's behalf. The objectives of IUSTI are the achievement of international cooperation in the control of sexually transmitted diseases, including HIV infection, with attention to the social and epidemiological as well as medical aspects of control.



The TESTme online/telephone consultation service offered at Melbourne Sexual Health Centre – how it works.

Postgraduate Students

7 PhD Students
 1 Masters Student

Publications

26 Journal Articles
 1 Commissioned Report




Baker IDI



Listed are the major national and international competitive, peer-reviewed research grants held by AMREP staff in 2012.

AUSTRALIAN GRANTS

Cooperative Research Centres (CRC) Program

CRC for Asthma and Airways. O'Hehir RE, Thompson P, Mackay C, Berend N, Foster P, Gibson P, Jenkins C, Weinstein P. 2005-2012. CRC Program funding: \$26,440,000. Total funding: \$54,000,000.

CRC for Biomarker Translation. Hogarth PM, Hoogenraad N, Hart D, Zola H, Morris H, Venter D, Warner N, Polverino T. 2007-2014. CRC Program funding: \$30,590,000. Total funding: \$90,000,000.

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.

Cooper D, Beard M, Dore G, Emery S, French M, Kelleher A, Kent S, Lloyd A, Purcell D. HIV and HCV vaccines and immunopathogenesis. 2009-2013: \$17,734,213. Administering institution: University of New South Wales.

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: \$15,718,075. Administering institution: Australian National University.

Jennings G, Dart A, Esler M, Kaye D, Kingwell B, Chin-Dusting J. A program of research addressing the transition from health to advanced cardiovascular disease. 2008-2012: \$12,281,756. Administering institution: Baker IDI.

Kaldor J, Garland SM, Fairley CK, Law MG, Grulich AE. Sexually transmitted infections: causes, consequences and interventions. 2010-2014: \$9,100,000. Administering institution: University of New South Wales.

Krum H, Kelly D, Reid C. Prevention and treatment of chronic heart and kidney disease via epidemiological, pharmacological device and cell-based approaches. 2010-2014: \$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. 2011-2014: \$3,773,000. Administering institution: Baker IDI.

Stewart S, Thompson D, Abhayaratna W. Integration of risk evaluation in cardiovascular disease management programs. 2011-2013: \$2,898,607. Administering institution: Baker IDI.

Capacity Building Grants

Sim M, Abramson M, Fritschi L, LaMontagne A. Linking research policy and health services to build a better evidence base for workplace public health. 2009-2013: \$1,625,115. Administering institution: Monash University.

Centres of Research Excellence

Cameron P. Australian Resuscitation Outcomes Consortium. 2011-2016: \$2,498,523. Administering institution: Monash University.

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.

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.

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.

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.

Redman S, Jorm L, Green S, D'Este C, Frew D, Shakeshaft A, Sanson-Fisher R, Davies H, Louviere J. Centre for Informing Policy in Health with Evidence from Research (CIPHER). 2011-2015: \$2,539,085. Administering institution: University of Western Sydney.

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.

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

Development Grants

Berger PJ, Hamilton GS, Naughton MT, Edwards BA, Sands SA, Cooke JR. Development of an effective therapy for Cheyne-Stokes breathing in heart failure. 2012-2014: \$584,700. Administering institution: Monash University.

Febbraio M, Cowley M, Adams T. Development of a modified gp130 ligand to treat obesity-induced insulin resistance. 2012-2013: \$424,363. Administering institution: Baker IDI.

Gorry P. Development of a biochemical HIV-1 tropism assay. 2011-2012: \$159,604. Administering institution: Burnet Institute.

Hagemeyer C. Site-specific bioconjugation to improve antibody drug conjugate production. 2012-2013: \$391,805. Administering institution: Baker IDI.

Head G, Kaye D, Byrne M. Development of oral natriuretic peptides for congestive heart failure. 2011-2012: \$496,410. Administering institution: Baker IDI.

Meikle P, Kingwell B, Dart AM, Pekarsky B. Plasma lipid profiling for risk assessment of unstable coronary artery disease. 2012-2013: \$499,750. Administering institution: Baker IDI.

Peter K, Hagemeyer C, Krippner G, Adams T. Development of platelet-targeted nanoparticles for magnetic resonance imaging towards the detection of thrombi/emboli and vulnerable atherosclerotic plaques. 2011-2013: \$586,996. Administering institution: Baker IDI.

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.

Buchbinder R, March L, Lassere M, Reid C. Australian Rheumatology Association Database. 2006-2012: \$1,250,000. Administering institution: Monash University.

McLean C. National Network of Brain Banks. 2010-2014: \$2,536,000. Administering institution: Mental Health Research Institute.

European Union Collaborative Research Grants

Sim M, Milne E, Benke G, Armstrong B. Risk of brain cancer from exposure to radiofrequency fields in childhood and adolescence. 2009-2013: \$693,550. Administering institution: Monash University.

Zimmet P, Curran J, Bozaoglu K. Identification of epigenetic markers underlying increased risk of T2D in South Asians. 2012-2014: \$218,078. Administering institution: Baker IDI.

Partnership Projects

Lewin S, Fairley C, Elliott J, Crooks L, Watson J, Kidd M, Battersby M, Akualcin 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.

McNeil J, Cameron P, Jolley D, Stevenson C, Wood E, Sanderson P, Isbister J. Transfusion Research: Improving Outcomes (TRIO). 2010-2012: \$900,000. Administering institution: Monash 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. 2012-2015: \$1,068,089. Administering institution: University of Sydney.

Zoungas S. The diabetes renal project: better outcomes for patients with diabetes and chronic kidney disease. 2012-2015: \$628,148. Administering institution: Monash University.

Project Grants

Abramson M, Dharmage S, Benke G, Thompson B. Third Euro-Australian Respiratory Health Survey. 2011-2013: \$343,028. Administering institution: Monash University.

Alderuccio F. Immune tolerance in experimental autoimmune encephalomyelitis following transplant of bone marrow cells genetically encoding autoantigen. 2011-2013: \$327,524. Administering institution: Monash University.

Allen T, Chai Z. Modulation of TGF-beta signalling by CDA1 in the diabetic vasculature. 2012-2014: \$506,250. Administering institution: Baker IDI.

Allen T, Cooper M. Angiotensin II AT2 receptor in diabetic atherosclerosis. 2012-2014: \$488,322. Administering institution: Baker IDI.

Allen T, Cooper M. The role of urotensin II in diabetes-associated atherosclerosis. 2010-2012: \$391,125. Administering institution: Baker IDI.

Andrews RK, Arthur JF. Redox regulation of platelet adhesion receptors. 2010-2012: \$571,500. Administering institution: Monash University.

Andrews RK, Ward CM. Factor XII-dependent thrombosis and platelet glycoprotein Ib. 2010-2012: \$324,750. Administering institution: Monash University.

Barker A, Brand C, Haines T, Hill K, Brauer S, Jolley D, Botti M. Falls prevention in the acute hospital setting: a multi-centre cluster randomised controlled trial of efficacy, cost effectiveness and sustainability of the 6-PACK program. 2011-2014: \$1,179,850. Administering institution: Monash University.

Barry A, Reeder J, Tavul L. Var gene diversity and naturally acquired immunity to malaria. 2011-2013: \$329,530. Administering institution: Burnet Institute.

Bellomo R. The Australasian Resuscitation in Sepsis Evaluation – randomised controlled trial – continuation funding request. 2012-2013: \$349,790. Administering institution: Monash University.

Bellomo R, Cooper DJ, Street A, Nichol A, French CJ, Presneill JJ. Erythropoietin in traumatic brain injury (EPO-TBI). 2009-2013: \$1,886,655. Administering institution: Monash University.

Berger P, Hamilton G, Naughton M. Duty ratio: a simple method for quantifying loop gain during breathing instability. 2010-2012: \$331,841. Administering institution: Monash University.

Bernard S, Cameron P, Jacobs I, Smith K, Finn J. The RINSE Trial: the Rapid Infusion of Cold Normal Saline by paramedics during CPR. 2011-2014: \$677,888. Administering institution: Monash University.

Bobik A, Toh BH, Tipping P. CD4 NKT cells and atherosclerosis: molecular mechanisms and therapeutic strategies for suppression. 2012-2014: \$487,260. Administering institution: Baker IDI.

Bozaoglu K. Chemerin may be a novel therapeutic target for modulation of adipose tissue mass. 2012-2014: \$516,325. Administering institution: Baker IDI.

Bozaoglu K, Blangero J, Nyholt D. Exome sequencing by NGS to identify rare variants affecting Type 2 diabetes. 2012-2014: \$553,510. 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.

Carey A. Adrenergic activation of brown adipose tissue in humans. 2012-2013: \$314,950. Administering institution: Baker IDI.

Churchill M, Wesselingh S, Turville S, Gorry P. Molecular studies of the astrocyte reservoir of HIV-1 in the central nervous system. 2010-2012: \$571,500. Administering institution: Burnet Institute.

Cooper DJ. STandaRd Issue TRAnsfusion versus Fresher red blood cell Use in intenSive carE (TRANSFUSE): a randomised controlled trial. \$2,761,870. Administering institution: Monash University.

Cooper DJ, Bernard S, Rosenfeld J, Cameron P. POLAR - Prophylactic hypothermia trial to lessen traumatic brain injury: a randomised controlled trial. 2009-2013: \$1,998,578. Administering institution: Monash University.

Cooper M, Chai Z, Cao Z. Novel strategy to reduce renal fibrosis. 2011-2013: \$558,390. Administering institution: Baker IDI.

