

2011

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.





Andrew Way
*Chief Executive,
 Alfred Health
 Chair, AMREP Council*

As I set out in my 2010/11 report, the benefits of Academic Health Science Centres (AHSCs) continue to be widely discussed. Both State and Federal government departments are known to be taking an increasing interest in their potential. AMREP, established in 2002, is Australia's first and longest existing example of such an endeavour, although when created no one at the time would have thought – Academic Health Science Centre. With the election commitment made by the current Victorian Government to see Victoria's first Academic Health Science Centre designated at the Alfred Health precinct, AMREP as part of the collaboration with Southern Health, Prince Henry's Institute, Cabrini Health and Epworth Healthcare, is well placed to support the government in meeting that promise intended to support the development and integration of clinical service, education and research.

Whilst the larger endeavour continues to gather momentum, with many of the theme and discipline leaders coming from within the AMREP organisations, AMREP has not remained idle. This year has seen a renewed focus on the core purpose of AMREP with a review of the partnership constitution. The AMREP Council, with key clinicians, educators and researchers, has undertaken a strategic review of its work. The outcomes of this review have been to clarify our priorities, to confirm our approach to a common infrastructure, and where possible, common, combined or shared facilities.

The Council has noted the increasing financial pressure its constituent organisations face as governments and funding bodies either reduce or maintain low levels of growth in their distributed funds. At the same time, pressure on corporate bodies and individuals from the financial environment has given additional challenge to our fund raising teams. Our organisations have committed jointly and severally to review 'back office' costs to ensure our funds are used as effectively as possible.

It would not be possible to respond to these pressures without impacting on our core purpose if we did not have such a strong history of working in partnership.

Finally, I would like to place on record again my thanks to our two very dedicated support teams in the research office and the ethics office, without whom much of what AMREP achieves would not be possible.



AMREP was officially opened in 2002 by then Premier of Victoria, Steve Bracks (Centre). Also pictured are John Thwaites, former Deputy Premier (L), and Professor John Funder, former Director of the Baker Institute (R).

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Electronic version: www.amrep.org.au



The new AMREP Lecture Theatre will open in late 2012.

Research Funding Success

AMREP researchers were successful in obtaining over \$45 million in new NHMRC funding commencing in 2012. Included were 50 new Project Grants totalling almost \$32 million, the largest with a budget of \$2.8 million to conduct a randomised clinical trial on blood transfusion in intensive care. Other grants received were three Development Grants and a European Union collaborative grant. A team led by Professor David Kaye (Baker IDI) was successful in securing a five-year \$12.4 million Program Grant commencing in 2013 to pursue an innovative program in translational cardiovascular medicine.

Two research groups were recently awarded five-year Centre of Research Excellence grants of nearly \$2.5 million each. A national, multidisciplinary team led by Professor Simon Stewart of Baker IDI will work on improving access to heart disease treatment for regional and indigenous Australians. Professor Jamie Cooper's intensive care team will undertake research to improve our understanding of the effects of blood transfusion on patient outcomes and how to best manage this vital resource.

Three AMREP clinician scientists were awarded new five-year Practitioner Fellowships, providing them with the opportunity to expand their research programs. Those successful were Professor Henry Krum, Professor Russell Gruen and Associate Professor Peter Kistler, with Professor Krum's application rated best nationally in the 2011 funding round.

Dr Katherine Gibney, Monash Department of Epidemiology and Preventive Medicine, received the Gustav Nossal Research Scholarship, awarded to the highest ranked applicant from the combined Medical and Dental Postgraduate Research Scholarship applications.

In support for early career scientists, Dr Charbel Darido (Monash CCS) was awarded the newly established Clare Oliver Memorial Fellowship in skin cancer research from the Victorian Cancer Agency to trial novel therapeutic approaches to squamous cell carcinoma. Dr Karly Sourris (Baker IDI) received a Diabetes Australia Research Trust Viertel Fellowship to undertake research into the development and progression of diabetic nephropathy.

AMREP Lecture Theatre

Construction group Monaco Hickey commenced work late in 2011 on construction of a 200 seat AMREP lecture theatre in the area between the Baker IDI and Burnet Institute buildings. The new theatre, to be fully operational by September 2012, will add a much-needed larger venue to the current seminar and meeting room complex, and has already been booked for a number of national conferences.

Monash Central Clinical School Restructure

In a major restructure of the Monash Central Clinical School (CCS), Infectious Diseases, Respiratory Medicine and Gastroenterology were established as departments in the School. Previously, they were incorporated under the Department of Medicine. Linked to this development is the creation of a Department of Clinical Sciences that includes Medicine, Surgery, Pathology, Neurology, Endocrine,

Anaesthetics, NTRI and Ethics. The Department of Gastroenterology from Box Hill Hospital (Eastern Health Clinical School) and the Monash Alfred Psychiatry Research Centre both joined CCS in 2012.

NHMRC Ten of the Best

The NHMRC's *Ten of the Best* is an annual publication showcasing recent NHMRC-funded research that is providing innovative solutions to some of Australia's greatest health challenges. Professor Mark Febbraio's research on activation of heat shock protein (HSP7) is highlighted in the 2012 edition. Supported by a Project Grant, Professor Febbraio's team at Baker IDI has been testing a drug that may lead to improved treatments for Type 2 diabetes and Duchenne Muscular Dystrophy.



Professor Mark Febbraio, NHMRC Senior Principal Research Fellow, is Head of Cell Signalling and Metabolism at Baker IDI.

The 2011 edition of *Ten of the Best* featured the research of two other AMREP groups. With the support of a Development Grant, Associate Professor David Anderson and his team from the Burnet Institute developed a rapid, disposable, point-of-care test for measurement of CD4+ T cells that could potentially benefit 15 million HIV-infected individuals worldwide. Professor Henry Krum's team in the Monash Centre of Cardiovascular Research and Education in Therapeutics is developing new pharmaceutical treatments for heart conditions, supported by Program Grant funding.

Alfred Week Research Day

Alfred Week Research Day was one of many events on the Alfred Week calendar in October 2011. A successful lunchtime session featured a keynote address by Professor David de Kretser AC, followed by four brief presentations on some of the latest research from AMREP. Professor de Kretser presented the AMREP Research Prizes (clinical and basic) for the highest impact original journal articles published in 2010. These were awarded to Professor Murray Esler and Professor Markus Schlaich, both of Baker IDI, for articles in *The Lancet* (impact factor: 33.633) and *Molecular Psychiatry* (impact factor: 15.470) respectively. A selection of posters showcasing AMREP research was displayed in the hospital for the duration of Alfred Week.

Professor David Kaye of Baker IDI receives the 2012 Australian Museum Eureka Prize for Medical Research Translation.

Acknowledgement:
Australian Museum Eureka Prizes;
Photographer: Daniel O'Doherty



Top Award for Alfred Health

Alfred Health was named Metropolitan Health Service of the Year in 2011. The award, presented by the Premier Ted Baillieu at the 2011 Victorian Public Healthcare Awards, is the Premier's highest honour, and recognises leadership and excellence in the provision of healthcare to the people of Victoria. Alfred Health was recognised as a leader in healthcare delivery and improvement, achieving the best health outcomes for the community through the integration of clinical practice, research and education. The health service treated more than 90,000 inpatients and over 130,000 outpatients in 2010/11.



Andrew Stripp (L) (Alfred Health Chief Operating Officer) and Helen Shardey (R) (Alfred Health Board Chair) receive the award for Metropolitan Health Service of the Year from Premier of Victoria, Ted Baillieu.

AMREP Staff Prizes and Awards

Professor David Kaye of Baker IDI, pictured above, received acclaim in August 2012 when he won the Australian Museum Eureka Prize for Medical Research Translation (sponsored by NSW Health). Professor Kaye was awarded this prestigious national science prize for the creation and translation into clinical use of a catheter-based system for prevention of kidney damage caused by the contrast dyes used in diagnosing and monitoring heart disease.

Other major awards to AMREP staff in 2011/12 include:

- Professor Murray Esler and Professor Markus Schlaich of Baker IDI won the 2011 Australian Museum Eureka Prize for Medical Research Translation for their research on a new treatment for resistant hypertension.
- Professor Hatem Salem, Director of the Australian Centre for Blood Diseases was awarded the Monash University 2011 David de Kretser Medal for exceptional contributions to the Faculty of Medicine, Nursing and Health Sciences and to medical science generally.
- Professor Frank Rosenfeldt won the 2012 Royal Australasian College of Surgeons (RACS) Surgical Research Award. This is an honour created by RACS to recognise the contribution of a pre-eminent surgical scientist who has made significant contributions to surgical research.

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



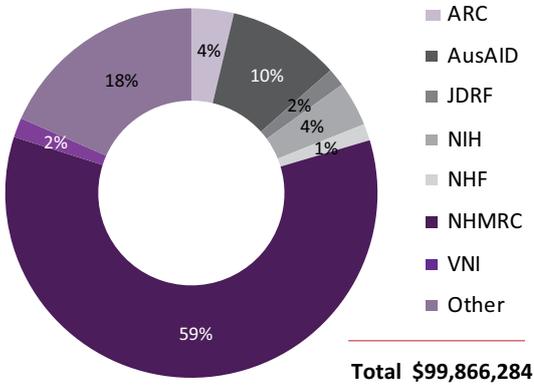
Professor Fabienne Mackay, Head of the Monash Department of Immunology, received a Thomson Reuters Australia Citation Award.

- Professor Jeffrey Rosenfeld AM was awarded the 2012 Sir John Monash Medal by the Rotary Club of Melbourne for 'outstanding Leadership, Integrity and Service, contributing to the Australian community and beyond throughout his career as a leading international surgeon, researcher, clinician, military surgeon, humanitarian and advocate to reduce traumatic brain injury and landmine injuries'.
- Associate Professor Bruce Thompson was awarded the Australian and New Zealand Society of Respiratory Science Fellowship and Society Research Medal for exceptional contribution to the advancement of knowledge in respiratory science in Australia and New Zealand.
- Professor Karlheinz Peter received the Ross Hohnen award from the Heart Foundation for the most outstanding and innovative Grant-in-Aid in 2012, 'Novel single-chain antibody targeted microbubbles for molecular ultrasound imaging and drug delivery in thrombotic disease'.
- Professor Henry Krum was awarded the 2011 Top Ranked Practitioner Fellowship in the NHMRC's Excellence Awards 2011-12, presented during the 75th Anniversary Scientific Symposium in Canberra.

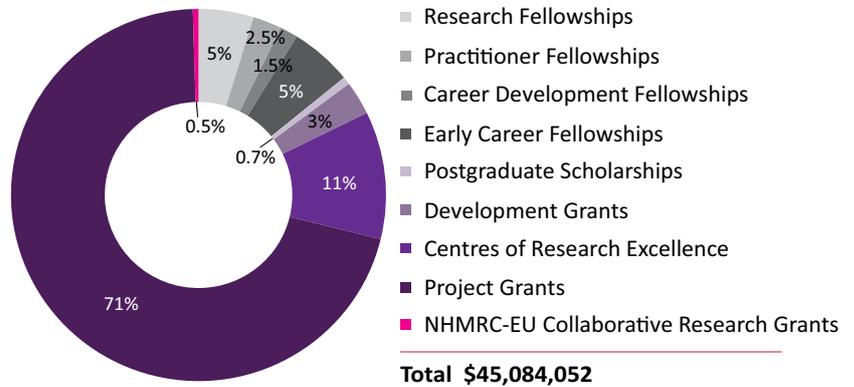


Professor Hatem Salem, Director of the Australian Centre for Blood Diseases, was awarded the Monash University 2011 David de Kretser Medal.

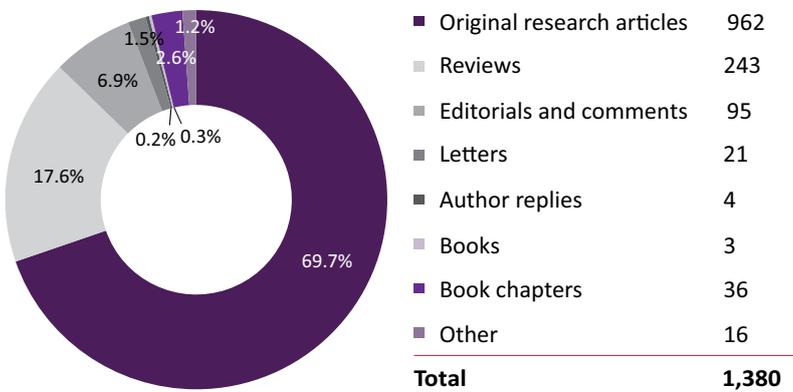
External funding received 2011



New NHMRC funding commencing in 2012



Publications 2011



In 2011, AMREP researchers published original research articles in top-ranking international journals including

New England Journal of Medicine [IF: 53.298]
 The Lancet [IF: 38.278]
 Nature Genetics [IF: 35.532]
 Cancer Cell [26.566]
 Nature Methods [IF: 19.276]
 Journal of Clinical Oncology [IF: 18.372]

The average impact factor of all journal articles published in 2011 was 4.918

25% of all articles were published in journals with an impact factor of ≥ 5

Note: 2011 impact factors

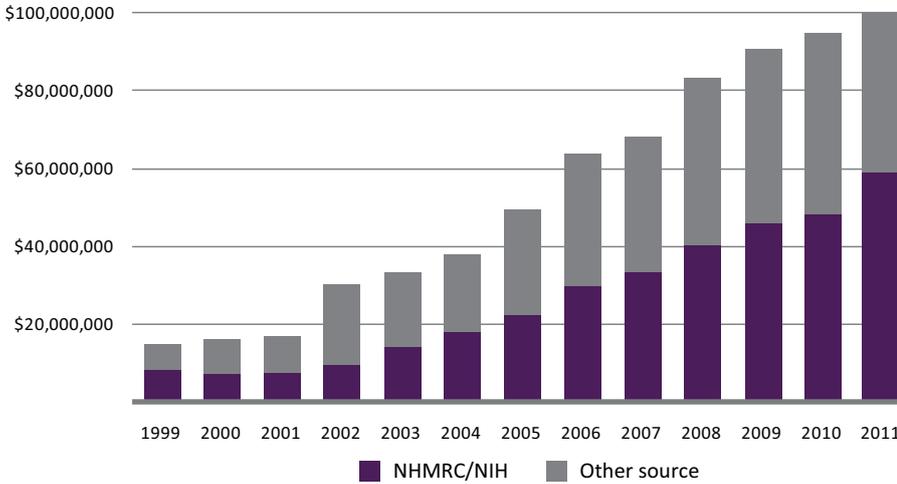
For a list of high-impact factor publications by AMREP staff in 2011, see page 95 of this report.