- Cooper M, El-Osta A, Jandeleit-Dahm K. Role of Set7 in diabetes related end-organ injury. 2012-2014: \$864,770. Administering institution: Baker IDI.
- Coughlan M. Restricting dietary advanced glycation end product intake as a potential therapeutic tool in diabetic nephropathy. 2010-2012: \$466,125. Administering institution: Baker IDI.
- Crabb B, Gilson P, Leykauf K. Signalling during red blood cell invasion by *Plasmodium falciparum*. 2010-2012: \$344,750. Administering institution: Burnet Institute.
- Davis S, Bell R, Kulkanri J. Transdermal testosterone therapy: a potential treatment for selective serotonin reuptake inhibitor-associated sexual dysfunction in women. 2011-2012: \$235,296. Administering institution: Monash University.
- Degenhardt L, Burns L, Weatherburn D, Butler T, Gibson A, Kimber J, Mattick R. Determining the impact of opioid substitution therapy upon mortality and recidivism among prisoners: A 22-year data linkage study. 2011-2012: \$208,153. Administering institution: Burnet Institute.
- Dietze P, Aitken C, Jolley D, Hickman M, Kerr T, Stoové M. The natural history of injecting drug use among IDU in Melbourne. 2009-2013: \$739,698. Administering institution: Monash University.
- Drummer H, Poubourios P, Coulibaly F. Structure and function of the HCV glycoproteins. 2010-2012: \$577,500. Administering institution: Burnet Institute.
- Du XJ. Beta-adrenergic activation: a double-edged sword on cardiac angiogenesis. 2011-2013: \$352,524. Administering institution: Baker IDI.
- Du XJ, Hewitson T, Samuel C. Relaxin therapy reverses large artery remodelling and stiffening in aged and hypertensive models. 2011-2013: \$429,615. Administering institution: Baker IDI.
- Dunstan D, Healy G, Owen N, Eakin E, LaMontagne A, Moodie M. Reducing prolonged workplace sitting time in office workers: a cluster-randomised controlled trial. 2011-2013: \$506,996. Administering institution: Baker IDI.
- Drummer H. Roles of the hepatitis C virus glycoprotein E2 variable regions in virus entry, immunogenicity and immune evasion. 2012-2014: \$659,685. Administering institution: Burnet Institute.
- Eades S, McNamara B, Stanley F, Pearson G, Langridge A. Intergenerational determinants of foetal growth in Aboriginal Western Australians. 2011-2013: \$381,605. Administering institution: Baker IDI.
- Eades S, Sanson-Fisher R, Paul C, Zimmet P, Carey M, Wenitong M. A cluster randomised trial to test a systems-based collaborative for Type 2 diabetes among Indigenous Australians. 2010-2014: \$1,311,000. Administering institution: Baker IDI.
- Esler M, Vaddadi G, Lambert E. Reducing the burden of orthostatic intolerance – delineating mechanisms and improving therapy. 2011-2013: \$397,524. Administering institution: Baker IDI.
- El-Osta A, Du XJ. Regulating gene expression changes in cardiac hypertrophy. 2012-2014: \$667,350. Administering institution: Baker IDI.
- Febbraio M. An essential role for skeletal muscle FoxO1 in protecting against obesity-induced insulin resistance. 2011-2013: \$573,390. Administering institution: Baker IDI.
- Febbraio M, Bruce C, McGee S. Activation of HSP72 in skeletal muscle as a therapeutic target for obesity. 2011-2013: \$633,390. Administering institution: Baker IDI.
- Febbraio M, Lancaster G, Sadler A, Williams B. A novel lipid sensitive kinase and its role in obesity-induced inflammation and insulin resistance. 2010-2012: \$540,075. Administering institution: Baker IDI.
- Fisher J. A brief couple-focused psychoeducational intervention to prevent postnatal mental health problems in women: a cluster randomised trial. 2012-2014: \$679,499. Administering institution: Monash University.
- Fitzgerald P, Barton D, Hoy K. A randomised controlled trial of magnetic seizure therapy in major depressive disorder. 2011-2013: \$359,208. Administering institution: Monash University.
- Forbes A, Gurrin L, Hodge A. Mediterranean diet and mortality: analysis of longitudinal dietary patterns using newly developed statistical methods. 2011-2013: \$330,058. Administering institution: Monash University.
- Gabbe B. Improving the measurement of non-fatal injury burden – validating the Global Burden of Disease (GBD) project through synthesis and analysis of the six leading injury outcome cohort studies from around the world. 2012-2013: \$151,755. Administering institution: Monash University.
- Gardiner EE, Andrews RK. Platelet receptor regulation in autoimmune disease. 2010-2012: \$489,500. Administering institution: Monash University.
- Gavin A. The role of NOD proteins in T cell development and function. 2011-2013: \$337,524. Administering institution: Burnet Institute.
- Gerondakis S. The NF- κ B transcription factors c-Rel and RelA control multiple steps in natural CD4 regulatory T cell development. 2012-2014: \$548,005. Administering institution: Monash University.
- Glass D. Immunological and respiratory effects among workers exposed to engineered nanoparticles. 2012-2014: \$499,222. Administering institution: Monash University.
- Gorry P. Elucidating unique molecular mechanisms involved in HIV-1 subtype C pathogenicity. 2012-2014: \$686,365. Administering institution: Burnet Institute.
- Gorry P, Churchill M, Lewin S. Elucidating the flexibility of co-receptor engagement by HIV-1 important for macrophage tropism and escape from entry inhibitors. 2011-2013: \$613,194. 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. 2011-2015: \$2,219,157. Administering institution: Monash University.
- Gregorevic P, Harvey K. Investigating Hippo signalling as a novel cause of muscle disease and as a target for new interventions to combat frailty. 2011-2013: \$444,615. Administering institution: Baker IDI.
- Gregorevic P, Larsson L, Haviv I. Dissecting microRNA dysregulation as a mechanism underlying muscle wasting. 2010-2012: \$496,125. Administering institution: Baker IDI.
- Gugasyan R, Berzins S. NF κ B1 is a novel regulator of CD8+ T cell development and memory cell generation. 2010-2012: \$422,400. Administering institution: Burnet Institute.
- Guthridge M. Dual inhibition of independent cell survival pathways as a new approach for targeting leukaemic stem cells. 2012-2014: \$543,675. Administering institution: Monash University.
- Guthridge M. The regulation of pleiotropic responses by bidentate motifs embedded in the fibroblast growth factor receptors. 2010-2012: \$428,065. Administering institution: Monash University.
- Guthridge M, Nilsson S. The role of osteopontin in leukaemia. 2011-2013: \$585,048. Administering institution: Monash University.

- Hagemeyer C, Johnston A, Peter K. Antibody targeted thrombin-activatable μ -plasminogen fusion proteins and nanocapsules for the treatment of acute thrombosis. 2012-2014: \$518,675. Administering institution: Baker IDI.
- Head G, Allen A, Davern P. Importance of the brain renin-angiotensin system for regulating blood pressure and cardiovascular autonomic function. 2011-2013: \$588,390. Administering institution: Baker IDI.
- Hibbs M, Anderson G. Defining subpopulations of pathogenic macrophages underlying lung diseases. 2011-2013: \$618,390. Administering institution: Monash University.
- Hibbs M, Tarlinton D. Defining the cellular and molecular mechanisms underlying autoimmunity using a model of SLE. 2011-2013: \$603,390. Administering institution: Monash University.
- Hogarth P, Wines B, Powell M, Baker R. Structure and function of receptors for IgG (Fc γ RI). 2011-2013: \$655,074. Administering institution: Burnet Institute.
- Jackson S. Investigation of a new leukocyte recruitment mechanism at sites of vascular injury. 2012-2014: \$528,675. Administering institution: Monash University.
- Jackson SP, Hamilton J. Investigating the role of type II PI 3-kinases in platelet function. 2011-2013: \$429,615. Administering institution: Monash University.
- Jackson SP, Nesbitt WS. Investigating biomechanical platelet activation mechanisms. 2011-2013: \$496,706. Administering institution: Monash University.
- Jackson SP, Schoenwaelder S. Investigation of a new approach to regulate fibrin clot retraction and arterial thrombolysis. 2010-2012: \$465,560. Administering institution: Monash University.
- Jackson D, Wright M, Ashman L. Tetraspanins serve as molecular facilitators to regulate platelet thrombus formation. 2010-2012: \$568,500. Administering institution: Burnet Institute.
- Jane SM, Cunningham JM. Identification and characterization of a novel tumour suppressor. 2010-2012: \$570,732. Administering institution: Monash University.
- Jane SM, Wilanowski T. A novel genetic element controlling adult haemoglobin production. 2012-2014: \$477,260. Administering institution: Monash University.
- Jane SM, Wilanowski T. Identification of critical factors for the establishment and maintenance of the epidermal barrier. 2012-2014: \$648,675. Administering institution: Monash University.
- Jane SM, Zhao Q, Street I, Parisot J. Identification of novel mechanisms governing stage-specific regulation of the human globin genes. 2011-2013: \$551,881. Administering institution: Monash University.
- Jandeleit-Dahm K, Thomas M, Bierhaus A. Targeting the AGE/RAGE axis in diabetes associated atherosclerosis. 2010-2012: \$523,500. Administering institution: Baker IDI.
- Jandeleit-Dahm K, Schmidt H, de Haan J, Winkler K. NOX isoforms in diabetes associated vascular injury: implications for therapeutic strategies. 2011-2013: \$426,273. Administering institution: Baker IDI.
- Kent SJ, Stambas J. Comparative effectiveness of vaccine-induced SIV-specific CD8 T cells. 2010-2012: \$588,750. Administering institution: University of Melbourne.
- Kinner S, Preen D, Lennox N, Butler T, Power R, Ober C, Ware R. Improving the health of Indigenous and non-Indigenous ex-prisoners: a multi-jurisdictional, mixed-methods study. 2011-2014: \$1,386,769. Administering institution: Burnet Institute.
- Kingwell B, de Courten B. Novel metabolic actions of HDL with therapeutic potential for Type 2 diabetes. 2010-2012: \$540,900. Administering institution: Baker IDI.
- Kulkarni J, Davis S, Gurvich C. Selective estrogen receptor modulators (SERMs) – a potential new treatment for women of child-bearing age with psychotic symptoms of schizophrenia. 2011-2012: \$205,016. Administering institution: Monash University.
- Lahoud M. Molecular characterisation of the dendritic cell receptor Clec9a and its ligand interactions. 2012-2014: \$640,405. Administering institution: Burnet Institute.
- Lambert E, Head G, Schlaich M, Straznicki N. Role of sympathetic nervous system in the development of early organ damage in obesity: an emerging target for therapy. 2010-2012: \$523,625. Administering institution: Baker IDI.
- Lambert G, Barton D. Interactions between the serotonin transporter and sympathetic nervous activation in patients with major depressive disorder - Understanding the link between the brain and the heart. 2012-2014: \$509,250. Administering institution: Baker IDI.
- Lambert G, Barton D, Dixon J, Straznicki N. A randomised trial examining the effectiveness of sympathetic nervous inhibition in alleviating the metabolic side effects of antipsychotic medications in patients with schizophrenia. 2012-2014: \$461,250. Administering institution: Baker IDI.
- Lambert G, Teede H, Dixon J, Tilbrook A. Polycystic ovary syndrome - targeting the sympathetic nervous system to improve outcomes. 2012-2014: \$341,175. Administering institution: Baker IDI.
- Lazarus R, Blangero J, Bozaoglu K. Genetics to function: identifying transcripts mediating the biological effects of GWAS SNPs. 2012-2014: \$423,579. Administering institution: Baker IDI.
- Lee-Young R. Understanding the metabolic consequences of impaired AMPK α 2 and nNOS μ in skeletal muscle: implications for the metabolic syndrome. 2011-2013: \$556,706. Administering institution: Baker IDI.
- 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.
- Lewin S, Cameron P, Jaworowski A, Cunningham A. The role of chemokines in establishing HIV latency. 2011-2013: \$359,208. Administering institution: Monash University.
- Lewin S, Churchill M, Wesselingh S. Histone deacetylase inhibitors and HIV latency. 2011-2013: \$593,416. Administering institution: Monash University.
- Lewin S, Matthews G, Torresi J, Crane M. Liver disease in HIV-HBV co-infection. 2012-2015: \$682,330. Administering institution: Monash University.
- Liu J-P. Studies of novel manganese transporter in lysosomes and its implications in Niemann-Pick type-C disease. 2011-2013: \$506,706. Administering institution: Monash University.
- Mackay F, Hertzog P. The role of BAFF, its receptor TACI and toll-like receptors in autoimmunity and tolerance. 2011-2013: \$470,022. Administering institution: Monash University.
- Magliano D, Shaw J, Huxley R, Balkau B, Davis W. The Australian and New Zealand Diabetes and Cancer Collaboration. 2011-2013: \$398,591. Administering institution: Baker IDI.

- Magliano D, Shaw J, Peeters A, Kookana R, Melzer D, Mueller J. The role of Bisphenol A in the development of chronic disease. 2012-2013: \$384,002. Administering institution: Baker IDI.
- McMullen J. PI3K-regulated heat shock proteins and microRNAs as new treatment strategies for atrial fibrillation. 2011-2013: \$534,615. Administering institution: Baker IDI.
- McMullen J. Manipulating cardiac-selective PI3K targets to reverse heart failure progression. 2011-2013: \$514,615. Administering institution: Baker IDI.
- McMullen J, Lin RCY. Targeting PI3K regulated microRNAs to treat heart failure. 2010-2012: \$514,125. Administering institution: Baker IDI.
- Medcalf R. To understand the role of the plasminogen activating and matrix metalloproteinase systems in traumatic brain injury. 2010-2012: \$481,500. Administering institution: Monash University.
- Medcalf R, Bottomley S, Samson A. To investigate how the aggregation of proteins during neuronal injury promotes neurotoxic plasmin formation. 2010-2012: \$565,500. Administering institution: Monash University.
- Medcalf R, Lawrence D. To determine the means by which plasminogen activators modulate integrity of the blood brain barrier. 2010-2012: \$504,500. Administering institution: Monash University.
- Meikle P, Tonkin A, Jowett J, Kowalczyk A, Hillis G, Zoungas S, Thompson P. Metabolomic insights into the pathogenesis and risk assessment of unstable coronary artery disease. 2012-2014: \$847,185. Administering institution: Baker IDI.
- Millar I, Williamson O, Cameron P, Myles P. Hyperbaric oxygen in lower limb trauma: a randomised controlled clinical trial. 2008-2012: \$684,375. Administering institution: Monash University.
- Myles P, Silbert B, Cooper DJ, McNeil J. Completion of the ATACAS trial. 2011-2014: \$3,328,614. 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'Hehir R, Rolland J. Human CD4+ T cell epitope-based therapeutic for peanut allergy. 2011-2013: \$389,208. Administering institution: Monash University.
- O'Hehir R, Rolland J, Bruce C, Hardy C. Impaired respiratory tolerance in obesity – the link with asthma? 2012-2014: \$644,685. Administering institution: Monash University.
- O'Keefe M, Radford K, Banerjee A. Production of interferon lambda by dendritic cell subsets and role in adjuvant effects of poly I:C. 2011-2013: \$383,028. 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.
- Peeters A. Predicting the impact of current obesity and diabetes trends on future prevalence of cardiovascular disease in Australia. 2012-2013: \$217,430. Administering institution: Baker IDI.
- Peleg AY. Characterizing the molecular mechanisms of clinically important bacterial-fungal interactions; the potential to uncover novel therapeutic targets. 2011-2013: \$472,438. Administering institution: Monash University.
- Peter K. CD40L/Mac-1 as therapeutic target in inflammatory diseases in particular atherosclerosis. 2010-2012: \$539,500. Administering institution: Baker IDI.
- Peter K, Bobik A. Preventing myocardial infarction: A mouse model of atherosclerotic plaque instability/rupture as unique tool for establishing novel pharmacological strategies and targeted molecular imaging. 2011-2013: \$566,706. Administering institution: Baker IDI.
- Peter K, Hagemeyer C, Ackermann U, O'Keefe G. Novel 18F and 64Cu labelled targeted nanoparticles for molecular positron emission tomography: A means for early and sensitive detection of thrombosis, inflammation and vulnerable, rupture-prone atherosclerotic plaques. 2012-2014: \$553,510. Administering institution: Baker IDI.
- Piterman L, Paul CL, Gibberd R, Shaw JE. RCT of continuing medical education and feedback to altering diabetes population outcomes. 2009-2013: \$900,825. Administering institution: Monash University.
- Plebanski M, O'Hehir R, Hardy C, Friend J, Rolland J. Mechanisms of nanoparticle-mediated inhibition of asthma. 2011-2013: \$615,903. Administering institution: Monash University.
- Ponsford J, O'Donnell M, Lee N. Motivational interviewing with cognitive behavioural therapy for anxiety and depression following traumatic brain injury. 2010-2012: \$442,825. Administering institution: Monash University.
- Ponsford J, Rajaratnam SW. Efficacy of melatonin for sleep disturbance following traumatic brain injury. 2012-2014: \$217,407. Administering institution: Monash University.
- Poumbourios P, Drummer H, Yuriev E. Elucidating the activation mechanism of the HIV-1 envelope glycoproteins, gp120-gp41. 2011-2013: \$615,074. Administering institution: Burnet Institute.
- Power D. The role of fatty acid metabolism in renin secretion. 2010-2012: \$561,500. Administering institution: Burnet Institute.
- Reeder J, Barry A, Mueller I, Siba P. Population genomics of *Plasmodium vivax* in Papua New Guinea. 2011-2013: \$576,706. Administering institution: Burnet Institute.
- Schlaich M, Lambert G. Renal denervation for uncontrolled hypertension. 2012-2016: \$2,073,675. Administering institution: Baker IDI.
- Schlaich M, Lambert G. Sympathetic nervous system inhibition for the treatment of diabetic nephropathy. 2010-2012: \$439,125. Administering institution: Baker IDI.
- Schlaich M, May C. Catheter based renal denervation to improve outcomes in congestive heart failure. 2011-2013: \$598,533. Administering institution: Baker IDI.
- Schmidt H, Morganti-Kossmann C, Winkler K, Armitage M. Role and mechanism of NADPH oxidase in ischemic stroke and neurotrauma. 2010-2012: \$560,250. Administering institution: Monash University.
- Schoenwaelder S, Josefsson E. Investigating the contribution of distinct mitochondrial cell death pathways to platelet survival and function. 2012-2014: \$613,375. Administering institution: Monash University.
- Shaw J, Zimmet P, Anstey K, Kavanagh A, Atkins R, Chadban S, Dunstan D, Balkau B. AusDiab 3: emerging risk factors for and long-term incidence of cardio-metabolic diseases. 2011-2014: \$2,537,113. Administering institution: Baker IDI.
- Slape C, Curtis D, Jane S. Molecular analysis of myelodysplasia in the Nup98HoxD13 mouse model. 2010-2012: \$340,873. Administering institution: Monash University.

- Slattery R, Miller J. The role of MHC class I expression on pancreatic ductal lineage cells in the pathogenesis of Type 1 diabetes. 2010-2012: \$467,200. Administering institution: Monash University.
- Stewart S, Jennings G, Bergin P, de Courten B, Lee G, Carrington M, Wong C. A randomised controlled trial of a Nurse-led Intervention for Less Chronic Heart Failure: the NIL-CHF Study. 2008-2012: \$1,101,990. Administering institution: Baker IDI.
- 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.
- 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.
- Sviridov D, Bukrinsky M, Slobedman B, Mukhamedova N. ABCA1 – an intersection between infection, atherosclerosis and metabolic disorders. 2012-2014: \$631,671. Administering institution: Baker IDI.
- Sviridov D, Remaley A, Shaw J, Turner S. Novel apolipoprotein A-I mimetic peptides: a research tool and a therapeutic agent to study and treat atherosclerosis. 2011-2013: \$389,208. Administering institution: Baker IDI.
- Sviridov D, Smyth I, Jowett J, Fu Y, Kelsell D. ABCA12 – a new regulator of cellular lipid metabolism. 2012-2014: \$699,685. Administering institution: Baker IDI.
- Tachedjian G, Cone R, Perlmutter P. Lactic acid as a natural microbicide for HIV. 2012-2014: \$577,350. Administering institution: Burnet Institute.
- Tachedjian G, Gorry P, Ramsland P, Aguilar M-I. Elucidating the mechanism of action of dendrimer nanoparticles against HIV. 2011-2013: \$540,048. Administering institution: Burnet Institute.
- Tachedjian G, Harrigan R, Sluis-Cremer N, Sonza S. Silent mutations in the HIV-1 reverse transcriptase selected during antiretroviral therapy. 2010-2012: \$535,500. 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.
- Ting S, Russell S, Savageau G. The role of Ap2a2 in self-renewal of haematopoietic and leukemic stem cells. 2011-2013: \$505,942. Administering institution: Monash University.
- Thien F, Thompson B, Robinson P, Harris B, Cowin G. Ventilation heterogeneity and airway remodelling in asthma. 2010-2012: \$504,750. Administering institution: Monash University.
- Thomas M, Tikellis C. Exploring the therapeutic potential of TRAIL in diabetes and the metabolic syndrome. 2012-2014: \$431,250. Administering institution: Baker IDI.
- Thompson B, Thien F, Douglass J, King G, O'Hehir R. Physiological aetiology of refractory asthma. 2011-2013: \$344,208. Administering institution: Monash University.
- Urquhart D, Wluka A, Sim M, van Tulder M, Forbes A, Gibson S. Is low dose amitriptyline more effective than placebo in the management of chronic, neuropathic low back pain? A double-blind, randomised, placebo-controlled trial with an economic evaluation. 2012-2014: \$296,155. Administering institution: Monash University.
- Wilkinson-Berka J, Campbell D, Slattery R, Miller A. Prorenin and the prorenin receptor in diabetic retinopathy: involvement of the Wnt pathway and inflammation. 2011-2013: \$560,022. Administering institution: Monash University.
- Wilkinson-Berka J, Peti-Peterdi J, Miller A. Evaluating the link between the GPR91 receptor and renin in the pathogenesis of diabetic retinopathy. 2011-2013: \$470,022. Administering institution: Monash University.
- Williams D, Silburn P, Rowe C, Cook M, Kinsella G, Bittar R. Finding the optimum target and predictors of outcome in deep brain stimulation of older patients with Parkinson's disease. 2010-2012: \$496,150. Administering institution: Monash University.
- Woodcock E, Grubb D. SHANK3 as a target to reduce hypertrophy and heart failure. 2011-2013: \$530,048. Administering institution: Baker IDI.
- Woodcock E, Iismaa S. Identification of novel targets for treatment of heart failure. 2012-2014: \$470,286. Administering institution: Baker IDI.
- Woodcock E, Kistler P. Phospholipase C β 1b, a target to limit atrial dilatation. 2011-2013: \$526,299. Administering institution: Baker IDI.
- Wright M. The role of the tetraspanins CD37 and CD82 in leukocyte migration. 2012-2014: \$358,510. Administering institution: Monash University.