Higher degree completions

53 PhD completions
 1 Other doctoral completion
 131 Masters completions

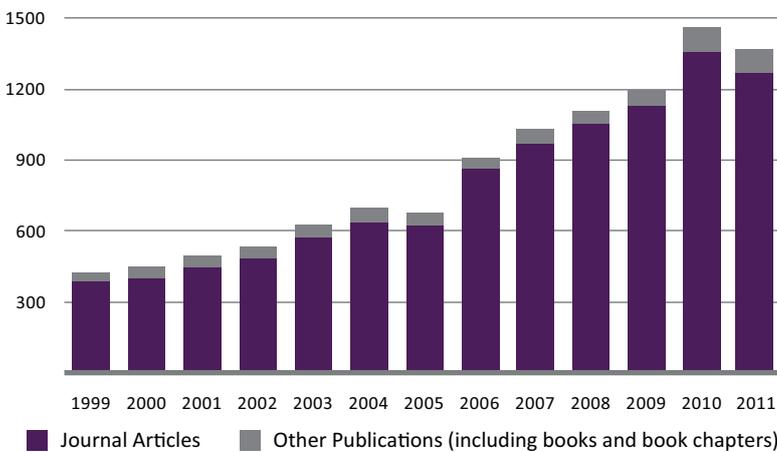
In 2011, there were 269 current PhD students and 24 other doctoral students at AMREP.

External research funding received



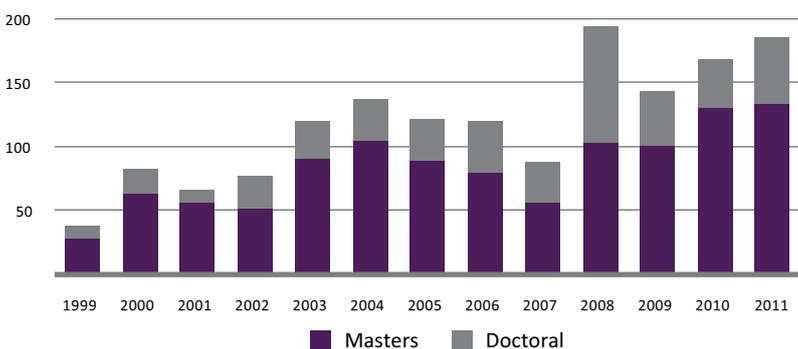
External research funding refers to competitive peer reviewed grants from schemes offered by funding bodies such as NHMRC, National Heart Foundation and NIH or government grants (e.g. Department of Human Services), industry and university grants. Funds received from commercially sponsored clinical trials/contract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

Professor John McNeil AM
Chair, Alfred Health Human Ethics Committee
www.alfredresearch.org

Alfred Health Human 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 2011, the Alfred HREC received 508 research projects for review. Of these, 121 were health and social sciences applications, 138 drugs and interventions applications and 249 'low risk' applications, which pose such little risk to participants that they do not need to be reviewed by the full HREC. Seven first-time-in-human (FTIH) applications were presented for approval.

Multicentre Research

Much research is conducted in more than one institution. This means an application needs to be made for ethics approval to each institution's HREC, which can be a time consuming, lengthy and costly process. The National Statement encourages institutions to accept another HREC's review and approval to avoid redundancy of review and allow studies to get under way in a timely manner. Until recently there have been no organised programs to assist with this.

The NHMRC has initiated a national approach to single ethical review of multicentre research, namely the Harmonisation of Multi-centre Ethical Review (HoMER). Institutions conducting research can accept the review of other HRECs 'certified' under HoMER. The Alfred Ethics Committee was certified during the year and is now listed on the NHMRC Human Research Ethics Portal.

Victoria has its own program for the streamlining of ethical review of multicentre trials known as the Streamlined Ethical Review Program (SERP). In 2011, 32 applications were submitted to the Ethics Committee for review under SERP. A total of 17 SERP projects to be conducted at Alfred Health were reviewed by another certified HREC and authorised for commencement at The Alfred.

The General Ethical Issues Sub-committee

The General Ethical Issues Sub-Committee (GEI S-C) considers broader ethical issues relating to human research and health care. These issues may come from the main Ethics Committee, from within Alfred Health, or externally via government reviews, NHMRC issues and consultation papers, or issues in the media.

Relevant experts from within Alfred Health, AMREP, other ethics committees/institutions and external bodies/government agencies are often invited to attend and contribute. The sub-committee also assists the main Ethics Committee by developing guidance documents to promote both good research practice and consistent ethical decision making.

Ethical Issues in Human Research

Clinical Quality Registries and the use of an opt-out participant consent process

Clinical quality registries, involving participating hospitals contributing information to a centralised databank, have become an important means of benchmarking and improving quality of care in the Australian healthcare system in recent years. Such registries require high levels of participation to avoid the manipulation of results and effectively monitor quality of care. An opt-out consent process achieves better participation than opt-in consent while still offering participants a choice. However, for an opt-out consent process to be ethically supportable, a registry needs to meet specific criteria. The sub-committee has spent some time over the last year debating the use of, and criteria for, opt-out consent.

Other research-related issues included:

- Research Governance and the NHMRC's Research Governance Discussion Paper: *Understanding Research Governance of Multi-centre Human Research*.
- Monitoring of research conduct and the research audit process.
- Witnesses to participant consent – what the Ethics Committee requires and why (guidelines developed).
- Payments to research participants (guidelines developed).
- Use of human tissue in research, including the use of discarded surgical tissue and a pathologist's perspective on the ethical allocation of samples for research purposes.
- Australian Electoral Commission requirements for access to the Australian Electoral Roll for medical research purposes.
- Review of various Alfred Hospital Ethics Committee guidelines.

Wider Institutional Ethical Issues

- Organ Donation after Cardiac Death: Guidelines for Inter-hospital transfer to The Alfred – discussion of ethical issues with representatives from the Intensive Care Unit.

Public Consultations

Victorian Law Reform Commission's Enquiry into the Guardianship and Administration Act 1986

The Guardianship and Administration Act provides for medical research to be undertaken with adult participants who are unable to give informed consent because of temporary or long term impairment. However, the Act's research provisions can make certain kinds of research difficult to undertake. The GEI S-C made a submission to the Victorian Law Reform Commission's Enquiry in 2010 and was closely involved in the subsequent consultation process in 2011.

Other public consultations included:

- NHMRC – Understanding research governance of multi-centre human research.
- Victorian Government's review of the Victorian Charter of Human Rights and Responsibilities Act 2006 (Vic).
- NHMRC - Ethical issues in research into alcohol and other drugs: An issues paper exploring the need for a guidance framework.



Animal Ethics

Dr Alana Mitchell

Chair, AMREP Animal Ethics Committees A and B

amrepaec.bakeridi.edu.au

AMREP Animal Ethics Committee

To manage the large number of applications, two Animal Ethics Committees (AECs) are in operation at AMREP. The AECs assess proposals for the use and production of animals for scientific purposes from Baker IDI Heart and Diabetes Institute, Burnet Institute, Monash University Central Clinical School, The Alfred hospital and AMREP Animal Services.

The AECs determine whether a proposal to use animals for scientific purposes 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. Each committee meets approximately every four weeks.

AEC applications in 2011

The AMREP AECs reviewed 112 new experimental proposals in 2011, compared with 126 in 2010. A summary of applications in all categories is shown in the table below. The animals used were mainly mice and rats, but a small number of rabbits and dogs were also used.

SUMMARY OF APPLICATIONS REVIEWED BY THE AMREP AEC IN 2011				
	Baker IDI Heart and Diabetes Institute	Monash Central Clinical School	Burnet Institute	Alfred Health
New experimental applications	66 (81)	34 (35)	11 (8)	1 (2)
Modifications to experimental applications	65 (60)	35 (28)	4 (10)	0 (2)
Tissue applications	4 (17)	7 (6)	2 (1)	0 (0)
Colony applications	6 (21)	86 (12)	13 (16)	0 (0)
Antibody applications	0 (1)	0 (1)	0 (0)	0 (0)

In brackets: number of applications reviewed in 2010.

The AMREP Animal Ethics Governance and Policy Committee

The AMREP Animal Ethics Governance and Policy (GAP) Committee was formed in 2010, primarily to facilitate 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 Committee's terms of reference and operating procedures are available on the AMREP animal ethics website. Its main responsibilities are to:

- Determine and approve policies for the operation of AMREP AECs A and B
- Undertake post-AEC approval monitoring of project compliance
- Monitor issues of compliance with governance and The Code

- Oversee the education and training of applicants to the AECs 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 applicants to the AEC that cannot be resolved at the AEC level.

During the past 12 months, the GAP Committee has developed *The Code of conduct for scientific procedures using animals under AMREP licences* to provide a framework for responsible practice and conduct to be applied when working with animals at AMREP. Policies were also developed on

- managing outstanding AEC applications
- professional level and experience of the 'Responsible person' nominated on an AEC application, and
- use of Standard Operating Procedures (SOPs) when submitting AEC applications.

In a recent initiative, the GAP Committee has established a working group to focus on facilitating the application process for animal ethics approval at AMREP, including redevelopment of the online application form.

The GAP committee also recently endorsed a major administrative change whereby the Animal Ethics Office will provide AEC members with their meeting agendas in electronic rather than the standard paper format. This initiative will result in significant long-term savings in paper, printing and postage costs. Each AEC member will soon be provided with a tablet computer and will be able to download their agenda by logging into a secure website.

Training

The GAP Committee continued to provide an on-site training program 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 training programs have been tailored to assist animal users at AMREP to learn about the relevant legislation, how the AECs function, and how applications are reviewed, with special attention focused on what AEC members of the different categories look for in an application.



Baker IDI Heart and Diabetes Institute

Research Groups and Laboratories

Director: Professor Garry Jennings

Deputy Director/Chief Scientific Officer: Professor Mark Cooper

Diabetes - Clinical and Population Health

Head: 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 System Biology (J Jowett)

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: A/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 Cardiology (R Ritchie)
Clinical Electrophysiology (P Kistler)
Clinical Cardiology (S Duffy, J Shaw, A Taylor)

Preventative Cardiology

Head: Prof. Simon Stewart

Preventative Health (S Stewart)
Data Management
Healthy Hearts



Professor Markus Schlaich and Dr Dagmara Hering assess peripheral vascular disease in a patient.

Baker IDI Heart and Diabetes Institute

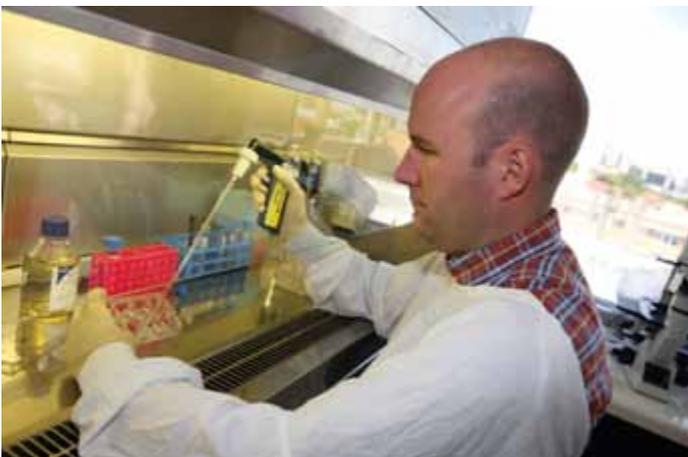
Director: Professor Garry Jennings AM, MBBS, MD, FRCP, FRACP, FAHA, FCSANZ

Baker IDI Heart and Diabetes Institute is a world renowned medical research facility. Our work extends from the laboratory to hospital research and wide-scale 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 insidious and complex diseases responsible for the most deaths and the highest costs in the world in terms of treatments and hospitalisation.

A network that includes a research facility in Alice Springs dedicated to Indigenous health, a research hub in South Australia with a focus on nutrition and community intervention research as well as expanding research operations in Singapore complement our main laboratory facilities located on the Alfred Medical Research and Education Precinct (AMREP) in Melbourne.

The Institute's work covers five 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.



Dr Christoph Hagemeyer was awarded a Heart Foundation Career Development Fellowship in 2011 for his research 'Molecular imaging and targeted drug delivery for the prevention, diagnosis and treatment of myocardial infarction and stroke'.

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.

Metabolism and Obesity

The group explores the complex relationship between physical activity, 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, insidious disease that is on the rise in the community. Among its many debilitating complications are heart and vascular disease, kidney and eye disease. This 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 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 for this group. These forms of cardiovascular disease are increasing the health burden of 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 health care 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.

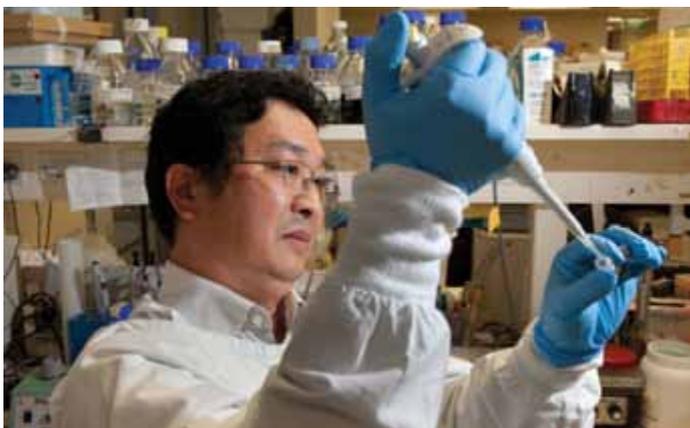
Over the years, our researchers have been responsible for many groundbreaking advances including:

- 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:** and the 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.
- **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.



Dr Zhonglin Chai performs an experiment to analyse genes responsible for the development and progression of diabetic complications.

- **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

- 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.
- 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.
- Discovery that high-density lipoprotein (HDL) cholesterol has an important role in glucose metabolism. These findings suggest a potential role for HDL raising therapies beyond vascular disease to address key aspects of the metabolic syndrome. Research is now under way to see if there is a sustained benefit with prolonged HDL elevation over a long period.

Adults with Risk Factors

- In November 2010, Baker IDI was awarded \$2.5 million through the National Health and Medical Research Council'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 study aims to track 11,000 Australian adults over 12 years to determine how many of the participants develop diabetes, obesity, kidney and heart disease. The first AusDiab study conducted in 1999/2000 showed that one million Australians had diabetes, another two million had pre-diabetes and more than 60 per cent of adults were either overweight or obese. The third round of screening commenced in Victoria in August 2011, with the AusDiab field research team travelling the nation for a year to collect health information about participants.



Associate Professor David Dunstan works at a height-adjustable desk. Associate Professor Dunstan is leading a study to test the effectiveness of an intervention to reduce workplace sitting time in office-bound workers and assess the impact of the intervention on biomarkers of chronic disease risk.

- A world-first breakthrough in the treatment of high blood pressure was pioneered by Baker IDI researchers, with several clinical studies confirming that a new catheter-based treatment is delivering remarkable improvements in blood pressure levels to clinical trial participants. The procedure involves the insertion of a catheter through the femoral artery and uses radio frequency to ‘silence’ sympathetic nerves in the renal artery, the artery that delivers blood supply to the kidneys. The results of this study, published in *The Lancet* and *The New England Journal of Medicine*, are expected to revolutionise treatment options for people with high blood pressure.
- Pilot results with this new catheter-based treatment suggest that in addition to effects on reducing blood pressure this therapy may improve blood glucose levels. This potential metabolic benefit is now being examined in more detail.
- Using state of the art techniques to measure different lipid particles in the blood, Baker IDI researchers have identified novel molecules that appear to be linked to heart attacks. These findings are currently being explored in more detail and could lead to new tests to identify individuals at risk of heart disease.