Australia Fellowships

- Cooper M. 2009-2013. Administering institution: Baker IDI.
Jackson S. 2010-2014. Administering institution: Monash University.

Research Fellowships

- Allen T. 2008-2013. Administering institution: Baker IDI.
Anderson D. 2007-2012. Administering institution: Burnet Institute.
Andrews R. 2011-2015. Administering institution: Monash University.
Clifton P. 2012-2016. Administering institution: Baker IDI.
Crowe S. 2008-2012. Administering institution: Burnet Institute.
Dart A. 2010-2014. Administering institution: Baker IDI.
Davis S. 2008-2012. Administering institution: Monash University.
Degenhardt L. 2011-2013. Administering institution: Burnet Institute.
Dietze P. 2011-2015. Administering institution: Burnet Institute.
Dixon J. 2010-2014. Administering institution: Baker IDI.
El-Osta A. 2009-2013. Administering institution: Baker IDI.
Esler M. 2010-2014. Administering institution: Baker IDI.
Febbraio MA. 2012-2016. Administering institution: Baker IDI.
Gerondakis S. 2011-2015. Administering institution: Monash University.
Head G. 2011-2015. Administering institution: Baker IDI.
Hellard M. 2009-2013. Administering institution: Burnet Institute.
Hibbs M. 2010-2014. Administering institution: Monash University.
Hogarth M. 2007-2012. Administering institution: Burnet Institute.
Jackson D. 2009-2013. Administering institution: Burnet Institute.
Jandeleit-Dahm K. 2009-2013. Administering institution: Baker IDI.
Kaye D. 2008-2012. Administering institution: Baker IDI.
Kent S. 2008-2012. Administering institution: University of Melbourne.
Kingwell B. 2009-2013. Administering institution: Baker IDI.
Lambert G. 2007-2012. Administering institution: Baker IDI.
Mackay F. 2012-2016. Administering institution: Monash University.
McMullen J. 2010-2014. Administering institution: Baker IDI. (Honorary)
Medcalf RL. 2008-2012. Administering institution: Monash University.
Meikle P. 2008-2012. Administering institution: Baker IDI.
Owen N. 2011-2015. Administering institution: Baker IDI.

Peter K. 2010-2014. Administering institution: Baker IDI. (Honorary)
 Plebanski M. 2008-2012. Administering institution: Monash University.
 Reeder J. 2009-2013. Administering institution: Burnet Institute.
 Reid C. 2008-2012. Administering institution: Monash University.
 Ritchie R. 2008-2013. Administering institution: Baker IDI.
 Schlaich M. 2010-2014. Administering institution: Baker IDI.
 Shaw J. 2010-2014. Administering institution: Baker IDI.
 Stewart S. 2008-2012. Administering institution: Baker IDI.
 Sviridov D. 2010-2014. Administering institution: Baker IDI.
 Tachedjian G. 2009-2013. Administering institution: Burnet Institute.
 Thomas M. 2010-2014. Administering institution: Baker IDI.
 Wilkinson-Berka. 2011-2015. Administering institution: Monash University.
 Woodcock E. 2010-2014. Administering institution: Baker IDI.

Practitioner Fellowships

Buchbinder R. 2010-2014. Administering institution: Monash University.
 Cameron P. 2009-2013. Administering institution: Monash University.
 Fitzgerald P. 2010-2014. Administering institution: Monash University.
 Gruen R. 2012-2016. Administering institution: Monash University.
 Kistler P. 2012-2016. Administering institution: Baker IDI.
 Krum H. 2012-2016. Administering institution: Monash University.
 Lewin SR. 2008-2012. Administering institution: Monash University.

Career Development Fellowships

Carrington M. 2012-2015. Administering institution: Baker IDI.
 Cheng A. 2011-2014. Administering institution: Monash University.
 Cherry C. 2009-2012. Administering institution: Burnet Institute.
 de Courten B. 2006-2013. Administering institution: Baker IDI.
 Drummer H. 2008-2012. Administering institution: Burnet Institute.
 Gicquel C. 2008-2012. Administering institution: Baker IDI.
 Gorry P. 2009-2012. Administering institution: Burnet Institute.
 Hagemeyer C. 2008-2012. Administering institution: Baker IDI.
 Hughan S. 2009-2012. Administering institution: Monash University.
 Kinner S. 2011-2014. Administering institution: Burnet Institute.
 Leder K. 2011-2014. Administering institution: Monash University.
 O'Keefe M. 2011-2014. Administering institution: Burnet Institute.
 Urquhart D. 2011-2014. Administering institution: Monash University.
 Weller C. 2012-2015. Administering institution: Monash University.
 Wluka A. 2009-2012. Administering institution: Monash University.

Early Career Fellowships

Abbott A. 2008-2012. Administering institution: Baker IDI.
 Ahimastos A. 2007-2012. Administering institution: Monash University.
 Audsley J. 2009-2013. Administering institution: Monash University.
 Bilardi J. 2011-2014. Administering institution: Monash University.
 Binger K. 2012-2015. Administering institution: Baker IDI.
 Chang J. 2008-2013. Administering institution: Monash University.
 Davern P. 2011-2014. Administering institution: Baker IDI.
 Dowrick A. 2011-2014. Administering institution: Alfred Health.
 Drew B. 2009-2013. Administering institution: Baker IDI.
 Driscoll A. 2009-2012. Administering institution: Monash University.
 Elliott J. 2012-2015. Administering institution: Monash University.
 Enticott P. 2009-2012. Administering institution: Monash University.

Fletcher A. 2009-2012. Administering institution: Monash University.
 Fowkes F. 2011-2013. Administering institution: Burnet Institute.
 Giles M. 2009-2012. Administering institution: Alfred Health.
 Gray L. 2010-2013. Administering institution: Monash University.
 Gurchich C. 2009-2012. Administering institution: Monash University.
 Hanna F. 2007-2012. Administering institution: Baker IDI.
 Hodgson C. 2012-2015. Administering institution: Monash University.
 Hoy K. 2009-2012. Administering institution: Monash University.
 Keegel T. 2009-2012. Administering institution: Monash University.
 Latouche C. 2011-2012. Administering institution: Baker IDI
 Li H. 2010-2012. Administering institution: Monash University.
 Lim M. 2009-2012. Administering institution: Burnet Institute.
 Lundie R. 2011-2012. Administering institution: Burnet Institute.
 Lynch B. 2010-2015. Administering institution: Baker IDI.
 McNamara B. 2010-2015. Administering institution: Baker IDI.
 McKenzie D. 2009-2012. Administering institution: Monash University.
 O'Connor D. 2010-2013. Administering institution: Monash University.
 Panjari M. 2012-2015. Administering institution: Monash University.
 Peleg AY. 2010-2013. Administering institution: Monash University.
 Richards J. 2012-2015. Administering institution: Burnet Institute.
 Smith MZ. 2008-2013. Administering institution: Monash University.
 Thompson K. 2007-2012. Administering institution: Alfred Health.
 Watson A. 2008-2013. Administering institution: Baker IDI.
 Wright E. 2011-2014. Administering institution: Burnet Institute.
 Zatta A. 2010-2013. Administering institution: Monash University.

Other Australian Grants

AusAID – Bilateral Program Grants

Morgan C. China-Australia health facility. 2007-2012: \$38,744,289.
 Administering institution: Burnet Institute.

Morgan C. Tibet health sector support project. 2004-2011: \$1,347,543.
 Administering institution: Burnet Institute.

AusAID – Development Research Awards

Toole M. Modelling sexual and social networks of urban men who have sex with men and women in Vietnam and the Lao PDR. 2008-2012: \$781,039. Administering institution: Burnet Institute.

AusAID – NGO Cooperation Program

Dorning K. Improving community demand for timely maternal & child health services in four rural townships located near Yangon, Burma - 4 townships near Yangon: Teikkyi, Thonegwa, Kayan, Mawbi. 2012-2013: \$65,885. Administering institution: Burnet Institute.

Toole M. HIV Prevention in Lhasa - Lhasa Municipality, Tibet Autonomous Region. 2012-2013: \$64,490. Administering institution: Burnet Institute.

AusAID – NGO Project Grants

Dorning K. Periodic Fund for Humanitarian Assistance to Burma (PFHAB). 2011-2012: \$88,172. Administering institution: Burnet Institute.

Holmes W. Women's and Children's Health Knowledge Hub. 2008-2012: \$6,883,962. Administering institution: Burnet Institute.

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.

Whitney R, Otto B, Toole M, Morgan D, Kwarteng T, Vaughan C, Holmes W. Community based HIV programs for youth and vulnerable populations. 2001-2012: \$2,987,649. Administering institution: Burnet Institute.

Australian and New Zealand College of Anaesthetists – Research Grant

Myles P, Leslie K, Chan. ENIGMA-II trial long-term follow-up study. 2010-2012: \$180,000. Administering institution: Alfred Health.

Australian Research Council – Discovery Projects

Enticott P. What is the functional significance of mirror neurons? Contrasting the adaptation and association models of the mirror neuron system. 2012-2013: \$155,000. Monash University.

Fisher JR, Biggs B, Rosenthal DA, Dwyer TD, Casey GJ, Tran T, Nguyen NT. Maternal mental health and anaemia as determinants of infant health and development in resource constrained settings. 2009-2011: \$220,000. Administering institution: Monash University.

Fitzgerald P. Studying the effects of repetitive transcranial magnetic stimulation with near infrared spectroscopy. 2010-2012: \$275,000. Administering institution: Monash University.

Forde GM, Plebanski M. Biodegradable immuno-therapeutic nanoparticles. 2009-2011: \$420,000. Administering institution: Monash University.

Jackson SP, Nestbitt WS, Fouras A. Development of model systems to investigate blood hydrodynamic parameters affecting blood cell function: an interdisciplinary approach. 2009-2011: \$300,000. Administering institution: Monash University.

Meeusen EN, O'Hehir R. Molecular determinants of an allergic response. 2009-2011: \$370,000. Administering institution: Monash University.

Renzaho AM, Swinburn BA, Lo SK, Mellor DJ, Green JB. African youth and obesity: The role of the intergenerational acculturation gap. 2012-2013: \$73,680. Monash University.

Australian Research Council – Discovery Early Career Researcher Awards

Jeffrey KL. 2012-2014. Administering institution: Monash University.

Smith PM. 2012-2014. Administering institution: Monash University.

Australian Research Council – Future Fellowships

Beeson J. 2011-2013. Administering institution: Burnet Institute.

Dietze P. 2010-2014. Administering institution: Burnet Institute.

Dunstan D. 2010-2014. Administering institution: Baker IDI.

Gavin AL. 2009-2013. Administering institution: Burnet Institute.

Gorry PR. 2012-2016. Administering institution: Burnet Institute.

Karagiannis T. 2012-2016. Administering institution: Baker IDI.

Mak J. 2010-2014. Administering institution: Burnet Institute.

McMullen J. 2009-2013. Administering institution: Baker IDI.

Peter K. 2009-2013. Administering institution: Baker IDI.

Renzaho AM. 2012-2015. Administering institution: Monash University.

Australian Research Council – Linkage Grants

Muir J, Gibson P, Bekes F, Suter D. Development of novel cereal grain products for wheat and gluten intolerant Australians. 2010-2014: \$519,000. Administering institution: Monash University.

George J, Abramson M, Bonesvki B, Dooley M, Taylor S, Poole S, Weeks G. Smoking cessation program for smokers admitted to public hospitals. 2011-2014: \$271,854. Administering institution: Monash University.

Australian Research Council – Research in Bionic Vision Science and Technology

Lowery A, Rosa M, Rosenfeld JV, Rajan R, Smith-Miles K, Kleeman L, Forsythe J, Adler B, Rood J, Hall A, Karmakar NC, Li WH, Harvey E. Direct stimulation of the visual cortex: a flexible strategy for resorting high-acuity pattern vision. 2010-2013: \$8,000,000. Administering institution: Monash University.

beyondblue National Priority Drive Research Grant Program – Research Grant

Oldenburg B, Hollingsworth B, Hare D, Atherton J, Jelinek M, Hawkes A, Sanderson K, Taylor B. MOODCARE: effectiveness of a telephone-delivered intervention to improve health outcomes of post-acute coronary syndrome patients with depression. 2011-2012: \$86,677. Administering institution: Monash University.

Fitzgerald P. A randomised controlled trial of magnetic seizure therapy in major depressive disorder. 2012-2014: \$121,890. Administering institution: Monash University.

BUPA Health Foundation – Project Grant

Davis S, Bell R. Life after breast cancer study. 2010-2013: \$778,911. Administering institution: Monash University.

Cancer Australia – Priority-driven Collaborative Cancer Research Scheme

Evans S, Bolton D, Costello A, David I, Frauman A, Frydenberg M, Giles G, Jolley D, McNeil J, Millar J. Determining the causes of observed variation in survival after diagnosis of prostate cancer. 2011-2013: \$570,552. Administering institution: Monash University.

Millar J, Davis I, Bolton D, Giles G, Costello T, McNeil J, Evans S. Pilot of a population-based prostate cancer clinical registry. 2010-2013: \$592,875. Administering institution: Monash University.

Cancer Council Victoria – Grant-in-Aid

Bach LA, Rice G. Insulin-like growth factor binding protein-6 & ovarian cancer. 2011-2013: \$292,524. Administering institution: Monash University.

Cardiac Society of Australia and New Zealand – World Congress of Cardiology/CSANZ Research Investigatorship

Hare J. Use of myocardial tissue characterisation by cardiac MRI to identify subclinical left ventricular dysfunction in patients undergoing anthracycline chemotherapy. 2011-2012. Administering institution: Baker IDI.

CASS Foundation – Science and Medicine Grants

Bye N, Morganti-Kossmann C. Validating the use of nanoparticles to visualise brain inflammation following injury. 2012: \$50,000. Administering institution: Monash University.

Chin-Dusting J. Causative mechanisms underlying hypertension induced coronary artery disease. 2012: \$50,000. Administering institution: Baker IDI.

Hogarth M. Development of novel anti-arthritis drugs. 2012: \$50,000. Burnet Institute.

O'Hehir R, Rolland JM, Mackay F, Hardy C. Follistatin therapy for cystic fibrosis and other lung inflammatory diseases. 2012: \$60,000. Administering institution: Monash University.

CSIRO – Flagship Cluster

McNeil J, Burgess A, Masters C, Nelson M. ASPREE Healthy Ageing Biobank. 2010-2012: \$2,442,000. Administering institution: Monash University

Dairy Innovation Australia – Dairy Innovation Research Grant

Meikle P. The relationship between dairy food, insulin resistance and the risk of type 2 diabetes. 2011-2013: \$155,000. Administering institution: Baker IDI.

Department of Health and Ageing (Federal Government)

Dietze P, Hellard M. Illicit Drug Reporting System (IDRS). 2010-2012: \$192,204. Administering institution: University of New South Wales.

Gruen R. Australian Satellite of Cochrane Effective Practice and Organisation of Care (EPOC) Group. 2009-2012: \$180,000. Administering institution: Monash University.

Hellard M. Ecstasy and Related Drug Reporting System (EDRS). 2010-2012: \$167,384. Administering institution: University of New South Wales.

Dietze P. Drug policy modelling program. 2011-2012: \$178,644. Administering institution: University of New South Wales.

Wilson J. Victorian cystic fibrosis e-health statement CF telemedicine project. 2011-2012: \$450,000. Administering institution: Alfred Health.

Department of Health (Victorian Government)

Arnold C, Gibson S, Hogg M. VICPPPOP - Victorian Persistent Pain Outcomes Project. 2012: \$74,076. Administering institution: Alfred Health.

Avery S. Positive Change for Life – Improving health, wellbeing and quality of life for survivors of blood cancer following stem cell transplantation by promoting a healthy lifestyle through diet and physical activity. 2011-2013: \$259,315. Administering institution: Monash University.

Crowe S. HIV susceptibility testing using genotyping. 2011-2012: \$758,057. Administering institution: Burnet Institute.

Evans S, Millar J. Expansion of the Prostate Cancer Registry across Victoria. 2011: \$130,130. Administering institution: Monash University.

Haskett M. Melanoma shared care, a tripartite approach for survival! The patient, their GP and their specialist. 2012-2013: \$150,000. Administering institution: Alfred Health.

Livingstone C, Bruce E. Problem gambling project evaluation. 2011-2012: \$33,450. Administering institution: Monash University.

McNeil J, Reid C, Tonkin A. Australian Cardiac Procedures Registry. 2011-2013: \$200,000. Administering institution: Monash University.

Nicholes M, Billing S, Gill L, Austin N, Hunter P. Can community dwelling in older adults complete a person based Advanced Care Directive to provide useful information to substitute decision makers? 2011-2013: \$22,868. Administering institution: Alfred Health.

Diabetes Australia Research Trust – General Grants

Backholer K, Magliano D, Peeters A, Shaw J, Chen L. Long-term population health impact of type 2 diabetes screening and prevention strategies among Australian adults. 2012: \$39,769. Administering institution: Baker IDI.

Gregorevic P, Febbraio M, Bruce C, Forbes J. Evaluating follistatin as a novel therapeutic for diabetes, and for diabetic complications. 2012: \$59,500. Administering institution: Baker IDI.

Febbraio M, Whitham M. Effect of adipose tissue specific deletion of Interleukin 6 on insulin sensitivity. 2012: \$39,769. Administering institution: Baker IDI.

Jandeleit-Dahm K, Kantharidis P, Agrotis A. Targeting a new microRNA in diabetes associated atherosclerosis and restenosis. 2012: \$39,769. Administering institution: Baker IDI.

Kantharidis P, Wang B. The microRNA-29 is a regulator of diabetic renal fibrosis. 2012: \$59,462. Administering institution: Baker IDI.

Miller A. Evaluation the molecular detail of epigenetic memory in diabetic retinopathy. 2012: \$59,250. Administering institution: Monash University.

Oldenburg B. The process of care in managing people with type 2 diabetes: What is the impact of peer support on uptake and effective implementation of care plans in the self-management of diabetes? 2012: \$56,465. Administering institution: Monash University.

Ritchie R, Kemp-Harper B, Delbridge L. The novel HNO donor 1-nitrosocyclohexyl acetate (1-NCA) blocks diabetes-induced cardiac dysfunction. 2012: \$60,000. Administering institution: Baker IDI.

Wilkinson-Berka J. The contribution of NADPH oxidase and microglia to diabetic retinopathy. 2012: \$59,389. Administering institution: Monash University.

Wong J, Chavaris S. Improving the metabolic health of patients treated with Clozapine, an atypical antipsychotic. 2012: \$31,000. Administering institution: Monash University.

Diabetes Australia Research Trust – Viertel Fellowship

Sourris K. 2012-2013. Administering institution: Baker IDI.

Dairy Innovation Australia – Dairy Innovation Research Grants

Meikle P. The relationship between dairy food, insulin resistance and the risk of type 2 diabetes. 2011-2013: \$155,000. Administering institution: Baker IDI.

Ilhan Food Allergy Foundation – Research Grant

O'Hehir RE, Rolland JM, Prickett S. Induction of regulatory T-cell responses to inhibit 'anaphylactic'-type immune responses to nut allergens. 2011-2013: \$300,000. Administering institution: Monash University.

Institute for Safety, Compensation and Recovery Research – Development Grants

Cooper DJ, Maller J, Hwang P, Fedi M, Murray L, Vallance S, Dinesh V, Rosenfeld JV. Multimodal MRI imaging in patients with severe traumatic brain injury to determine structural impact of DECRA craniectomy surgery and early prognostication: Pilot studies. 2012: \$50,000. Administering institution: Monash University.

Cooper DJ, Murray L, Vallance S, Trapani T, Rosenfeld JV. Understanding how hypothermia impairs coagulation in patients with severe traumatic brain injury. 2012: \$50,000. Administering institution: Monash University.

Leukaemia Foundation – Clinical Trial Grant

Wei A, Spencer A. Investigating the role of targeted therapy with the FLT3 inhibitor for AML patients with FLT3 mutations (AML). 2011-2012: \$198,000. Administering institution: Monash University.