Sub-clinical Organ Damage

- Identification of novel pathways that contribute to myocardial hypertrophy and cardiac fibrosis - key factors in the damaging effects of heart disease.
- The description of the role of two relatively recently discovered proteins, ACE2 and RAGE, which could potentially become new drug targets for cardiovascular and metabolic disorders.
- Baker IDI researchers have found that a short course of relaxin treatment in older rats with hypertension has led to marked changes in the large artery structure and a reduction in blood pressure. This suggests a possible therapy in humans is worth exploring and it is hoped that joint studies through The Alfred and Baker Medical Unit will develop this approach in the near future.
- 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.

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 have coronary angiography without further damaging their kidneys.
- Our staff were key investigators in the publication in the *The New England Journal of Medicine* of landmark studies on the best drug treatment for diabetes (ADVANCE) and for people at high risk after stroke, heart attack or other vascular event (ONTARGET, TRANSCEND).
- In 2009, we launched the landmark study known as the ‘Heart of the Heart’ program in Central Australia. Professor Alex Brown and his team have now screened 200 Indigenous adults and have identified that there is a major burden of cardiovascular (and renal disease) in this population.
- We have continued to support the Heart of Soweto Study in South Africa with > 8000 patients now captured via Africa’s largest study of heart disease to date.
- Discovery that inhibition of the hormone, angiotensin II reduces aortic diameter in patients with Marfan syndrome.

- Breaks in sedentary time have beneficial associations with metabolic risk. These findings suggest new public health recommendations regarding sedentary behaviour that are complementary to those for physical activity. A range of studies is under way to examine the links between sedentary behaviour and metabolic risk in specific environments such as the workplace.
- A diabetes risk score instrument for assessing the risk of developing this condition has been developed from AusDiab, and is now being used nationally (and as part of a new Medicare item) to select people for diabetes prevention programs.
- The discovery of important interactions between cell compartments in generating potentially harmful reactive oxygen species which damage the kidney in diabetes. These findings have direct clinical implications emphasising the multiple sources of damaging molecules in the diabetic environment that need to be blocked or scavenged in order to reduce blood vessel and kidney injury in diabetes. This work has been enhanced by recent demonstration that a new type of antioxidant may be particularly useful in the diabetic setting.
- The demonstration that HDL has profound anti-inflammatory effects on monocytes, helping to explain why this ‘good cholesterol’ helps avoid atherosclerosis.
- The discovery of a novel treatment for patients with focal atrial tachycardia, which was published in the *Journal of the American College of Cardiology*. By passing wires up from the leg into the heart, the abnormal focus for the arrhythmia was ablated and their heart function returned to normal within three months.
- Baker IDI partnered with Elsevier to deliver the second Asia Pacific Conference on the Metabolic Syndrome in Sydney in November 2011.

- Development of a novel method for assessing cardiac fibrosis in the human heart using MRI. Further studies are now under way in this area.
- ‘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 phenomenon and this discovery will be the basis for new treatments. Member of The Wiggles, Greg Page, is a sufferer and has supported our research by establishing a fund.

Acute Complications

- 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.

Future Directions

The Institute has established a range of state-of-the-art facilities designed to enhance diabetes and heart disease research and management including those outlined below.

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 prevention 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.

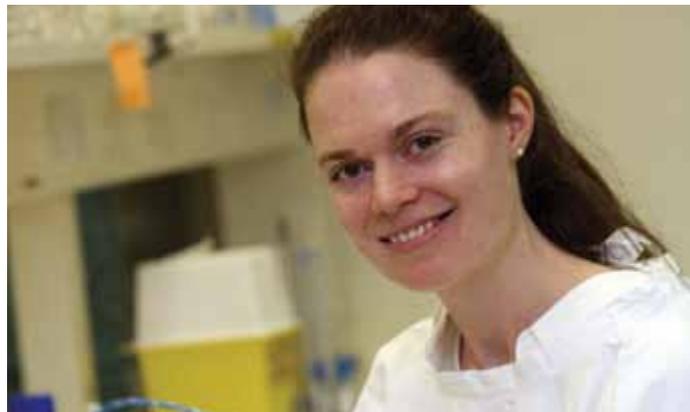
DNA and Blood Profiling

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.

Clinical Metabolism: 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.

Baker IDI has also made several key appointments in the field of health behaviour, including Professor Neville Owen. Professor Owen’s research relates to the primary prevention of cancer, diabetes and heart disease, and deals with the environmental, social and personal determinants of behavioural risk factors, including television viewing and desk and screen-bound work.



Dr Julie McMullen, Head of the Cardiac Hypertrophy research group, studies gene expression in mouse models of physiological hypertrophy.

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 8000 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.

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 Informatics at Baker IDI.



Professor Neville Owen, Head of Behavioural Epidemiology, joined Baker IDI in April 2011, following nine years as Director of the Cancer Prevention Research Centre at the University of Queensland.



Professor Simon Stewart, Head of Preventative Cardiology, has a research program encompassing heart failure intervention strategies including addressing inequality in heart disease, especially in Indigenous communities. Here, he interacts with a member of the local Indigenous community in Central Australia.

Baker IDI Central Australia: Indigenous Health Research

As part of our mission to address the health inequalities of disease between Indigenous and non-Indigenous Australians, the Institute has 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.

Professor Alex Brown and Professor Sandra Eades from Baker IDI were among the chief investigators in the newly-established Centre of Excellence for Indigenous Primary Care Intervention Research in Chronic Disease. It is one of three specialist centres announced in late 2010 under the auspices of the Australian Primary Healthcare Research Institute to undertake research focused on key health reform challenges.

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; increasingly it is a major threat to the future of many developing nations. 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 Partnership

The Institute's long-standing relationship (over 25 years) with Mauritius passed a major milestone in late 2009 with the signing of a Memorandum of Understanding between Baker IDI and the Mauritian government to extend our research into non-communicable diseases, in particular type 2 diabetes in Mauritius. The objectives of this agreement are to improve the current understanding of the mechanism of type 2 diabetes through family studies so that effective treatment is possible in the future. The relationship also provides a framework for training and exchange between Mauritian scientists and students with an interest in medical research.

To date, the Institute has provided support in the form of survey methods and execution, data analysis and sample preparation. This is an important partnership documenting premature ill health and mortality in a multi-ethnic society that reflects our global population. Projects on gestational diabetes and prevention of type 2 diabetes are in the planning phase and the largest surveillance of diabetes complications in any developing nation has just been concluded and published.

Heart of Soweto

This landmark program of research is being conducted by Baker IDI in collaboration with the University of the Witwatersrand and the Hatter Cardiovascular Research Institute, 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 & European Heart Journal*), heart failure (*Circulation*), hypertension (*International Journal of Cardiology*), rheumatic heart disease (*European Heart Journal*) atrial fibrillation (*Heart*) and primary care burden of heart disease (*International Journal of Cardiology*). The data have informed and influenced health care policy in South Africa. A new phase of research involving the Heart of Africa Study and the multicentre, international Big 5 Primary Prevention Trial, aims to extend heart disease surveillance to other Sub-Saharan countries and examine the impact of a family-based prevention trial (in South Africa and Mozambique).

United Arab Emirates

Baker IDI has a Memorandum of Understanding with the University of Sharjah. The United Arab Emirates (UAE) is the epicentre of the global epidemic of diabetes and a national study is in the planning phase. The University of Sharjah has been contracted to undertake the study and Baker IDI will be advising on the survey methods and execution, training of UAE staff, data analysis and sample preparation.

Singapore

Baker IDI has a number of projects under way in Singapore, where the organisation has an expanding base as a result of key collaborations with organisations such as Duke University, SingHealth and the National University of Singapore. These projects aim to foster research in the area of cardiovascular disease and metabolic disorders.

The National University of Singapore (NUS) has also established an initiative to improve the health of Asian populations as part of its NUS Global Asia Institute. Baker IDI is represented on the International Advisory Board by Professor Paul Zimmet. The first collaborative project to look at the frequency of diabetes, and risk determinants, in Asian populations is under way between epidemiology groups at NUS, Baker IDI and two leading centres in Beijing.



Postgraduate Students

1 Masters Student
50 PhD Students

Publications

368 Journal Articles
13 Book Chapters



www.nucleusnetwork.com.au

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



Nucleus Network

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

Nucleus Network is a not-for-profit clinical research and education 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, together with the Centre for Clinical Studies at the Austin Hospital in Heidelberg, are purpose-built facilities for the conduct of clinical trials and are core to the business of Nucleus Network. In addition to conducting early phase clinical trials, Nucleus Network provides education and training in Good Clinical Practice and clinical trial consulting services.

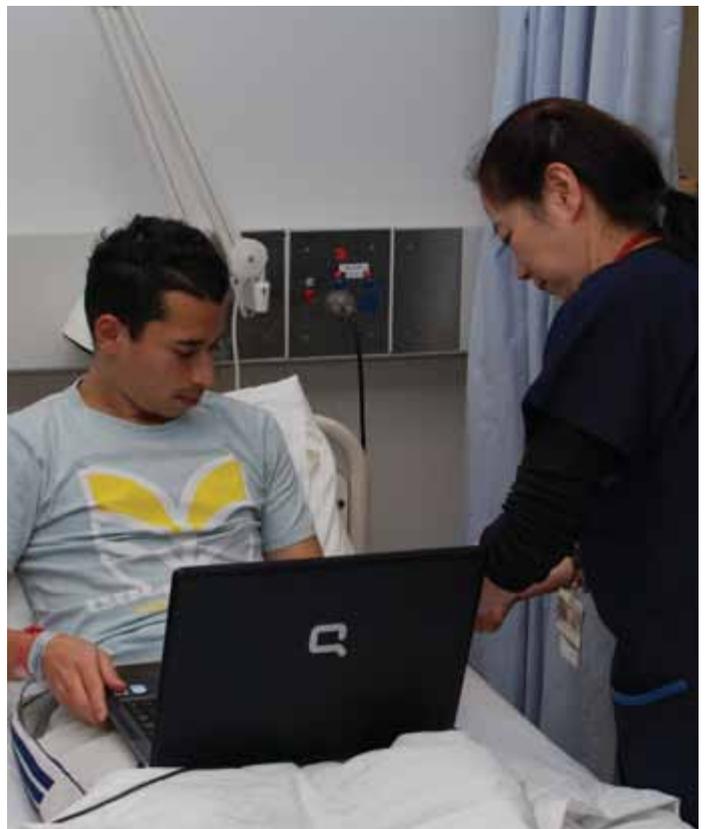
Phase 1 clinical trials, where a new drug therapy is tested in a healthy volunteer or in patients with specific medical conditions, are integral in the development of new therapies. Nucleus Network relies on community involvement in this process, and is grateful for the time and effort volunteered by 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.

Nucleus Network Education

Nucleus Network Education is committed to developing high standards for education and training for clinical research and for building clinical research support frameworks. In 2011, Nucleus Network Education continued its collaboration with the Victorian Managed Insurance Authority (VMIA) - insurer of all Victorian hospitals - to develop and deliver Research Governance Training seminars for the Victorian public hospital system. Seminars are to be presented by leading experts in the clinical research industry in partnership with local research office representatives. These educational seminars will be delivered across Victorian public hospitals free-of-charge to participating clinical research professionals. The series will be converted to a set of 21 eLearning modules in 2012. In 2011 this education program was nominated as a finalist by the Institute of Public Administration Australia (IPAA) Victorian Division in the 'Risk Management' category of their Leadership in the Public Sector Awards.

Highlights in 2011

- Over \$2 million of services, donations, education subsidies and contract work paid to AMREP members
- Approximately \$11 million of direct export revenue generated for the Australian biopharmaceutical industry plus unquantifiable flow-on benefits for the industry and other economic sectors
- Three direct student placements, plus support provided to external researchers (including PhDs)
- More than 48 clinical trials conducted
- Clients include international pharmaceutical and biotech companies from Australia, USA, France, New Zealand and the United Kingdom.





Burnet Institute

Medical Research. Practical Action.



Burnet Institute - Centres and Working Groups

Director: Professor Brendan Crabb

Centre for Immunology

Head: Prof. James Beeson

Pietersz Laboratory: Bio-Organic and Medicinal Chemistry

Lahoud Laboratory: Dendritic Cell Receptors

O'Keefe Laboratory: Dendritic Cell Research

Caminschi Laboratory: Dendritic Cells in Innate and Adaptive Immunity

Hogarth Laboratory: Immunology and Cancer Vaccines

Hogarth Laboratory: Inflammatory Diseases and Infection

Gavin Laboratory: Leukocyte Development in Health and Disease

Gugasyan Laboratory: Lymphocyte Biology Group

Gilson/Crabb Laboratory: Malaria Research

Beeson Laboratory: Malaria, Immunity, Vaccines, and New Therapies

Ffrench Laboratory: Viral Immunology

Anderson Laboratory: Diagnostics Development*

Fowkes Laboratory: Malarial Epidemiology Group**

Centre for Virology

Co-Heads: Professors Suzanne Crowe and Sharon Lewin

Cherry Laboratory *Research: Neurological problems and drug toxicities in people living with HIV*

Churchill Laboratory *Research: How HIV infects the central nervous system*

Crowe Laboratory *Research: Development of HIV monitoring tests*

Crowe/Jaworowski *Research: Pathogenesis of HIV infection*

Drummer/Poumbourios Laboratory *Research: Viral Fusion: How HIV and HCV enter cells*

Gorry Laboratory *Research: Molecular HIV pathogenesis*

Gowans/Loveland Laboratory *Research: Virus replication and assembly mechanisms in HCV, GB virus B and dengue*

Lewin Laboratory *Research: HIV, HBV and CMV*

Tachedjian Laboratory *Research: Retroviral biology and antivirals*

Tannock Laboratory *Research: Influenza B virus vaccines*

Wright Group *Research: HIV clinical management in Asia Pacific regions*

Anderson Laboratory: Diagnostics Development*

Centre for International Health

Head: Prof. Mike Toole

Education and Capacity Development

HIV and Harm Reduction

Infectious Disease and Health System Strengthening

International Operations

Women's and Children's Health

Centre for Population Health

Head: Prof. Margaret Hellard

Alcohol and Other Drugs

HIV and Sexual Health

International Health Research

Justice Health

Malarial Epidemiology**

Surveillance and Evaluation

Viral Hepatitis

Young People's Health

* In Centre for Immunology and Centre for Virology

** In Centre for Immunology and Centre for Population Health



Burnet Institute
Medical Research. Practical Action.

www.burnet.edu.au

Burnet has a broad approach to improving the health of communities globally. These young children are from one of Burnet's program areas in the Morobe Province of Papua New Guinea.

Burnet Institute

Director: Professor Brendan Crabb PhD

The Burnet Institute is pleased to report on another year of strong achievement and productivity. We have established and are now implementing our five-year strategic plan that centres around our mission of improving the health of the poor and vulnerable using an approach that closely links research to public health practice. We continued to translate our research findings, such as the candidate hepatitis C vaccine and the CD4 point-of-care diagnostic test, towards commercial development, and we maintained a strong international and public health output. Importantly, we also bedded down some new initiatives such as our cross-Institute health themes aimed at stimulating new research initiatives with a strong translational focus that will help us achieve our goals.