Leukaemia Foundation – Grants-in-Aid

Curtis D, Jane S. Testing small molecules that inhibit an enzyme expressed in chronic lymphocytic leukaemia. 2011-2012: \$95,239. Administering institution: Monash University.

Guthridge M. New approaches to targeting the survival of AML cells. 2011-2012: \$99,736. Administering institution: Monash University.

Multiple Sclerosis Research Australia – Incubator Grant

Alderuccio F. Regulatory T cells to treat experimental multiple sclerosis. 2012: \$24,200. Administering institution: Monash University.

National Heart Foundation of Australia – Career Development Fellowships

Hagemeyer C. 2012-2016. Administering institution: Baker IDI.

Hamilton J. 2008-2012. Administering institution: Monash University.

National Heart Foundation of Australia – Grants-in-Aid

Allen T, Chai Z. Modulation of TGF-beta signalling by CDA1 in the diabetic vasculature. 2011-2012: \$128,818. Administering institution: Baker IDI.

Chin-Dusting J, Moore S, Dart AM. Role of endothelial markers in understanding vascular competency in obese individuals. 2011-2012: \$128,992. Administering institution: Baker IDI.

Dart AM, Chin-Dusting J, Fang L, Moore S. Contribution of a novel population of fibroblasts: fibrocytes to atherosclerotic plaque stability. 2011-2012: \$119,000. Administering institution: Baker IDI.

Du XJ. Abnormal autonomic neurocardiac activity in Huntington's disease. 2011-2012: \$129,000. Administering institution: Baker IDI.

Dunstan D, Kingwell B, Thorp A, Owen N. Understanding the efficacy of reducing workplace sedentary time through increased standing on cardio-metabolic health: an experimental study using a simulated workplace environment. 2011-2012: \$128,912. Administering institution: Baker IDI.

Jandeleit-Dahm K, Kantharidis P, Agrotis A. The role of microRNA Let7b in proliferation and vascular disease in diabetes. 2012-2013: \$129,725. Administering institution: Baker IDI.

Kaye D. Nerve growth factor mediated cardiac regeneration. 2012-2013: \$129,956. Administering institution: Baker IDI.

McMullen J. Significance of ER alpha in the normal and failing heart of females and males. 2012-2013: \$130,000. Administering institution: Baker IDI.

Meikle P, Meredith I, Kowalczyk A, Zoungas S, Hills G. Prediction of unstable coronary disease. 2011-2012: \$129,000. Administering institution: Baker IDI.

Peter K. Novel single-chain antibody targeted microbubbles for molecular ultrasound imaging of thrombosis and inflammation. 2012-2013: \$130,000. Administering institution: Baker IDI.

Ritchie R. Annexin-A1 mimetics as targets for cardioprotection. 2012-2013: \$130,000. Administering institution: Baker IDI.

Siebel A, Kingwell B, Ritchie R, Vernardos K. Improving cardiac function and metabolism: Is HDL the missing link? 2012-2013: \$129,125. Administering institution: Baker IDI.

Straznicky N, Lambert E. Novel treatments to improve nutritional sympathetic and thermogenic responsiveness in metabolic syndrome obesity. 2012-2013: \$130,000. Administering institution: Baker IDI.

National Heart Foundation of Australia – Overseas Research Fellowship

Calkin A. The role of the nuclear receptor NR4A receptors in inflammation, lipid metabolism and atherosclerosis. 2009-2013. Administering institution: Baker IDI.

National Heart Foundation of Australia – Postdoctoral Fellowships

Henstridge D. Does heat shock protein 72 (HSP72) protect the heart from the deleterious effects of a high fat diet? 2011-2012. Administering institution: Baker IDI.

Irvine J. Novel NO siblings inhibit myocardial remodelling in diabetes. 2010-2012. Administering institution: Baker IDI.

Rajapakse N. Renal L-arginine transport mechanisms in hypertension. 2011-2012. Administering institution: Baker IDI.

Thorp A. Can reducing workplace sedentary time improve cardio-metabolic health? 2011-2012. Administering institution: Baker IDI.

Pfizer – Cardiovascular Lipid Research Grants

Childs W. The effects of chronic high-density lipoprotein (HDL) elevation with extended release niacin on peripheral arterial disease. 2012: \$45,000. Administering institution: Baker IDI.

Pfizer – Senior Research Fellowship

Gregorevic P. Using gene transfer technology to study and treat muscle-related disease. 2008-2012. Administering institution: Baker IDI.

Prostate Cancer Foundation of Australia – Project Grant

Tachedjian G. Xenotropic murine leukaemia virus-related virus (XMRV) in Australian prostate cancer. 2011-2012: \$187,500. Administering institution: Burnet Institute.

Sylvia and Charles Viertel Charitable Foundation – Senior Medical Research Fellowship

Curtis D. Using mouse models to identify improved therapies for hematologic malignancies. 2010-2014. Administering institution: Monash University.

Transport Accident Commission – Grants

Cameron P. Victorian Orthopaedic Trauma Outcomes Registry (VOTOR). 2011-2012: \$520,375. Administering institution: Monash University.

Gruen R, Rosenfeld J, Cooper DJ, Bernard S, Cameron P, Fitzgerald M, Ponsford J, Morganti-Kossmann C. Centre of Excellence in Traumatic Brain Injury Research. 2012-2014: \$3,340,000. Administering institution: Monash University.

Morganti-Kossmann C, Bye N. Enhancing the production of new neurons to promote neurological recovery following traumatic brain injury. 2011-2013: \$506,996. Administering institution: Monash University.

Victorian Cancer Agency – Research Fellowships

Bell R. Public Health. 2011-2012. Administering institution: Monash University.

Curtis D. Clinical. 2011-2012. Administering institution: Monash University.

Darido C. Clare Oliver Memorial Fellowship in Skin Cancer. 2012-2013. Administering institution: Monash University.

Magliano D. Public Health. 2011-2012. Administering institution: Baker IDI.

Wei A. Clinical. 2011-2012. Administering institution: Monash University.

Victorian Cancer Agency – Research Grants

Spencer A. Epigenetics and cancer therapy. 2010-2012: \$512,280. Administering institution: Alfred Health.

Watkins N, Brown T, Millar J, Stirling R, Solomon B, Ashley D, Fox S, Irving L, Wright G, Mitchell P, MacManus M, Waring P, John T, Ganju V. The Victorian lung cancer initiative. 2011-2013: \$1,671,672. Administering institution: Monash University.

Victorian Cancer Agency – Translational Cancer Research Grant

McNeil J, Reid C, Burton R, Woods R. Building translational clinical research capacity in regional Victoria through ASPREE and the Healthy Ageing Biobank. 2010-2012: \$1,921,000. Administering institution: Monash University.

Victorian Neurotrauma Initiative – Program Grants

Cooper DJ, Cameron P, Bernard S, Rosenfeld J, Nichol A. Early interventions to improve outcomes after traumatic brain injury. 2009-2012: \$2,100,000. Administering institution: Monash University.

Gruen R, Green S. Improving evidence-based care and the outcomes of patients with traumatic brain injury through a program to facilitate knowledge transfer and exchange. 2009-2014: \$4,399,539. 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. 2010-2014: \$2,100,000. Administering institution: Monash University.

INTERNATIONAL GRANTS

Association for International Cancer Research – Project Grant

Jane SM, Darido C. Identification of novel therapeutic targets in squamous cell carcinoma. 2011-2013: \$294,806. Administering institution: Monash University.

Bill and Melinda Gates Foundation – Grand Challenges in Global Health

Anderson D. Antigen-specific dimeric IgA for the serological diagnosis of tuberculosis. 2011-2012: US\$413,268. Administering institution: Burnet Institute.

Bill and Melinda Gates Foundation – Grand Challenges Explorations

Beeson J, Drew D. Accelerating vaccine development against *P. vivax* malaria. 2012-2013: US\$96,268. Administering institution: Burnet Institute.

International AIDS Society and National Institutes of Health – Creative and Novel Ideas in HIV Research Grant Program

Palmer C. Leucocyte metabolic and T cell specific immune dysfunction in HIV infection. 2011-2014: US\$600,000. Administering institution: Burnet Institute.

Juvenile Diabetes Research Foundation International – Career Development Award

Tikellis C. ACE2 in the vascular complications of Type 1 diabetes. 2010-2014. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Postdoctoral Fellowships

Tan SM. The effects of novel GPx1-mimetics in diabetic nephropathy. 2011-2013: Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Multi-project Grants

Cooper M. NOX isoforms in diabetic nephropathy. 2010-2013: US\$135,465. Administering institution: Baker IDI.

Jandeleit-Dahm K. NOX isoforms in diabetes-associated atherosclerosis. 2010-2013: US\$271,200. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Project Grants

Cooper M. Set 7: a novel target for diabetic vascular complications. 2008-2013: US\$1,250,000. Administering institution: Baker IDI.

Cooper M. Targeting CDA1 to treat diabetic renal fibrosis. 2009-2012: US\$696,555. Administering institution: Baker IDI.

El-Osta A. Understanding the mediators of metabolic memory. 2012: US\$55,000. Administering institution: Baker IDI.

Sakoda M. Diabetic nephropathy: role of renin-angiotensin system and memory. 2011-2013: US \$154,704. Administering institution: Baker IDI.

Thallas-Bonke V. Synergistic actions of NADPH oxidase and PKC in diabetic nephropathy. 2012-2014: US\$269,820. Administering institution: Baker IDI.

Wilkinson-Berka J. NOX-derived ROS: renal and vascular complications of type 1 diabetes. 2010-2012: US\$245,234. Administering institution: Monash University.

National Institutes of Health (USA)

Bukrinsky M, Sviridov D. Mechanisms of virus-induced impairment in reverse cholesterol transport. 2009-2014: US\$641,399. Administering institution: George Washington University.

Chaikof E, Peter K. Site-specific therapies to prevent intimal hyperplasia. 2011-2014: US\$50,000. Administering institution: Beth Israel Deaconess Medical Centre.

Grimm R, McNeil J. ASPIRIN in Reducing Events in the Elderly (ASPREE). 2010-2015: US\$23,372,347. Administering institution: Monash University.

Deeks S, McCune M, Seklay R, Lewin SR, Palmer S, Hazuda D, Stevenson M. DARE: Delaney AIDS Research Enterprise to Find a Cure. 2011-2012: US\$19,826,794. Administering institution: University of California, San Francisco.

Lewin S. The role of chemokines in the establishment of HIV latency. 2012-2013: US\$259,990. Administering institution: Monash University.

Meikle P, Blangero J, Zimmet P, Shaw J, Haviv I, Kowalczyk A, Jowett J. Metabolomic studies into the pathogenesis and risk assessment of Type 2 diabetes. 2010-2013: US\$929,809. Administering institution: Baker IDI.

Wright E. International Network for Strategic Initiatives in Global HIV Trials (INSIGHT). 2010-2012: US\$45,000. Administering institution: Monash University.

NIH Fogarty International Centre – Millennium Promise Award

Oldenburg B, Fisher E, Kadir K, Thankappan K. Building the Asian non-communicable disease research network for regional research capacity. 2010-2015: US\$1,178,773. Administering institution: Monash University.

Stanley Medical Research Institute (USA)

Kulkarni J, Rossell SL, Lee S, de Castella A, Fitzgerald P. Double blind, placebo controlled, randomized investigation of ondansetron in chronic residual schizophrenia. 2010-2013: US\$899,029. Administering institution: Monash University.

United Nations Development Program – Fund for HIV/AIDS in Myanmar Grant

Fischer A. Reducing burden of CD morbidity/mortality in Myanmar. 2007-2011: \$3,174,605. Administering institution: Burnet Institute.

NHMRC GRANTS COMMENCING IN 2013

Program Grants (funding commencing in 2014)

Stewart S, Thompson D, Scuffham P. GNT1055214: Optimising the cost-benefits of multidisciplinary, heart disease prevention and management programs. \$4,647,175. Administering institution: Baker IDI.

Partnership Projects

Barker A. GNT1056802: A multi-centre RCT to prevent secondary falls in older people presenting to the emergency department with a fall. \$1,488,315 Administering institution: Monash University.

Project Grants

Andrews R, Ramshaw H, Cranmer S. GNT1050817: A newly identified role for 14-3-3zeta protein in thrombosis and platelet procoagulant activity. \$537,124.77. Administering institution: Monash University.

Beeson J, Rogerson S. GNT1047715: Surface antigens of *Plasmodium falciparum*-infected erythrocytes and immunity to malaria in humans. \$578,502.60. Administering institution: Burnet Institute.

Bobik A, Toh BH, Tipping P. GNT1049356: Regulatory T cells and cardiac fibrosis in hypertensive heart disease: cellular and molecular mechanisms of suppression. \$690,627.60. Administering institution: Baker IDI.

Cameron P, Lewin S, Chomont N. GNT1041795: HIV latency and regulation of HIV life cycle. \$489,927.26. Administering institution: Monash University.

Churchill M, Gorry P, Wesselingh S. GNT1051093: Viral determinants of HIV-1 transcriptional latency in the central nervous system. \$610,658.10. Administering institution: Burnet Institute.

Coughlan M. GNT1043753: Does excess consumption of dietary advanced glycation end products activate the complement pathway contributing to diabetic nephropathy? \$454,373.89. Administering institution: Baker IDI.

de Courten B, Scragg R, Walker K, de Courten M. GNT1047897: Can vitamin D prevent diabetes by improving insulin sensitivity and secretion in overweight humans? \$647,961.50. Administering institution: Baker IDI.

Curtis D, Pimanda J, McCormack M. GNT1052313: The bHLH transcription factor LYL1 in normal and leukemic haematopoiesis. \$502,964.28. Administering institution: Monash University.

Eisen D, Leder K, McBryde E, Wolfe R, Pilcher D, Woods R. GNT1041986: The Aspirin To Inhibit SEPSIS (ANTISEPSIS) trial; an ASPREE substudy to measure the benefit of low dose aspirin in the prevention of severe sepsis. \$391,879.56. Administering institution: Monash University.

El-Osta A, Thomas M, Tikellis C. GNT1048377: Exploring the upstream mediators of metabolic memory. \$614,104.73. Administering institution: Baker IDI.

Febbraio M. GNT1041760: Blocking IL-6 trans-signalling: a therapeutic strategy to prevent metabolic disease. \$521,975.03. Administering institution: Baker IDI.

Febbraio M. GNT1042465: IC7: a gp130 receptor ligand to treat type 2 diabetes. \$578,169.64. Administering institution: Baker IDI.

Fitzgerald P, Hoy K. GNT1041890: Accelerated repetitive transcranial magnetic stimulation in the treatment of depression. \$471,252.60. Administering institution: Monash University.

Fowkes F. GNT1049213: Human malarial immunity and risk of malaria post-partum and during infancy. \$254,165.93. Administering institution: Burnet Institute.

Gibson P, Muir J, Boyd B. GNT1046540: Use of oral enzymes to treat carbohydrate intolerance: adjunct therapy to the low FODMAP dietary treatment of irritable bowel syndrome. \$590,365.43. Administering institution: Monash University.

Gruen R, Mitra B, GNT1044894: Bernard S, Jacobs I, Medcalf R, Reade M, Tran H. Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage (The PATCH Study). \$1,668,152.46. Administering institution: Monash University.

Hamilton J. GNT1047295: Defining the function of the thrombin receptor, PAR4, on human platelets. \$522,270.16. Administering institution: Monash University.

Head G, Davern P. GNT1043718: Role of the paraventricular hypothalamus in angiotensin induced neurogenic hypertension. \$431,586.68. Administering institution: Baker IDI.

Holland A, McDonald C, Mahal A. GNT1046353: Benefits and costs of home-based pulmonary rehabilitation in chronic obstructive pulmonary disease. \$364,360.82. Administering institution: La Trobe University.

Jackson S. GNT1048574: Investigation of the proinflammatory function of platelets during ischaemia-reperfusion injury. \$533,642.85. Administering institution: Monash University.

Jackson S. GNT1042886: Investigation of a novel mechanism causing platelet hyperactivity in diabetes. \$562,892.85. Administering institution: Monash University.

Jandeleit-Dahm K, Thomas M, Tikellis C. GNT1044097: The role of methylglyoxal and RAGE in diabetes associated atherosclerosis. \$454,375.35. Administering institution: Baker IDI.

Jane S, Pearson R, Darido C. GNT1049870: Translating molecular insights in squamous cell carcinoma into novel therapeutics. \$823,336.80. Administering institution: Monash University.

Jane S. GNT1049871: The role of the mammalian Grainyhead-like gene family in neural tube closure. \$613,612.35. Administering institution: Monash University.

Jaworowski A, Crowe S, Cameron P, Elliott J. GNT1048536: A longitudinal study of natural killer cell function in HIV-infected individuals initiating therapy. \$598,938.60. Administering institution: Burnet Institute.

Kulkarni J. GNT1049041: Adjunctive hormone therapy for treatment resistant depression in perimenopausal women. \$599,514.44. Administering institution: Monash University.

Kulkarni J, Barton D, Gurvich C. GNT1042429: Selective estrogen receptor modulators - a new adjunctive treatment for men with schizophrenia? \$788,419.13. Administering institution: Monash University.

Leslie K, Short T, Chan M, Myles P, Paech M, Corcoran T. GNT1042727: The influence of anaesthetic depth on patient outcome after major surgery. \$2,893,794.64. Administering institution: Monash University.

McMullen J. GNT1045585: Targeting PI3K-regulated lipids to treat heart failure. \$472,889.14. Administering institution: Baker IDI.

McMullen J, Lin R. GNT1045144: The cardioprotective role of PI3K-regulated small non-coding RNAs. \$589,695.02. Administering institution: Baker IDI.

McNeil J, Guymer R, Robman L, Woods R. GNT1051625: Low dose aspirin and age-related macular degeneration: randomised controlled trial. \$991,797.06. Administering institution: Monash University.

Medcalf R, Lawrence D. GNT1045755: Proteases and protease-inhibitor complexes as modulators of traumatic brain injury severity. \$592,142.85. Administering institution: Monash University.

Medcalf R, Mitchell A. GNT1045756: New approaches to improve thrombolysis in ischaemic stroke. \$565,847.10. 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. \$621,134. Administering institution: University of Sydney.

Myles P, Bellomo R, Christophi C, Corcoran T, Forbes A, Peyton P, Story D. GNT1043755: Restrictive versus Liberal Fluid Therapy in Major Abdominal Surgery: The RELIEF Trial. \$2,384,173.35. Administering institution: Monash University.

Peeters A, Wolfe R, Barendregt J, Backholer K. GNT1044366: Implications of the increasing duration of life spent with obesity for population health. \$245,631.65. Administering institution: Baker IDI.

Peter K. GNT1050018: Developing functionalised microbubbles for molecular ultrasound imaging, drug and microRNA delivery. \$653,597.10. Administering institution: Baker IDI.

Reid C, Liew D, Owen A, Williamson E, Ademi Z. GNT1049610: Modelling of clinic and ambulatory blood pressure on cardiovascular risk and outcomes. \$130,480.84. Administering institution: Monash University.

Ritchie R, Gao XM, Yang Y. GNT1045140: Annexin-A1 agonists rescue cardiac contractile function after myocardial infarction. \$599,972.1. Administering institution: Baker IDI.

Schlaich M. GNT1052470: Renal denervation to improve outcomes in patients with end-stage renal disease. \$992,544.64. Administering institution: Baker IDI.

Schlaich M, Head G, Denton K. GNT1046594: Mechanisms and consequences of renal denervation in chronic kidney disease. \$1,247,960.90. Administering institution: Baker IDI.

Schoenwaelder S, Jackson S. GNT1044214: The role of PI 3-kinase p110beta in regulating thrombus porosity. \$500,502.60. Administering institution: Monash University.

Shehabi Y, Bellomo R, Reade M, Seppelt I, McArthur C, Bailey M, Howe B. GNT1043938: Early goal-directed sedation compared with standard care in mechanically ventilated critically ill patients: a prospective multicentre randomised controlled trial. \$2,752,725.01. Administering institution: Monash University.

Stewart S, Horowitz J, Carrington M, Scuffham P, Wong C, Newton P, Rischbieth A. GNT1049133: Which Heart failure Intervention is most Cost effective in reducing Hospital care (WHICH? II) Trial: A multicentre, randomised trial of standard versus intensified management of metropolitan and regional-dwelling patients with heart failure. \$1,817,824.76. Administering institution: Baker IDI.

Storey E. GNT1049536: Mechanisms of ataxia in spinocerebellar ataxia type 1 transgenic mice. \$348,864.36. Administering institution: Monash University.

Ting S, Curtis D. GNT1047554: Endocytosis and asymmetric cell division in leukaemia. \$529,419.64. Administering institution: Monash University.

Wang Y, Cicuttini F, Tonkin A, Hill C, Ding C. GNT1048581: Does statin use have a disease modifying effect in symptomatic knee osteoarthritis? A multicentre randomised, double-blind, placebo-controlled trial. \$971,019.95. Administering institution: Monash University.