Making an Impact: Introducing our Health Themes

The Burnet's laboratory research and public health programs address issues surrounding promoting better health and the treatment and prevention of many diseases; however, six major health themes underpin our work and cut across the translational focus of our Centres.

- **Alcohol, Other Drugs and Harm Reduction**
- **Immunity, Vaccines and Immunisation**
- **Infectious Diseases**
- **Maternal and Child Health**
- **Sexual and Reproductive Health**
- **Young People's Health**

Centre for Virology

Overview

Our main focus is the study of chronic viral diseases such as HIV, hepatitis C and hepatitis B, and furthering the understanding of how viruses manipulate their host cells in order to infect them and replicate within the body.

There is a strong emphasis within the Centre 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, given that the burden of many of these diseases falls mainly within these settings.

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 several key themes:

- 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

Working Groups in 2011 dedicated to the Centre for Virology themes include: the **Cherry Laboratory** (neurological problems and drug toxicities in people living with HIV; pathogenesis, prevention and treatment); the **Churchill Laboratory** (HIV neuropathogenesis and HIV reservoirs); the **Gorry Laboratory** (HIV molecular pathogenesis); the **Gowans/Loveland Laboratory** (replication and virus assembly mechanisms of hepatitis C virus (HCV), GB virus-B and dengue fever virus); the **Anderson Diagnostics Development Laboratory** (development and refinement of diagnostic techniques for infectious diseases in disadvantaged populations); the **Wright Group** (training programs and research studies on HIV clinical management and neurological complications, nationally and internationally); the **Tannock Laboratory** (influenza B viruses); as well as the laboratory groups featured in the snapshots below.

Virology Snapshots

Retroviral Biology and Antivirals

The **Tachedjian Laboratory** undertakes fundamental research to understand the biology of retroviruses including HIV and the role of host cell factors in retroviral replication. They also study the role of HIV mutations selected during antiretroviral therapy in drug resistance and viral fitness, and perform translational studies to identify, determine the mechanism of action, and develop novel agents for the treatment and prevention of HIV and other sexually transmitted infections.

Understanding the Mechanism of HCV Entry

HCV glycoproteins mediate attachment to liver cells and viral entry. Although our understanding of the receptors that are required for HCV has advanced, relatively little is known about the structure of the viral glycoproteins prior to and during viral entry. Recent findings from the **Drummer/Poumbourios Viral Fusion Laboratory** reveal for the first time that the viral glycoproteins present on virions must be in a reduced state prior to attachment to cells and transition to an oxidised state after attachment.

Tackling HIV Latency: Towards a Cure for HIV

Dr Suha Saleh and Dr Paul Cameron from the **Lewin Laboratory** have pioneered a novel method to study HIV latency in the test tube. In collaboration with scientists from our Centre for Virology, Westmead Millennium Institute in Sydney, and the Vaccine and Gene Technology Institute in Florida, they identified the pathways that are activated by proteins called chemokines that lead to the establishment of latency. The laboratory is now using this model to identify new targets to block and reverse HIV latency.

The Lewin Laboratory, headed by physician scientists, Sharon Lewin and Paul Cameron, includes a wide range of health related skill sets and backgrounds, while the research focus is mainly on HIV, hepatitis B virus (HBV) and cytomegalovirus (CMV).

Improving Treatment for HIV Infected Individuals

HIV-infected individuals have a shorter life expectancy and increased non-AIDS-related morbidities even in the setting of virological suppression following treatment with combinations of potent antiretroviral drugs. The **Crowe/Jaworowski HIV Pathogenesis Laboratory** aims to understand the mechanisms of dysregulation of the innate immune system that lead to increased morbidity and mortality in these patients.

Hosting International Clinicians and Students:

Transferring Technology for HIV-1 Drug Resistance Testing

The **Crowe Laboratory** is an accredited WHO Regional HIV Drug Resistance Laboratory for the Asia and Pacific regions. This Clinical Research Laboratory develops and validates affordable methods of drug-resistance testing for use in resource limited settings, performs surveillance testing for countries without established testing, and initiates field research. Through these initiatives, regional laboratories are strengthened with hands-on training provided at Burnet or in-country. In 2011, a medical student from Botswana, a PhD student from Papua New Guinea, a Malaysian medical microbiologist and laboratory technicians in India were trained.

Virology: Selected Major Awards and Achievements

Delaney AIDS Research Enterprise: Professor Sharon Lewin

In July 2011, the National Institutes of Health (NIH) awarded USD\$70 million over five years for work towards a cure for HIV. Three large programs were funded as part of the 'Martin Delaney Collaboratory Initiative'. Professor Lewin is a project leader of one of the 'collaboratories', called the Delaney AIDS Research Enterprise (DARE), which received USD\$23 million to find a cure. The other DARE co-investigators include Steve Deeks and Mike McCune (University of California, San Francisco), Rafick Sekaly (Vaccine Gene Therapy Institute, Florida), Sarah Palmer (Karolinska Institute, Stockholm), Daria Hazuda (Merck) and Mario Stevenson (University of Miami). The goal of the program is to use immune-based approaches to eliminate latent HIV infection from patients receiving anti-HIV drugs. The team will evaluate new approaches using laboratory models of HIV latency, monkeys infected with simian immunodeficiency virus (SIV) and

HIV-infected patients receiving long-term anti-HIV drugs. Professor Lewin's group will explore the role of chemokines in HIV persistence. They will determine if unique markers on the surface of the cell can identify latently infected cells. The group will evaluate the anti-latency potency of novel drugs developed by the collaboratory using a new laboratory model.

NHMRC '10 of the Best': Development of a CD4 Test

David Anderson's NHMRC Development Grant featured as one of '10 of the best' NHMRC projects in the selection of completed grant-funded projects for 2010. HIV-infected patients must have their levels of CD4 T-cells measured on a regular basis, with a count of less than 350 T-cells per cubic millimetre being the signal for starting antiviral therapy. Since 2005, we have been working to develop a simple, rapid point-of-care test as an alternative to the expensive and poorly accessible CD4 tests such as flow cytometry. Evaluations of the prototype CD4 test device in our Diagnostics Development Laboratory and at an independent test site show excellent performance, and we are actively pursuing commercial partnerships.

Centre for Immunology

Overview

The Centre's program combines research on biological mechanisms involved in the development of human diseases, discovering new ways to treat or prevent major diseases and understanding fundamental processes in the function of the immune system that are important in many diseases. This is addressed through innovative and multidisciplinary research that encompasses laboratory-based research, clinical studies of human disease, and research at the population level.

Key aims include understanding how the immune system attacks or clears infectious agents, why in autoimmune diseases the immune system attacks normal cells it should ignore, and how infectious agents and cancer cells avoid immune destruction. Our research program is focused on several key themes:

- 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

Working Groups in 2011 dedicated to the Centre for Immunology themes include: the **Dendritic Cell Receptors - Lahoud Laboratory** (molecular characterisation of Clec9A and its potential as a target for immune therapy); the **Dendritic Cells in Innate and Adaptive Immunity - Caminschi Laboratory** (improving vaccines by targeting dendritic cells); the **Diagnostics Development - Anderson Laboratory**, which also falls within the Centre for Virology (development and refinement of diagnostic techniques for infectious diseases in disadvantaged populations); the **Immunology and Cancer Vaccines - Hogarth Laboratory, the Malaria Epidemiology - Fowkes Group**; as well as the laboratory groups featured in the snapshots below.

Immunology Snapshots

Nuclear Factor- κ B1 and T-Cell Memory

A major goal of immunological research is to enhance the formation of long-lived memory T-cells. Pathogenic infections or cancer therapy can leave individuals severely immune-compromised. This has prompted the need to develop novel strategies to enhance immune function, including the development of T-cell memory. Research in the **Lymphocyte Biology - Gugasyan Group** has identified a unique role for a regulatory protein, Nuclear Factor- κ B1 (NF- κ B1), whereby blocking the function of NF- κ B1 promotes the development of CD8⁺T-cells with memory characteristics. The thymus is the primary site for the production of naïve T-cells. However, thymuses from mice that lack the gene for NF- κ B1 produced a unique population of CD8⁺ T-cells that resemble and function like memory cells. This unexpected finding highlights the importance of NF- κ B1 as a major regulator of memory T-cells. Future research will focus on understanding the biological role of NF- κ B1 and how the loss of this protein promotes long-lived CD8⁺ memory T-cells. These findings provide important insights into the development of new therapeutic strategies aimed at targeting NF- κ B1 for enhancing T-cell memory responses against pathogenic infections or cancer.

How Antibodies Signal Inflammatory Cells

Antibodies are the body's 'natural drugs' found in blood and secretions where they normally protect against infection by neutralising microbes and their toxins. Unfortunately, antibodies can also cause inflammation resulting in tissue destruction in diseases such as rheumatoid arthritis and lupus. In 2011, Professor Mark Hogarth and Dr Bruce Vines from the **Inflammatory Diseases and Infection - Hogarth Laboratory** made several fundamental discoveries. Firstly, we now understand how antibodies signal inflammatory cells and trigger inflammation in autoimmune disease through a cell membrane sensor called the Fc receptor. Secondly, we have discovered how some disease causing microbes, such as *Staphylococcus aureus*, have evolved in response to the immune system to avoid being neutralised, especially by the mucosal antibody called IgA. Our work in understanding how antibodies activate the immune system to protect the body or how they unfortunately cause injury in autoimmune disease is aimed at developing new approaches for the diagnosis and therapy of a wide range of diseases including arthritis, lupus, some cancers and infection.



Central Ribbon: A three dimensional image from Dr Maree Powell of an Fc receptor discovered by the Hogarth laboratory [Nature Reviews Drug Discovery April 2012].

Bottom left and top right: These inflammatory cells isolated by Dr Bock Lim are being stimulated by antibodies via their Fc receptors. Inflammatory cell stimulation can lead to resistance to infection after vaccination and has been exploited to develop some successful antibody-based cancer therapies. Aberrant antibodies, however, lead to tissue destruction in diseases like rheumatoid arthritis, lupus and allergy.

Computational Modelling

The **Structural Immunology - Ramsland Laboratory** used small-angle scattering techniques to determine solution structures of immune system glycoproteins and pathogen proteins. Mariel Bartley used the Australian Synchrotron to visualise IgM (an important class of antibody) in collaboration with Dr Cy Jeffries and Professor Jill Trehwella (University of Sydney).

This year our computational modelling of glycoprotein-mediated virus (HIV) entry into immune cells resulted in several high profile primary research papers in collaboration with the Centre for Virology's Gorry, Churchill, Tachedjian and Pombourios laboratories.

Understanding the 'Export Machine' in Malaria

The extreme virulence of malaria parasites is largely due to their ability to grow rapidly and to avoid the human immune system. The parasites achieve this by extensively renovating the red blood cells in which they grow by exporting hundreds of their own proteins into them.

The **Malarial Research - Crabb/Gilson Laboratory** recently discovered the molecular machinery that acts as a gateway for protein export and has made significant progress in understanding when and how the export machine is assembled. The export machine could make an excellent drug target since hundreds of parasite proteins rely on it to function properly.

Tolerance Mechanisms in Crohn's Disease

The **Leukocyte Development in Health and Disease - Gavin Laboratory** is studying immune tolerance mechanisms. Normally, self-reactive immune cells are removed or controlled in a process known as tolerance. In Crohn's disease, the immune system appears to attack the gut and the bacteria within it. We have exciting results indicating that important tolerance mechanisms are abnormal in mice lacking NOD2, a gene found to be defective in patients with Crohn's disease. This helps us understand what goes wrong in this crippling disease.

Dendritic Cells Types in Bone Marrow

There is little information about the dendritic cells (DCs) of the bone marrow, yet this bone marrow DC likely plays an important role in viral infections, particularly in immunosuppressed patients.

This year the **Dendritic Cell Research - O'Keefe Laboratory** has made great progress in understanding what types of DCs are present in the bone marrow. In addition, we have further characterised the production of the anti-viral hormone IFN- λ , finding that its production by DCs varies greatly in different organs and that it likely plays a role in various autoimmune diseases.

New Assays to Assess the Production of IL-28

The influence of genotype on the outcome of HCV infection was examined in a project funded by the Australian Centre for HIV and Hepatitis Virology Research (ACH²) to determine if IL-28 production could be used as a prognostic marker.

This included developing new assays to assess the production of IL-28 by ELISA and the frequency and phenotype of IL-28 producing cells by ELISPOT. Two students, Jeff Smith and Shane Licheni, conducted this project in the **Viral Immunology - Ffrench Laboratory** with assistance from Kylie Goy and Devy Santoso.

Overall, the **Ffrench Laboratory** aims to gain a clearer understanding of the nature of cellular immune responses to viral infections to aid the development of new vaccines and immunotherapies.

Candidate HIV Gag MicroCube Vaccine

Continued funding from the Gates Foundation allowed the **French Laboratory** to further develop and test a candidate HIV gag MicroCube vaccine. This vaccine has proven to be very stable and not sensitive to degradation by heat or proteases, making it attractive for use in developing countries. We are working on including further HIV proteins to elicit neutralising antibodies. This project has been conducted in collaboration with Dr Fasseli Coulibaly's group at Monash University, with the experimental work in the French lab performed by Dr Amanda Brass.

Novel Drug and Vaccine Delivery Systems

The Bio-organic and Medicinal Chemistry - Pietersz Laboratory uses chemical methodology to design novel drug and vaccine delivery systems. Membrane translocating peptides from a fruit fly were successfully used to deliver multipartite peptides incorporating synthetic tumour antigens to immune cells to stimulate anti-tumour responses in mice. Anti-cancer drugs are not specific to cancers and result in dose-limiting side effects. To increase selectivity of these drugs we have used novel strategies to link anti-cancer drugs to anti-breast cancer antibodies that target breast cancers. These drug-antibody conjugates are specifically toxic to cancer and not normal cells.

Malaria Immunity, Vaccines, and New Therapies

A major focus of the work in the **Beeson Laboratory** is on understanding immunity to malaria in humans and using this knowledge towards the development of malaria vaccines. Young children and pregnant women are the two groups at greatest risk of malaria and its severe consequences. Our work has made important progress in the development of several candidate malaria vaccines by providing insights into how these vaccines work against malaria, and how to address the ability of malaria infections to avoid or dodge immune responses.

Centre for Population Health

Overview

HIV, hepatitis C, sexually transmitted infections, malaria, tuberculosis (TB) and drug and alcohol misuse are serious health concerns in Australia and the Asia Pacific Regions. 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.

Population Health Working Groups

Working Groups in 2011 dedicated to the Centre for Population Health themes include: the **HIV and Sexual Health Group** (conducts research to understand transmission and prevention of HIV and other STIs), the **Surveillance and Evaluation Group** (manages HIV and other STI surveillance systems, evaluates programs aimed at understanding transmission and prevention of communicable diseases), the **Viral Hepatitis Group** (focuses on improving the understanding of hepatitis C to develop harm reduction strategies and ultimately develop a vaccine), **Young People's Health** (examines the epidemiology and consequences of risky behaviour among vulnerable or marginalised youth in the population); **International Health Research** (combines basic laboratory research, field-based research and epidemiology, to understand infectious diseases of global significance, with a particular focus on malaria and TB); as well as the groups featured in the snapshots below.

Population Health Snapshots

Alcohol and Other Drugs Group

A major public health issue especially amongst young people, alcohol and other drug use costs Australia an estimated \$55 billion a year. Headed by Professor Paul Dietze and Dr Peter Higgs, this group studies the nature and extent of the problem with a view to developing effective policy responses. Major initiatives of this group include:

The NHMRC-funded Centre for Research Excellence in Injecting Drug Use (CREIDU) brings together Australia's leading researchers on injecting drug use (IDU), along with partners and key experts from the non-government and policy sectors, to generate new evidence on ways to ameliorate the health, social and economic burden of IDU in Australia.

The Melbourne Injecting Drug User Cohort Study (MIX) has recruited almost 700 injecting drug users. Established in 2009, the study aims to examine the health and social outcomes of people who inject drugs (PWID) in Melbourne. In 2011, the study moved into the second and third follow-ups of participants that will be augmented by linkage to health service records in 2012.

Public Drinking and Drug Use in the Footscray CBD

In spite of much public concern, very little research has been conducted on public drinking and drug use. Based in the Footscray CBD this study aims to identify patterns of drinking and drug use in this public space, including gaining an understanding of the reasons people drink and use drugs in these spaces, their social groups and experiences of others' use of alcohol and drugs.

Naloxone for Heroin Overdose Treatment

Naloxone is an important tool in reducing heroin overdose. In 2011, The Centre for Population Health was involved in the Enhancing Naloxone Availability in ACT (ENAACT) Committee that has worked to facilitate a rollout of Naloxone to friends and families of people who inject drugs in the ACT. This work culminated in the official launch of the program by the ACT Chief Minister in December. Burnet's Centre for Population Health was also directly involved in the background work for a new randomised controlled trial of the effectiveness of intranasal Naloxone for the treatment of heroin overdose that will be implemented at the Sydney Medically Supervised Injecting Centre in 2012.



Young people attend Burnet's tent at the Big Day Out for sexual health and drug risk behaviour research.

Justice Health

Both in Australia and internationally, prisoners and ex-prisoners struggle with poverty, poor physical and mental health, and tobacco, alcohol and other drug problems. This group undertakes research to build the evidence base for policy and practice. Two such projects are:

A Prospective Cohort Study of Ex-prisoners with a History of IDU

Prison populations are characterised by high levels of injecting drug use, blood-borne virus infection and poor physical/mental health. Although prisons and community transition offer opportunities to address these health issues, intervening effectively at these crucial points is limited by a poor understanding of the trajectories of people who inject drugs (PWID) during and after they transition to the community. A study in 2012, led by Dr Mark Stoové, will aim to identify the typical trajectories of PWID released from prison; and determine risk and protective factors for PWID in the health, social and criminal justice domains. Findings will inform the policy and services for this high-risk population and help prevent ongoing morbidity and recidivism.

Evaluation of Condom Distribution Trial in Victorian Prisons

After considerable advocacy, research and encouragement by many organisations, including the Burnet Institute, condoms and dental dams have been introduced into Victorian Correctional facilities as a pilot program. The Centre for Population Health has been commissioned by Justice Health to evaluate the pilot program using a combination of qualitative and quantitative methods. An examination of barriers to implementation, positive and adverse outcomes during this pilot stage will inform the roll-out of condoms and dental dams to the remaining Victorian prisons in 2012.

Malaria Epidemiology Group

Immunity to Malaria During Pregnancy

More than two billion people live in malaria endemic areas. Understanding malaria dynamics in populations is key to implementing effective public health control measures as we strive towards the ultimate goal of malaria elimination. This Group, which also falls within the Centre for Immunology, headed by Dr Freya Fowkes, has conducted the largest, most comprehensive, immunological analysis of the acquired immune response to a pathogen during pregnancy to date. In their study, they found that women exposed to malaria were able to mount an immune response, maintain it throughout pregnancy, and were able to boost responses upon re-exposure to a pathogen. These findings are not only important for the field of malaria but are also applicable to all infectious diseases and positively contribute to the understanding of the immune response to infectious diseases throughout pregnancy.

Centre for International Health

Overview

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. Innovation, inquiry and influence underpin our public health approach. Working closely with communities, civil-society organisations, governments, international non-government organisations, and UN agencies, we can respond effectively to local health issues. The Centre for International Health (CIH) has a five-year strategic plan with priorities that guide public health responses internationally. Activities in the technical areas are prioritised in the countries where Burnet has a presence.

In 2011, the CIH maintained long-term staff in seven countries: Myanmar (Burma), Papua New Guinea, Lao PDR, Indonesia,



Both the laboratory and field programs at Burnet have contributed greatly to the international body of knowledge regarding many diseases, especially infectious diseases.

Mozambique, Tibet/China and Thailand. In addition, the CIH maintained an active interest in Southern and Eastern Africa, Timor-Leste, Melanesia (Vanuatu, Solomon Islands), Cambodia, Vietnam, Nepal, Sri Lanka, and Afghanistan/Pakistan.

The Centre's priorities have been developed with due consideration of the expressed country priorities as determined in 2011, as well as external and global trends. They address technical themes as apparent in the list of working groups. In addition, CIH is engaged in programs that promote healthy ageing. This focus provides general guidance on technical and resource allocation.

International Health Working Groups

Education and Capacity Development

The Education and Capacity Development group is responsible for the oversight, development and strategic direction of the Centre for International Health's education, training and capacity development programs in Melbourne and overseas.

HIV and Harm Reduction

The focus is to provide technical assistance, strategic direction and quality oversight of international HIV and harm reduction initiatives.

Infectious Disease and Health System Strengthening

Malaria and TB are preventable infectious diseases and are the main target of our prevention and control activities. We support our partners in each country using technologies from 'bench to the bedside' through basic science, clinical and social research.

International Operations

A team of locally based country representatives 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.

Women's and Children's Health

This group implements programs to improve the health of women and children in a way that strengthens the capacity of individuals and health systems in-country.

International Health Highlights

Expanding our Work in Papua New Guinea (PNG)

The significant expansion of our work in Papua New Guinea (PNG) has involved each of the Centres of the Institute. The AusAID-funded East New Britain Sexual Health Improvement Project works through the provincial health system to improve clinic management of sexually transmitted infections and through community mobilisation to increase demand for services. Several studies are exploring male involvement in antenatal care to help reduce parent-to-child transmission of HIV. Through a Global Fund grant, Burnet is helping to strengthen the capacity of the Central Public Health Laboratory to conduct antiretroviral drug resistance testing.

Operational research continued its focus on improving services delivered by Village Health Volunteers and the feasibility of delivering birth-dose hepatitis B vaccination and early postnatal care in remote villages in East Sepik Province. Studies are also being done on the molecular epidemiology of malaria and the development of immunity to malaria in children and pregnant women. We have expanded our efforts to build local capacity in research on drug and alcohol harm reduction.

Mapping Sexual Networks

A landmark study to map the sexual networks of men who have sex with both men and women in Vientiane and Hanoi was completed. This was a collaboration between Burnet's Centres for International Health and Population Health. We believe that this is the first such study of bisexual men. Men who report sexual contact with women and men and/or transgender people may constitute a bridge between 'high-risk' and 'low-risk' populations for transmission of HIV and other sexually transmitted infections.

HIV Planning in the Pacific

The National Strategic Frameworks (NSF) Project aims to improve the quality of national strategic HIV and AIDS frameworks in 10 Pacific countries. CIH staff have worked with a broad range of government, United Nations, and civil society partners to review the current status of national strategic plans in each of the nominated 10 countries. Subsequently, we have helped develop new strategic frameworks in the Solomon Islands, Federated States of Micronesia, Marshall Islands and Kiribati. Under a separate mechanism, similar assistance was provided to Fiji.

Health Security in the Asia and Pacific Regions

'One Health' is the collaborative effort of multiple disciplines – working locally, nationally and globally – to attain optimal health for people, animals and our environment. During the year our staff helped develop Vietnam's Integrated National Operational Program on Avian Influenza, Pandemic Preparedness and EIDs (2011-2015) and a Pacific regional health security plan based on the 'One Health' approach.

Evidence to Support Health Reform in China

China has a three-year rapid agenda for health system reform. Burnet Institute manages the innovative AusAID-funded China-Australia Health and HIV Facility (CAHHF), which works in direct partnership with China's Ministry of Health. Of the 39 activities funded up until 2011, 31 (plus a further 11 in 2012) were assessed as having direct health reform policy relevance. Studies have been conducted through partnerships between 23 Chinese agencies and 26 Australian academic institutions and have led to 120 papers published in Chinese health journals and 10 in international journals.



Burnet's peer educators in Vanuatu continue to promote sexual and reproductive health messages to young people.

Engaging in Indonesia's Response to HIV and AIDS

Burnet Institute has been a partner in AusAID-funded bilateral HIV and AIDS prevention and care projects in Indonesia since 1997. The eight-year HIV Cooperation Program for Indonesia (HCPI) is implemented by GRM International (a Global Development management firm) in partnership with Burnet, focusing on people who inject drugs, prisoners, and Papua and West Papua provinces. SUM represents Scaling Up of MARP (most at risk populations) participation. Burnet is working on SUM Phase II in a consortium led by Training Resources Group Inc. to implement this USAID-funded project that focuses on female sex workers, men who have sex with men, and people who inject drugs.

Measuring the Prevalence of HIV in Papua New Guinea

Papua New Guinea accounted for 19 of every 20 HIV cases reported in the Pacific region between 1984 and 2007. The media over many years have spoken of an impending 'catastrophe' and the medical literature reported 'an unfolding disaster'. Some research projected adult prevalence to be as high as 18 per cent by 2010. Few claims were based on comprehensive or representative data. The best estimate in 2010, based on testing pregnant women, was 0.7 per cent of the adult population. In order to obtain a representative estimate of HIV prevalence in each of the four regions of PNG, Burnet staff – in partnership with FHI 360 – began planning a national Integrated Bio-Behavioural to be conducted during 2012.

Photo credits: Professor Mark Hogarth, Liquid Creations, Brent Balalas.

Postgraduate Students

33 PhD Students

Publications

156 Journal Articles

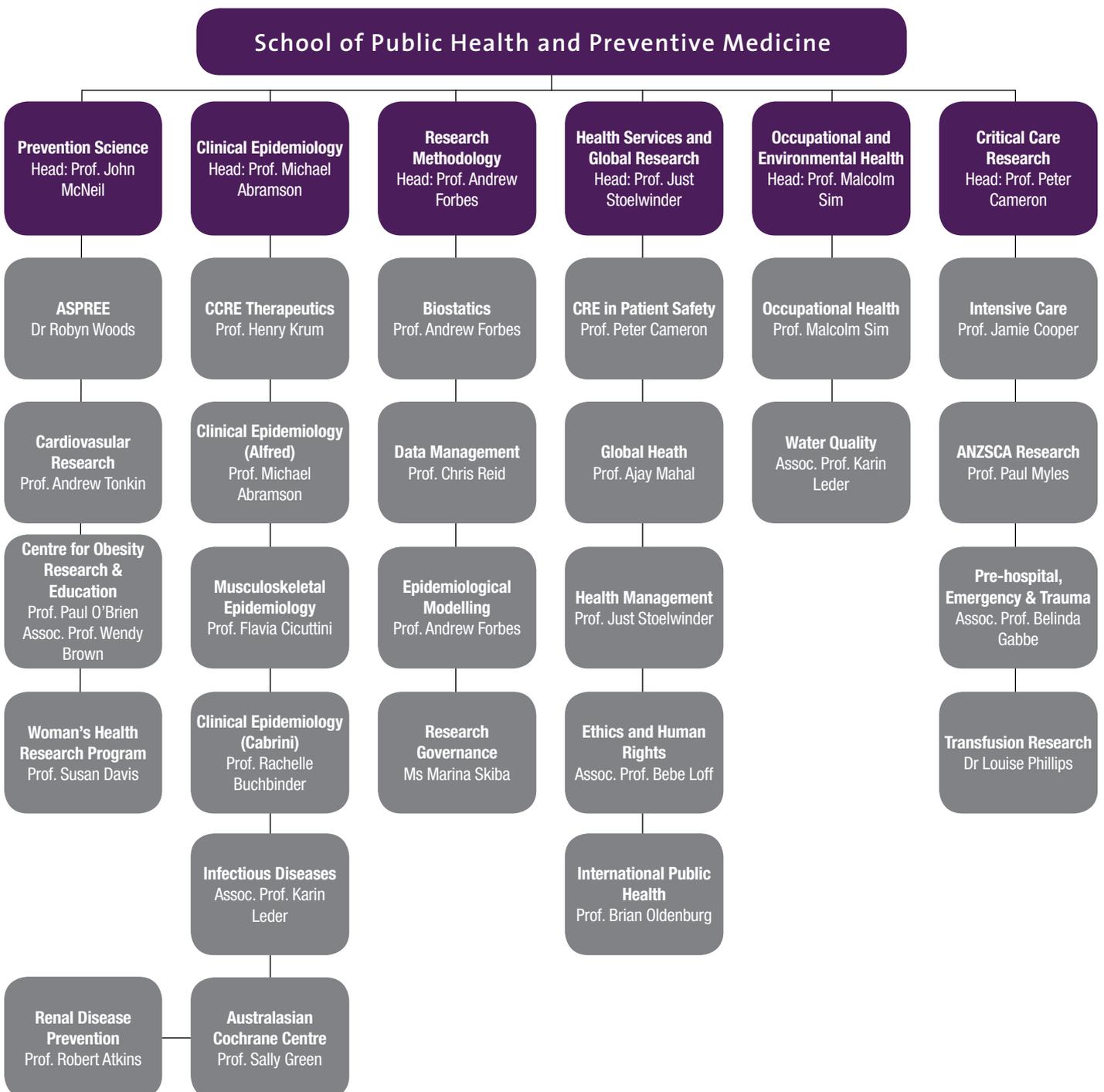


The Monash School of Public Health and Preventive Medicine is based in The Alfred Centre.



School of Public Health and Preventive Medicine

Head: Professor John McNeil





The ASPREE Warrnambool Clinical Trial Centre was officially opened by the Minister Denis Naphine on Friday 24th June 2011. From L to R: Mark Johnstone (ASPREE/South West Alliance of Rural Health: SWARH); Gary Druitt (SWARH); Dr Robyn Woods (ASPREE Executive Officer); Minister Denis Naphine; Professor John McNeil; John Krygger (CEO, South West Health Care) and Dr Mark Page (Warrnambool Physicians Group).

Epidemiology and Preventive Medicine

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

The Department of Epidemiology and Preventive Medicine (DEPM) is the largest department in the School of Public Health and Preventive Medicine, and 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 Study

ASPREE (ASPirin in Reducing Events in the Elderly) is the first study in the world to weigh the potential benefits against the risks of daily low dose aspirin in healthy people aged 70 and over. It is the largest primary prevention study ever undertaken in elderly Australians and will determine whether aspirin can help prevent or delay the onset of common age-related disease such as cardiovascular disease, dementia and some cancers in older people. The trial, which requires international collaboration between researchers, universities, general practitioners and the community, aims to recruit 12,500 participants from Australia and another 6,500 participants from across the USA.