Wei A, Bradstock K, Levis M, Murray M, Roberts A. GNT1048312: A randomised study to optimise clinical outcomes in patients with FLT3 mutant AML. \$1,111,891.27. Administering institution: Monash University.

Development Grants

Kaye D. GNT1055647: Development of an extended release oral formulation of milrinone for patients with advanced heart failure. \$455,000. Administering institution: Baker IDI.

Peter K, Sampson D, Lorensen K. GNT1056569: Development of a catheter-based device for the detection of vulnerable atherosclerotic plaques. \$545,507. Administering institution: Baker IDI.

Research Fellowships

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

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

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

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

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

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

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

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

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

Stewart S. PRF. 2013-2017. Administering institution: Baker IDI.

Practitioner Fellowships

Cooper DJ. PF2. 2013-2017. Administering institution: Monash University.

Lewin S. PF2. 2013-2017. Administering institution: Monash University.

Maguire G. PF1. 2013-2017. Administering institution: Baker IDI.

Myles P. PF2. 2013-2017. Administering institution: Monash University.

Career Development Fellowships

Gabbe B. Level 2 Population Health. 2013-2016. Administering institution: Monash University.

Gregorevic P. Level 2 RD Wright Biomedical. 2013-2016. Administering institution: Baker IDI.

Lee-Young R. Level 1 RD Wright Biomedical. 2013-2016. Administering institution: Baker IDI.

Peeters A. Level 2 Population Health. 2013-2016. Administering institution: Baker IDI.

Peleg A. Level 1 RD Wright Biomedical. 2013-2016. Administering institution: Monash University.

Ting S. Level 1 RD Wright Biomedical. 2013-2016. Administering institution: Monash University.

Early Career Fellowships

Agostino M. CJ Martin. 2013-2016. Administering institution: Burnet Institute.

Chan W. Neil Hamilton Fairley. 2013-2016. Administering institution: Baker IDI.

Jenkinson R. Australian Public Health. 2013- 2016. Administering institution: Burnet Institute.

Lim K. Peter Doherty. 2013- 2016. Administering institution: Baker IDI.

Weiss G. Peter Doherty. 2013- 2016. Administering institution: Burnet Institute.

Doctoral Degrees Completed and Passed 2012



PhD

Ackland H. Assessment of the correlation of clinical and radiographic findings in acute cervical discoligamentous injury with long term outcomes in road trauma patients. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Intensive Care Unit, Alfred / National Trauma Research Institute.*

Allen-Graham J. Inhibition of APP and APLP2 to investigate protein function possible therapies for Alzheimer's disease. Monash University. *Department of Medicine, Monash / Department of Neurology, Alfred.*

Andrew N. Epidemiology and outcomes of serious sport and leisure injuries. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / National Trauma Research Institute.*

Bailey N. Neural changes related to depression and traumatic brain injury. Monash University. *Monash Alfred Psychiatry Research Centre.*

Biesiekierski J. Understanding the role of gluten in the genesis of gastrointestinal symptoms in individuals who do not have coeliac disease. Monash University. *Department of Gastroenterology, Alfred.*

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High Impact Publications 2012



*2011 impact factors > 7.000

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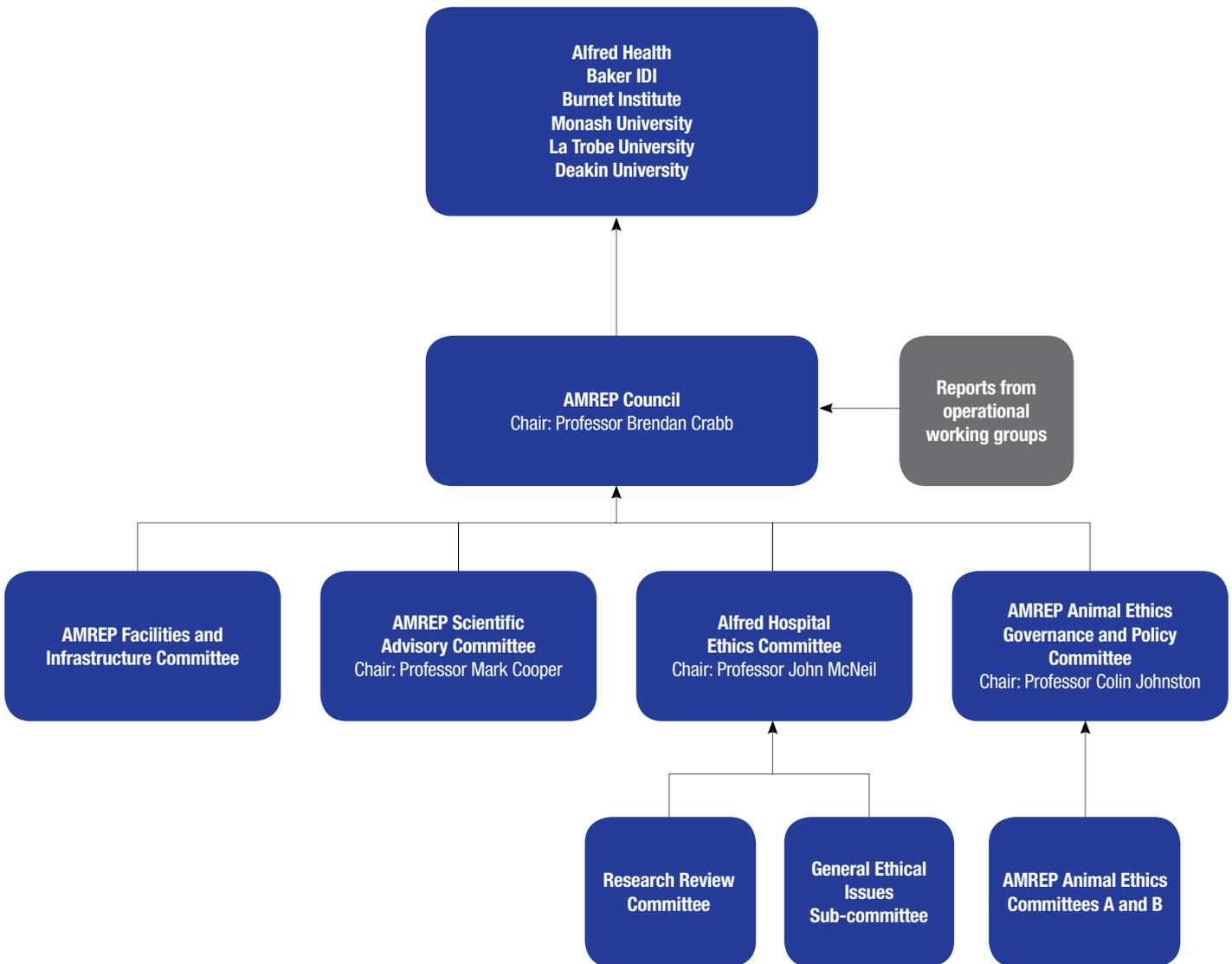
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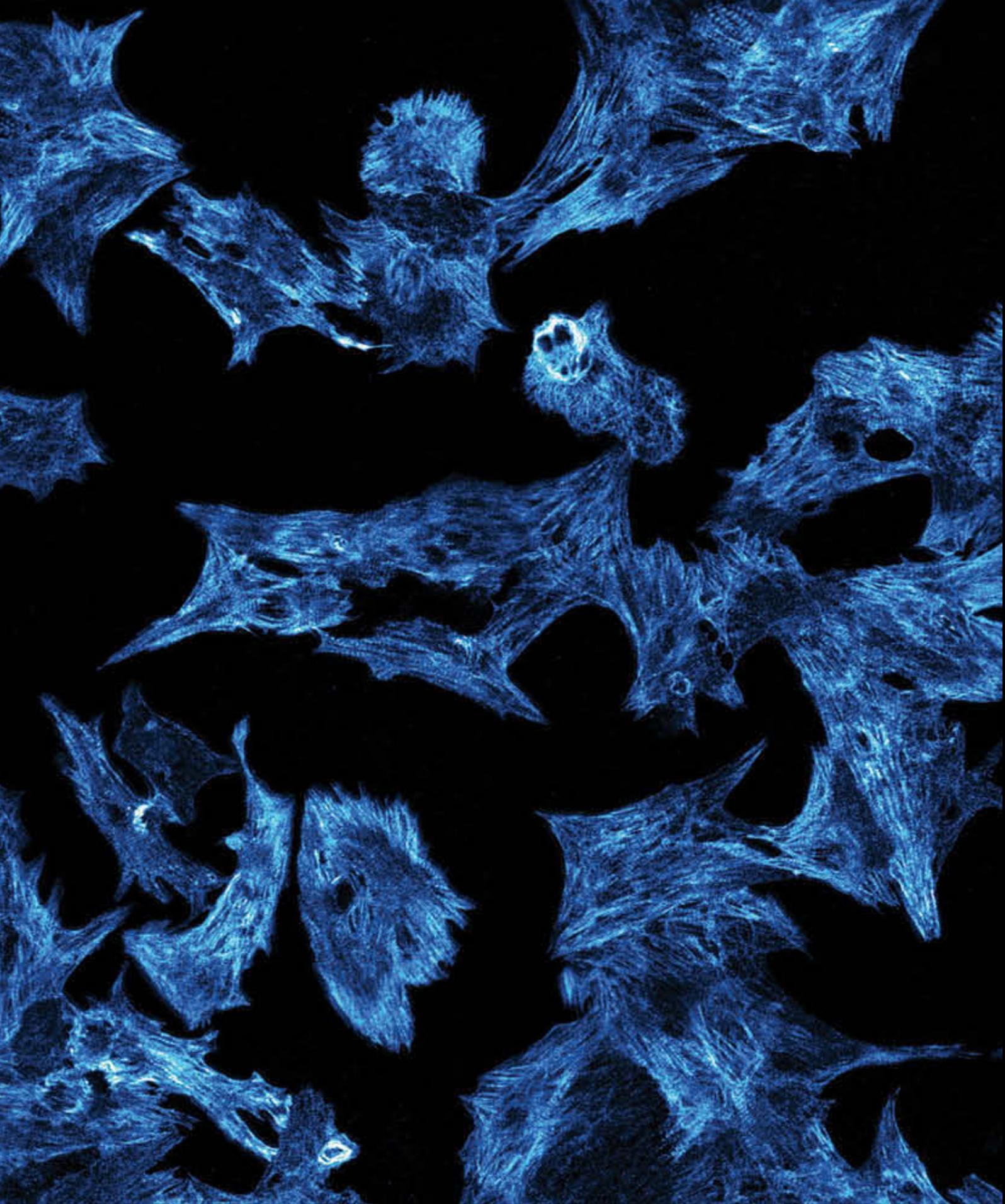
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