The study is currently recruiting around 500 people per month from metropolitan and regional areas in Victoria, Tasmania and the ACT; almost 5,000 healthy elderly people enrolled in the trial during 2011. Regional Victoria has been one of the fastest growing recruitment areas this year, reporting a 20-fold increase in the number of people participating in the study to almost 1,400 by December.

Minister for Ports, Major Projects, Regional Cities and Racing, the Honourable Denis Naphine MP, officially launched the new Clinical Trial Centre in Warrnambool in June, the sixth regional ASPREE centre to open in Victoria. This movement into regional areas, has created new employment and training opportunities at each site, developed working relationships with local health service providers and laid the foundations for future research in the area. Importantly, ASPREE's ongoing regional outreach has provided the opportunity for residents in rural and regional areas to engage in international research.

New Evidence for Treatment of Severe Traumatic Brain Injury: The DECRA Trial

Traumatic brain injury: (TBI) is a potentially devastating injury that predominantly affects young males. Approximately 10 per cent of patients admitted with severe TBI have a diffuse injury and persistent brain swelling that is difficult to control with best medical management. Over the past decade, management of these patients has been shifting from barbiturate coma to decompressive craniectomy. This is a well-established neurosurgical procedure, in which a large piece of skull bone is removed, stored for one to two months and then replaced.

Professors Jamie Cooper (Head of Research in Intensive Care) and Jeffrey Rosenfeld (Head of Monash Department of Surgery) led a team of researchers in a landmark international multicentre randomised controlled trial to assess for the first time in adults the effectiveness of decompressive craniectomy. In the trial known as DECRA (*DEcompressive CRAniectomy in Diffuse Traumatic Brain Injury*), patients with severe diffuse TBI that were suitable for the project were randomly assigned to receive best medical care or decompressive craniectomy and best medical care.

The results showed that surgery was extremely effective in decreasing intracranial pressure (a measure of brain swelling) and markedly decreased medical therapies required for treatment of intracranial pressure. There was also a shortened ventilation time and a shortened length of stay in the Intensive Care Unit. However, despite these positive short-term effects, the findings in relation to patients' functional outcome at six months were the reverse of what was expected. The group of patients who received surgery were more likely to have a poorer outcome (death or dependence) when compared with those who received best medical care. These results have enormous significance, as the functional outcomes of future patients with severe diffuse TBI can be substantially improved by choosing best medical care rather than decompressive craniectomy for management of raised intracranial pressure.

Cooper DJ, Rosenfeld JV, Murray L, Arabi YM, Davies AR, D'Urso P, Kossmann T, Ponsford J, Seppelt I, Reilly P, Wolfe R; DECRA Trial Investigators; Australian and New Zealand Intensive Care Society Clinical Trials Group. N Engl J Med. 2011;364(16):1493-502.

Reduction in Breast Cancer Mortality: Screening or Treatment?

A study of participants from Breastscreen (the national breast cancer screening program) between 1991 and 2007 has revealed that most of the reduction in breast cancer-specific mortality can be attributed to adjuvant chemotherapy and endocrine therapy. In fact, mammographic screening made only a minor contribution to the decline in mortality. Similar conclusions have been described for the United Kingdom, Denmark, Norway, Belgium and Ireland. This is a significant finding as there is a continuing debate about why breast cancer-specific mortality has declined since the introduction of Breastscreen in 1991 and the relative contributions of mammographic screening for breast cancer versus improvements in adjuvant therapy.

In a study carried out by Dr Robert Burton and Professor Robin Bell, we examined the time trends in participation in Breastscreen and breast cancer incidence and breast cancer-specific mortality in different age groups in Australia between 1991 and 2007. The evidence from the countries mentioned above includes the original randomised trials of mammographic screening and studies that investigated trends in mortality in different age groups (where only some age groups are routinely screened). There is also evidence from studies comparing data from within and between countries with different population screening practices.

However, Australia is unique as it has six population-based breast cancer treatment surveys taken between 1986 and 1999. These recorded the initial treatment that women with breast cancer received. Our study included a review of these surveys and showed a continuous improvement over this period in both the number of women receiving adjuvant therapy and in the therapies received. This correlated with decreases in age-specific mortality and increases in five-year survival from breast cancer.

For example, since 1991, the entire increase in five-year survival and decrease in breast cancer specific mortality for women aged 60 to 69 years (who have had the highest participation in Breastscreen) occurred before the program could have been expected to affect breast cancer mortality. Furthermore, the incidence trends provided evidence of over-diagnosis of invasive breast cancer. This was due to the identification of cancers by screening that would not have otherwise become clinically evident. The over-diagnosis was also most evident for the 60 to 69 year age group.

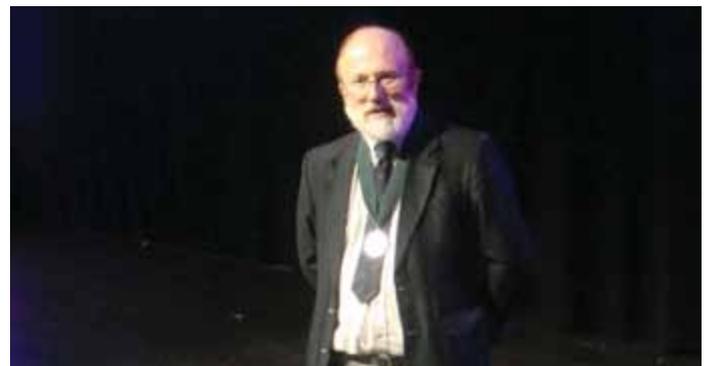
On the basis of the current evidence, the recommendation from this study is that women should be provided with more information about the balance of benefits to potential harm when they are counselled about mammographic screening for breast cancer.



A woman participating in the Breastscreen program.

Achievements and Awards

- Professor Andrew Tonkin was awarded a Medal of the Order of Australia, for service to medical research in the field of epidemiology and preventative medicine.
- The Deputy Head of School, Professor Michael Abramson, was awarded a Research Medal for his contributions to clinical epidemiology by the Thoracic Society of Australia and New Zealand.
- Professor Susan Davis was awarded the Henry Burger Prize.
- Associate Professor Robin Bell was awarded the Australasian Menopause Society Scientific Award.
- The Vice-Chancellor's Commendation for Doctoral Thesis Excellence in 2011 was awarded to Dr Paul Burton.
- Dr Dianna Magliano and Dr Emma Ridley both received Churchill Fellowships.
- In 2011, nine NHMRC Project Grants were secured by the Department. These grants were led by Professor Jamie Cooper, Dr Alistair Nichols, Professor Rinaldo Bellomo, Professor Brian Oldenburg, Associate Professor Belinda Gabbe, Dr Deb Glass, Dr Donna Urquhart, Dr Anna Peeters and Professor Elsdon Storey.
- Professor Peter Cameron was successful in receiving funds under the NHMRC Centres of Research Excellence scheme to establish the Australian Resuscitation Outcomes Consortium.
- Professor Henry Krum was awarded an NHMRC Practitioner Fellowship and his work on 'Novel therapeutic strategies to reduce the burden of chronic heart failure' was named as one of the top 10 projects funded by NHMRC.
- Four early career researchers were awarded fellowships (Dr Carolina Weller, Dr Carol Hodgson, Dr Mary Panjari and Dr Xue Feng Zhong).
- Dr Anna Peeters was successful in securing an ARC Linkage Project with VicHealth.
- Dr Chris Stevenson was successful in securing an ARC Discovery Projects grant.
- Professor Malcolm Sim and Dr Deb Glass were successful in securing a contract from the Australasian Fire and Emergency Service Authorities Council to investigate cancer and mortality occurrence in Australia's fire-fighters compared with the general population.



Professor Michael Abramson, Deputy Head of the School of Public Health and Preventive Medicine, was awarded a research medal for his contributions to clinical epidemiology by the Thoracic Society of Australia and New Zealand.

Postgraduate Students

98 PhD Students
381 Masters Students
11 Other Doctoral Students

Publications

368 Journal Articles
4 Book Chapters



Vizhinjam Community Health Centre in Kerala Province, India.

Global Health

Co-Directors: Professor Brian Oldenburg, Monash School of Public Health and Preventive Medicine
Professor Mike Toole, Burnet Institute

Conferences and Forums

The 5th Annual AMREP World Health Day Conference

focused on challenges in antimalarials and other drug resistance issues, prevention of hospital acquired infections in resource poor countries and vaccine research. Coinciding with the 7th April WHO World Health Day, the conference topic, 'Global health: A focus on infectious disease', reflected WHO's 2011 theme of 'Antimicrobial resistance and its global spread'.

Compass (The Women's and Children's Health Knowledge Hub) is an AusAid-funded collaboration between Burnet's Centre for International Health, Menzies School of Health Research, and the University of Melbourne's Centre for International Child Health. In 2011, Compass and AusAID co-hosted a reproductive-health roundtable meeting on increasing access to family planning services in developing countries with high maternal and newborn mortality rates.

Maternal, Neonatal, Child Health and Nutrition service delivery in low income settings was a Burnet hosted half-day seminar presented by Professor Zulfiqar Bhutta, Head of the Division of Women and Child Health, Aga Khan University, Pakistan.

Research, Teaching and Capacity Building

The ASCEND (Asian Collaborative for Excellence in Non-communicable Disease) research network is a program designed to develop and enhance the research skills and careers of early career researchers in the prevention and management of non-communicable diseases in the Asian region. Monash's International Public Health Unit (IPHU) received funding for the program from the US National Institutes of Health (Fogarty International Centre). Launched in 2011 at the Monash Malaysia Sunway Campus, ASCEND's first cohort of 25 trainees from India, Sri Lanka, Malaysia and China commenced their 18-month program with a three-week teaching block, followed by 12-month research projects in their own countries.

The Kerala Diabetes Prevention Program is a cluster randomised controlled trial of a group-based lifestyle intervention for people at high risk of diabetes in Kerala, India, being undertaken by Monash's IPHU with NHMRC funding. This year, two Indian-based workshops were attended by investigators from Australia, Finland, the USA and India, to finalise the study protocol and develop a culturally appropriate peer-support intervention. Study recruitment was due to commence in mid-2012.

A Network Study of Bi-sexual Men in Vietnam was completed by the Burnet Institute in 2011. The study mapped the sexual and social networks of men who have sex with both men and women in Vientiane and Hanoi.

Compass Women's and Children's Health Knowledge Hub activities included strengthening youth-friendly health services in Vanuatu and partnerships with WHO on adolescent health as well as integration of maternal and newborn care with immunisation programs.

Australian Leadership Awards 2011: The Burnet Institute won awards to support the 'Development of Public Health Research Skills in Alcohol and Drugs in Papua New Guinea'; and, in collaboration with the Nossal Institute, to build the capacity of the 'Sub-Saharan African Harm Reduction Network' to drive policy development and advocacy to mitigate the health impacts of drug and alcohol use in the Western Indian Ocean region.

Monash-Oxfam Australia Partnership: Monash's IPHU, in collaboration with Oxfam Australia, developed a new undergraduate Monash Passport unit known as 'MON2002 - Improving Health Futures in a Global World', which was offered for the first time in 2011. The unit aims to increase students' understanding of global health, development and many other issues in a global world.

CAHFF (China-Australia Health and HIV Facility) is an AusAID funded partnership between the Burnet and China's Ministry of Health to inform health system reform in China. In 2011, CAHFF was involved in dialogue between the Australian and Chinese Health Ministers and presented findings to the Health Care Reform in Asia Conference in Hong Kong.

The Mauritius Non-communicable Diseases Project is a Baker IDI led population-based surveillance of diabetes in Mauritius, conducted with collaborators in Finland and the UK, along with the Mauritian government. To date, the program has revealed significant insights into the population-level risks of diabetes, and is now developing a diabetes prevention intervention.

The Australia-Sri Lanka Public Health Program has been developed by Monash University's School of Public Health and Preventive Medicine over a number of years. Designed for mid-career Sri Lankan Medical and Dental Practitioners, the program aims to provide public health research training in preparation for senior roles in the Sri Lankan health system. A 12-month research placement in Australia is sponsored by the Sri Lankan Ministry of Health and in 2011 there were several public health professionals in the program.

A patient has their statistics measured on bioelectrical impedance scales.



Centre for Obesity Research and Education

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

The Centre for Obesity Research and Education (CORE) is dedicated to understanding and optimally managing the chronic disease of obesity and measuring the effects of weight loss on health, quality of life and survival. Our research aims to better understand obesity, obesity-related diseases (including psychosocial conditions) and to identify optimal methods for the safe, cost-effective, long-term management of this disease. Additionally, we seek to identify preventive strategies that can be implemented in the community.

CORE takes a multidisciplinary approach to the study of obesity, integrating a clinical obesity management program with strengths in medicine, surgery, psychology, epidemiology, public health, and professional and community education. We are leaders in clinical and psychosocial research into obesity and weight loss. Based on this approach, CORE is expertly placed to measure the health consequences of obesity and has the capacity to evaluate the health benefits of weight loss. To date, our research has demonstrated potential to improve the lives of people with limited options.

Key Research Findings in 2011

- Significant weight loss in obesity is accompanied by a marked regression of left ventricular hypertrophy (LVH), with no apparent change in cardiac volume or function. The local effect of a diminished amount of pericardial fat tissue may be more important than absolute weight loss with respect to the regression of LVH in obesity.
- High rates of depression are continually reported in obesity, as is a remarkable decrease in depressive symptoms following weight loss. Negative attitudes towards oneself appear to be driving elevated BDI (Beck Depression Inventory) scores rather than the overlap in physical symptoms between obesity and depression. The BDI system is a widely used instrument to measure severity of depression, which uses self-reported measures.
- Patients are highly satisfied with the outcome of the obesity surgery known as Laparoscopic Adjustable Gastric Banding (LAGB) and achieve substantial weight loss that is sustained three years after surgery. Expected ranges of satiety, adverse symptoms, and outcomes have been defined. The most troublesome symptom is the inability to consume certain foods. Weight loss predicted overall satisfaction, regardless of adverse symptoms.
- Overall, gastric emptying does not appear to be significantly altered following LAGB. Considerable progress has been made in understanding the mechanical physiological effects of LAGB on

oesophageal and proximal gastric function. These have been correlated with patient outcomes and sensations. The evidence suggests that satiety develops following LAGB without physical restriction of meal size. Therefore, it should not be classified as a restrictive procedure.

Achievements and Awards

Grants

- A 2011 Monash University Faculty of Medicine, Nursing and Health Sciences Strategic Grant of \$54,965 was awarded to Dr Rene Stolwyk, Dr Leah Brennan, Professor Michael Cowley, Professor Tamas Horvath, Associate Professor Wendy Brown, Professor Brian Oldfield and Dr Anna Peeters for the research 'Improved neurocognitive function associated with reduction in obesity - understanding underlying mechanisms: a pilot study'.

Awards

- Dr Leah Brennan received the 2011 Australian and New Zealand Obesity Society (ANZOS) Young Investigator Award.
- Dr Leah Brennan received a Monash University School of Public Health and Preventive Medicine 2011 Travel Grant for International Travel.
- Mr Paul Burton received the School of Public Health and Preventive Medicine 2010 Doctoral Excellence Award in 2011.



Postgraduate Students

2 PhD Students
1 Master of Surgery Student

Publications

13 Journal Articles
1 Book



Delegates attend the 2011 Australasian Cochrane Symposium at the Malthouse Theatre in Melbourne.

Australasian Cochrane Centre

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

The Australasian Cochrane Centre (ACC) coordinates activities of the Cochrane Collaboration in Australia and the region spanning East Asia, South East Asia, New Zealand and the Pacific Islands by providing training and support to authors of Cochrane Systematic Reviews, working with policy makers, advocating on behalf of Cochrane regionally and promoting the use and uptake of *The Cochrane Library*. The Centre works closely with Cochrane people in the region and has established branches in Korea, New Zealand, Singapore and Thailand, and supports networks in Malaysia, the Philippines and East Asia.

Training and Support: Review Authors

Australasian review authors are widely recognised as active and productive contributors to *The Cochrane Library*. Over 3,000 authors from ACC supported countries contribute to the Cochrane Collaboration, of whom 2,200 are Australian-based.

In 2011 the Centre conducted seven 'Introduction to writing a Cochrane review' courses around Australia and overseas, plus several review completion workshops. The Centre has a leading role in the development and quality improvement of training internationally. In July, the Centre's Systematic Review Trainer was appointed to the position of Training Co-ordinator for the Cochrane Collaboration globally.

In 2011 the Centre hosted the Australasian Cochrane Symposium in Melbourne under the theme 'Evidence, Communication and Impact'. The symposium showcased how the Cochrane Collaboration supports the use of evidence to inform decision making. Over 170 people attended the presentations from Professor Jonathan Craig, co-chair of the Cochrane Collaboration, and Dr David Tovey, Editor in Chief of *The Cochrane Library*. Dr Georgia Salanti (University of Ioannina, Greece) led an ACC run pre-symposium event for statisticians on advanced methods for multiple-treatments meta-analysis.

In September 2011, the *Medical Journal of Australia* started to publish a regular ACC staff authored column summarising the latest systematic reviews from *The Cochrane Library*.

Current Research

The ACC's research program explores effective ways to inform healthcare decisions via uptake of evidence. Projects focus on the synthesis, interpretation, dissemination and implementation of research evidence for clinical practice and policy. In 2011 two major NHMRC-funded research projects were commenced: SEA-URCHIN and CIPHER.

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 Indonesia, Malaysia, Thailand and the Philippines. Infection is one of the leading causes of death in newborn babies and a significant global health challenge. The first investigators' meeting was held in Yogyakarta, Indonesia. Ethics approval was granted and the data collection instruments were designed and piloted ready for an audit of clinical practice in 2012.

CIPHER (Centre for Informing Policy in Health with Evidence from Research) is a five-year collaborative project with the Sax Institute that is looking at how to increase the use of evidence from research within a policy environment. CIPHER was officially launched in July 2011 and was attended by representatives of more than 30 health policy agencies with a keynote address by Gary Banks AO, Chairman of the Australian Government Productivity Commission.

IRIS (Investigating Research Implementation Strategies) investigates the care of people with dementia in general practice. Semi-structured interviews with general practitioners (GPs) were 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 was also completed. The final phase of the project is a cluster-randomised trial; to date, 111 general practices have been recruited into the trial. The intervention for the trial, consisting of interactive workshops, will be delivered in June 2012 and final trial outcomes will be collected in early 2013.

Our Research into Systematic Review Methods aims to determine how frequently selective inclusion and reporting of outcomes biases results of meta-analyses resulting in misrepresentation of the available evidence. We focus on arthritis and depression with a view to informing strategies to improve the quality of systematic reviews of these areas leading to more reliable evidence for healthcare decision-making. The protocol for this research was submitted to *The Cochrane Library*.

Awards

- Dr Tari Turner won the School of Public Health and Preventive Medicine Prize for her PhD 'Evidence-based clinical protocols in the real world: a pragmatic approach to evidence-based clinical protocol development'.

Postgraduate Students

4 PhD Students

Publications

15 Journal Articles
1 Book Chapter



Assessment of knee structure from a magnetic resonance image of a study participant.

Rheumatology (Musculoskeletal Epidemiology)

Director: Professor Flavia Cicuttini MBBS(Hons), MSc, PhD, FRACP, FAFPHM

The focus of the work in the Rheumatology Unit is on novel approaches to the treatment and prevention of musculoskeletal diseases, particularly osteoarthritis (OA). Work has continued in understanding the pathogenesis of knee OA, which has been underpinned by the ability to non-invasively examine joint structures with magnetic resonance imaging. The use of this technique has enabled us to explore the relationship between obesity and body composition, and the association of these factors in OA.

Osteoarthritis

Risk Factors

Using total joint replacement as a surrogate measure of end-stage OA, we examined associations of genetic and lifestyle factors with the risk of total joint replacement for OA. The results of some exciting new work have provided evidence for the role of metabolic factors in knee OA. This offers potential for novel approaches to the treatment of knee OA. Parallel work is also continuing that explores the effect of physical activity on joint health. We also commenced an NHMRC-funded study aimed at determining whether Vitamin D prevents progression of knee OA.

Osteoarthritis and Metabolic Syndrome Link?

Work completed this year has further supported the notion that OA is part of the metabolic syndrome. We found that the amount of fat an individual has is independently associated with knee osteoarthritis, but also back pain and disability. There is increasing evidence that obesity is not associated with osteoarthritis simply through loading on the joints, whether it is knee, foot or back, but rather that metabolic factors associated with fat are priming joints for further damage. This is an important novel way to consider osteoarthritis as it has significant implications for the treatment and prevention of the disease. It may be that the meta-inflammation offers a therapeutic target for the treatment of OA. This avenue of investigation has led to Donna Urquhart and Patricia Berry's International Young Investigator Award.

Osteoarthritis Clinical Trial: A novel therapy for the knee?

In a clinical trial, we have found that intra-articular injections of the elastoviscous fluid Hylan G-F 20 was associated with reduced structural progression of knee OA, suggesting that Hylan G-F 20 may be a potential disease-modifying agent. The findings may lead to a novel therapy for knee OA.

Osteoarthritis Beyond the Knee

Following the success of the work in the knee, we are turning our attention to the hip, foot and back. These areas are relatively under-investigated but are major causes of pain and disability in the ageing population. We are developing the work through a number of key collaborations. These include The University of Tasmania, The University of Melbourne, the Anti-Cancer Council, La Trobe University, Griffith University, the Australian National Joint Replacement Registry, Deakin University, VU University (The Netherlands), Florida University and The University of Montreal. A new and existing stream of work led by the consultant rheumatologist Dr Anne Powell is also under way in collaboration with The Alfred's Ronald Sawers Haemophilia Centre.

Awards and Prizes

- Donna Urquhart and Patricia Berry received the 2011 International Young Investigator Award from the International Society for the Study of the Lumbar Spine for work published in the journal *Spine*.

Urquhart D, Berry P, Wluka A, Strauss B, Wang Y, Proietto J, Jones G, Dixon J, Cicuttini F 2011 Young Investigator Award winner: Increased fat mass is associated with high levels of low back pain intensity and disability. Spine. 2011;36(16):1320-1325.

- The Barwon Health Research 2011 Clinician's Choice Award for best presentation was awarded for the research 'Bone mineral density is cross-sectionally associated with cartilage volume in healthy, asymptomatic adult females: Geelong Osteoporosis Study'. Brennan, SL, Pasco JA, Cicuttini, FM, Henry MJ, Kotowicz, MA, Nicholson GC, Wluka AE
- Donna Urquhart and colleagues were awarded an NHMRC Project Grant for their research 'Is amitriptyline effective in the management of chronic low back pain?' The grant is valued at \$296,155 and will run from 2012-2014.
- Dr Donna Urquhart commenced an NHMRC Career Development Fellowship entitled 'Optimising prevention and therapeutic strategies for low back pain and disability'.

Postgraduate Students

6 PhD Students

Publications

18 Journal Articles



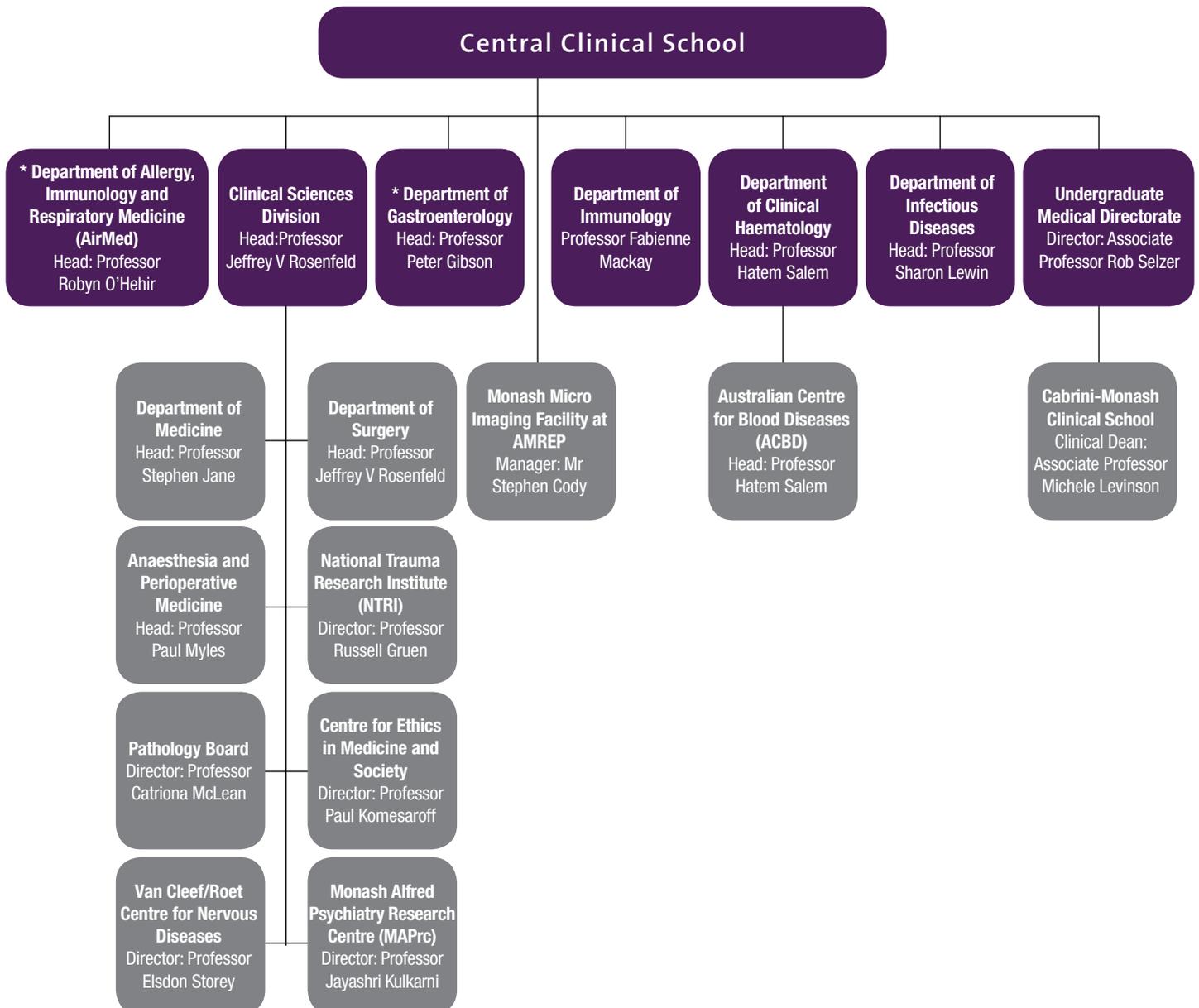
Perdita Cheshire, PhD student in the Monash Central Clinical School, researches Parkinson's Disease.



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.



Professor Jeffrey Rosenfeld, Chief Investigator for the neurosurgery component of the Bionic Eye project, shows the location of cortical tile implants to the visual cortex.

Division of Clinical Sciences

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

The Division of Clinical Sciences was created in 2011 as part of a restructure of the Central Clinical School. The Division's emphasis is on the integration of clinical practice with basic scientific research. A close affiliation with Alfred Health, with many staff holding joint appointments as practising clinician-researchers, makes the division well placed to expedite the clinical translation of its research projects into innovative treatments. The Division has 320 staff, including adjuncts, affiliates and higher degree research students.

In 2011, the Division encompassed the following groups:

- 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

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

All of 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.

The Monash Alfred Psychiatry Research Centre (www.maprc.org.au/) became part of the Division on 1 January 2012.



Professor Paul Myles with nurse Heidi Harrosh explains the pre-operative procedure to a patient.

Anaesthesia and Perioperative Medicine

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

The Department of Anaesthesia and Perioperative Medicine at The Alfred hospital is amongst the largest in Australia, consisting of 29 fulltime and over 50 visiting specialist anaesthetists, as well as 40 registrars in training. Its research unit is currently coordinating four multicentre international trials, and participating in a further five trials, including randomised clinical trials, audits and surveys. One of the biggest research initiatives of the department is the ENIGMA-II Trial (www.enigma2.org.au/) with Principal Investigator Professor Paul Myles. This worldwide trial is investigating the safety of nitrous oxide ("laughing gas") in 7,000 patients with risk factors for coronary artery disease undergoing major surgery. We expect that avoidance of nitrous oxide will reduce the incidence of cardiac complications or death when compared with otherwise identically managed surgical patients receiving a non-nitrous anaesthesia regimen. This international multicentre trial commenced in May 2007. We are collaborating with other major research groups around the world to answer this important clinical question.

Awards

- Professor Myles was awarded the Robert Orton Medal for distinguished service to Anaesthesia by the Australian and New Zealand College of Anaesthetists.

Publications: 12 Journal Articles

Centre for Ethics in Medicine and Society

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

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, co-ordination and conduct of teaching at undergraduate and postgraduate levels; fosters research in ethics and values in relation to medicine and society; and maintains a clinical ethics service at The Alfred hospital. The annual intensive research ethics course was highly successful, with demand increasing. CEMS is planning to offer more courses annually, not only at The Alfred but in different parts of Australia. Online ethics teaching has also been very successful with over 100 people enrolling during 2011, and discussions have started with various universities for international participation. In 2011, the Centre launched two initiatives: the International Health Workforce Society of Australasia, and the Complementary and Alternative Medicine Quality Use of Medicines Framework.

www.cems.monash.org/

Department of Medicine

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

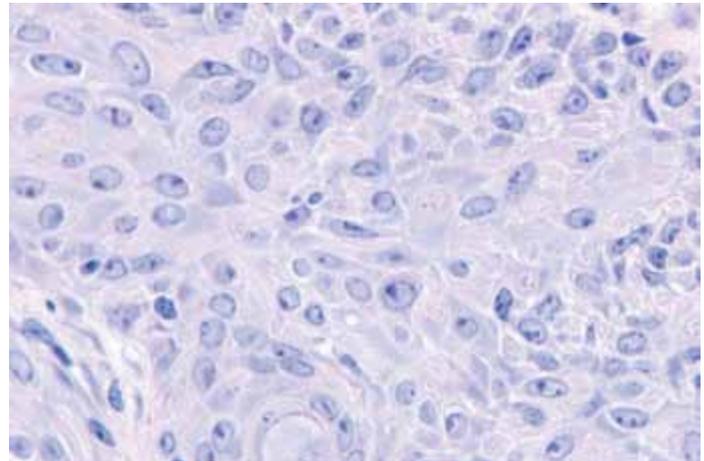
Inaugural Head of School and Head of the Department of Medicine, Professor Napier Thomson AM, retired from both roles in 2011 and Professor Stephen Jane became Head of School and Head of Department of Medicine. Professor Jane brought with him a number of research groups, which are now established within the Division of Blood Cancers in the Australian Centre for Blood Diseases and in the Department of Medicine. The School was restructured in September 2011 with the creation of the new departments of Allergy, Immunology and Respiratory Medicine, Infectious Diseases and Gastroenterology headed respectively by Professors Robyn O'Hehir, Sharon Lewin and Peter Gibson.

Professor Stephen Jane's and Dr Charbel Darido's Epidermal Development group, together with international collaborators, has discovered a gene in humans and mice which acts as a tumour suppressor. When this gene is damaged, it leads to the development of squamous cell cancer (SCC), an extremely prevalent cancer, particularly in Australia. The team discovered that this gene, which plays an important role in skin development in the foetus, is missing in adult SCC tumour cells. Loss of the gene knocks out the signal to stop skin cells from growing, which means the cells can keep increasing in number and eventually form a cancer. The breakthrough will provide new targets for therapies in these malignancies, and also strategies for prevention of SCC. Their paper was published in *Cancer Cell* in 2011.

Awards

- Dr Charbel Darido was awarded the newly established Clare Oliver Memorial Fellowship (\$200,000 over two years) in skin cancer research from the Victorian Cancer Agency to trial novel therapeutic approaches to SCC.
- Professor Suzanne Crowe was awarded an Order of Australia (AM) in the area of HIV/AIDS medicine and infectious diseases.
- Kai Syin Lee was awarded a Postgraduate Cancer Research Scholarship from the Cancer Council Victoria.
- The Epidermal Development group was awarded an NHMRC Project Grant in 2011.

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



Developing squamous cell cancer on the skin: Cells grow in an uncontrolled fashion after damage to the tumour suppressor.

National Trauma Research Institute

Director: Professor Russell Gruen MBBS, PhD, FRACS

The National Trauma Research Institute's (NTRI's) remit is to bridge the gap between research, clinical practice and policy for the benefit of patients with traumatic brain and spinal cord injuries. In addition to basic research into physiological mechanisms and therapeutic agents, the NTRI is developing both systematic reviews and more effective methods of information delivery. One of their programs, the Neurotrauma Evidence Translation (NET) Program, is two years into a five-year research program to develop and test strategies to increase the uptake of research into policy and practice, facilitating improved outcomes for people after traumatic brain injury (TBI). The program comprises four themes:

- gathering and summarising research in TBI to improve patient care;
- summarising the most up-to-date research evidence regarding the management of spasticity following brain injury and comparing this to what is actually happening in practice;
- developing and trialling a consistent approach to the management of patients with mild TBI in Australian emergency departments;
- translating the results of themes one to three, and related projects and information, to clinicians, researchers, patients, carers, research funders and policymakers involved in TBI.

To read further about NTRI activities see page 75.

Awards

In 2011 NTRI Director Professor Russell Gruen received an NHMRC Practitioner Fellowship and also a three-year capacity building grant from the Transport Accident Commission (TAC) of \$3.34 million to create a Centre of Excellence in TBI Research (CETBIR). The TAC grant is for three distinct programs of work over three years (2012-2014): to create a Centre of Excellence in TBI; to establish the NTRI Forum program to improve networks, collaborations and care of the injured; and to establish the Victorian Neurotrauma Council, an expert body to inform clinical practice, development of policy and other functions.

www.ntri.org.au/

Pathology Board

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

The Pathology Board develops, implements, reviews and integrates all pathology curriculum material including haematology, microbiology and tissue pathology for the Monash MBBS. Professor Catriona McLean is an anatomical pathologist with her own active research program. With her pathology skills and knowledge, she also collaborates on many research projects. She has a leading role in the formation and ongoing activity of the Pathology Board.

Professor McLean's Anatomical Pathology Laboratory works in collaboration with researchers from The Alfred hospital, Burnet Institute and Victorian Infectious Diseases Reference Laboratory (VIDRL). Their research throughout 2011 focused on the pathogenesis of immune associated viral infections of the brain and other common pathological conditions including breast cancer and neurodegenerative disease.

Viral Infections of the Brain

Viral infections represent a significant threat to the long term health of patients with underlying immunosuppressive conditions such as HIV/AIDS, organ transplant and cancer. Many of these viral infections result from reactivation of a pre-existing infection due to weakening of the immune system. Current research projects include investigation of HIV neuropathogenesis and establishment of viral reservoirs within the brains of affected individuals (*Dr Katherine Thompson*) and exploration of the pathogenesis of JC virus, the causative agent of progressive multifocal leukoencephalopathy (PML) (*Dr Julianne Bayliss*).

Recent research from the Anatomical Pathology group into HIV-1 suggests that brain cell reservoirs of latent virus exist long before the development of pathological HIV encephalitis and are correlated with macrophage trafficking into the brain. They have also demonstrated that JC virus DNA is present within resident brain cells of the non-PML brain, known to be infected during PML and JC virus granular cell neuronopathy. The group's research suggests that immunosuppression drives increased brain latency of JC virus and supports the argument for a brain only reservoir of latent JC virus and the hypothesis that reactivation of latent brain JC virus is central to disease pathogenesis.

Breast Cancer

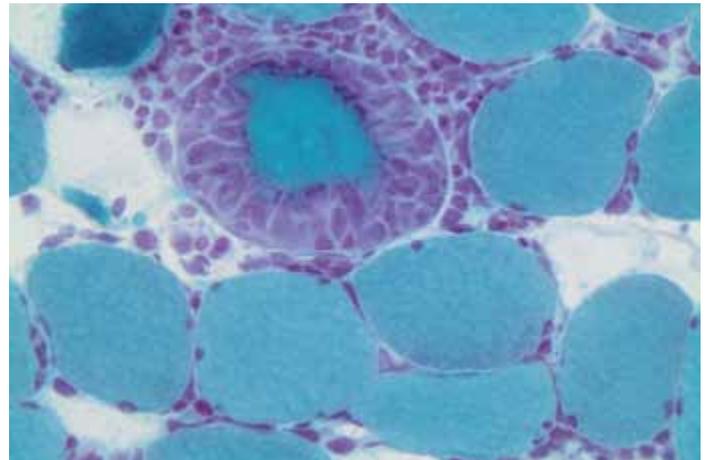
Breast cancer continues to be a major cause of mortality and morbidity amongst Australian women. Professor Catriona McLean investigates the pathological characterisation of breast cancer subtypes and their association with specific environmental and genetic factors. This research has assisted with the identification and characterisation of novel risk factors for breast cancer subtypes including the finding that reproductive factors and body mass index are most clearly associated with hormone receptor-positive tumours. There is also evidence that certain dietary factors may impact on tumour development and disease progression. Professor McLean's research has provided additional support for the hypothesis that a diet rich in fruit and salad might protect against invasive breast cancer.

Awards

- In November 2011, Professor McLean was included on a multidisciplinary international team of 10 researchers involved in establishment of an NHMRC Centre for Research Excellence into Neuromuscular Disorders. This \$2.5 million endeavour will focus on advancing the diagnosis and treatment of patients with neuromuscular disorders.
- Professor Catriona McLean was awarded an NHMRC Project Grant in 2011 to support her research in phosphoinositide 3-kinase signalling and skeletal muscle mass.

- In November 2011, Dr Kate Thompson was awarded an American Foundation for AIDS Research (AmFAR) Fellowship to investigate 'Brain HIV reservoirs - their role in cognitive impairment in the ART era'. Dr Thompson aims to determine which brain cell types are infected, which result in latent infection, and whether latent infection of brain cells is associated with the cognitive impairment observed in some HIV patients. These studies may point to a need to design therapies specifically targeted to infected brain cells.
- Dr Colleen D'Arcy completed a MBBS PhD in Muscle Disease (co-supervised with Professor Christina Mitchell, Monash University).
- Professor Catriona McLean was awarded a five-year grant by the Victorian State Government to run the Victorian Neuromuscular Laboratory Service.
- Professor Catriona McLean was named The Alfred Medical Student Society BMedSc Supervisor of the Year.

Publications: 23 Journal Articles, 1 Book Chapter



Abnormal muscle fibres in immune-mediated damage.

Department of Surgery

Head: Professor Jeffrey V Rosenfeld

The Monash Department of Surgery (DOS) at The Alfred is headed by Professor Jeffrey V Rosenfeld AM. Research in DOS is boosted by the clinical research of the surgeons and surgical trainees of The Alfred hospital. It includes research in a wide variety of areas including trauma, burns, cardiothoracic, colorectal, endocrine, upper gastrointestinal, urology, orthopaedics, spine, general surgery and neurosurgery. Additionally, the underlying causes of health problems are investigated in the DOS. The DOS collaborates with the NTRI the School of Public Health and Preventive Medicine and the recently established Monash University Brain Institute.

The Alfred hospital's General Surgery department associated with the Monash DOS and headed by Professor Jonathan Serpell, is committed to clinical research, surgical audit, clinical registries, clinical trials, and audit and quality assurance processes. Endocrine Surgery has developed Australia's leading registry for thyroid cancer.

Bionic Eye Project

Professor Jeffrey Rosenfeld (who also heads The Alfred's Neurosurgery Department) is a principal investigator on the Monash Vision Group's Bionic Eye project, which began in 2010. Professor Rosenfeld collaborates with a multidisciplinary team who, in partnership with industry, aim to restore functional vision to selected blind individuals.

The Monash Vision Bionic Eye Project is developing a brain implant, in contrast to a retinal implant. This approach may have a wider range of applications than the retinal device. Using standard neurosurgery techniques, a small area of the skull will be temporarily removed in surgery. Multiple tiles with a total of up to 650 microelectrodes will be placed in the primary vision area of the brain. The small area of the skull will then be replaced. During 2011, preclinical development and testing of the prosthesis was undertaken. The first implant trials are expected to take place in 2014.

Spine Trauma Registry

The Alfred Neurosurgery Department is developing a spine trauma registry, which is a multidisciplinary project involving Trauma Radiology and Neurology, aimed at standardising reporting of spine trauma imaging to ultimately improve the management of spine trauma patients at The Alfred and in the wider trauma community. The project is the first of its kind in the world.

Traumatic Brain Injury Interventions

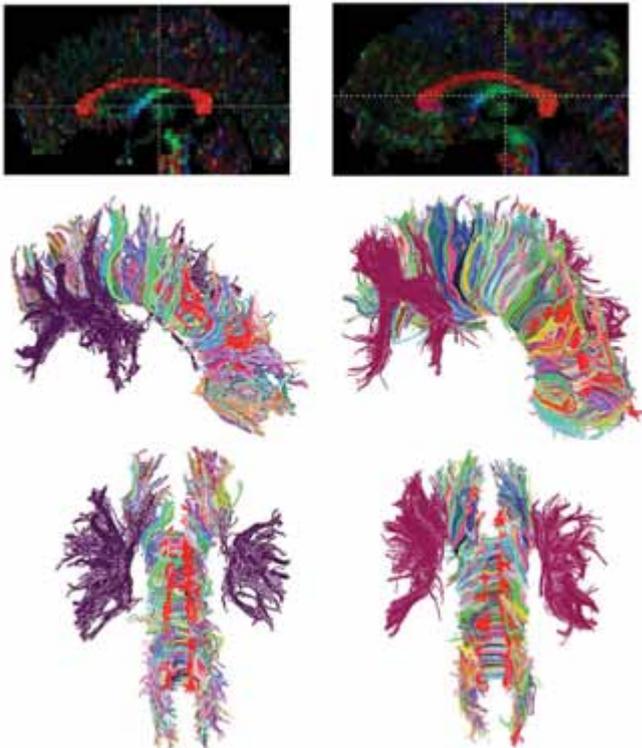
Alfred Neurosurgery continues collaboration in the POLAR (Prophylactic hypOthermia trial to Lessen trAumatic bRain injury) study of early hypothermia and the erythropoietin study in severe traumatic brain injury.

Awards

- Dr Vlad Bolshinsky, surgical registrar in the Department of General Surgery at The Alfred, won the 2011 DS Rosengarten Surgical Trainee Research Prize.
- Professor Jeffrey Rosenfeld was appointed Member (AM) in the General Division of the Order of Australia in the 2011 Queen's Birthday Honours.

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

Publications: 40 Journal Articles, 1 Book Chapter



Advanced imaging techniques are allowing us to see the effects of traumatic brain injury in new ways. This picture was generated using a technique called Diffusion Tensor Imaging (DTI), and shows loss of projecting fibres from the corpus callosum.

Van Cleef/Roet Centre for Nervous Diseases

Director: Professor Elsdon Storey MBBS, DPhil, FRACP

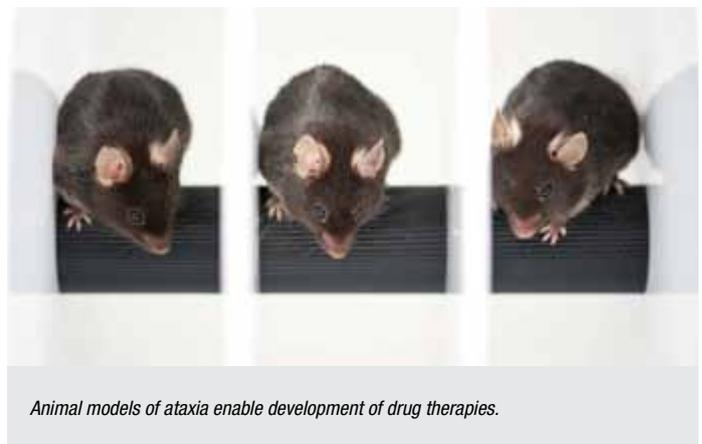
The principal areas of research of the Van Cleef/Roet Centre for Nervous Diseases are the neurobiology of movement disorders, and clinical aspects of cognitive disorders. These include stroke, Alzheimer's disease and other dementias, Parkinson's disease (PD) and other neurodegenerative disorders. Clinical research is conducted primarily at The Alfred. The Alfred Stroke Unit, under the leadership of Dr Judith Frayne, participates in many national and international multi-centre stroke trials, including both industry-sponsored and investigator-driven trials.

Progressive Supranuclear Palsy

The Centre conducts research into the neurodegenerative condition progressive supranuclear palsy (PSP), which includes participation in the only multicentre international study with a potential disease modifying therapy. A longitudinal study has also commenced into the neuropsychological changes that accompany the balance and visual disturbances of the disease. In addition, Dr Kelly Bertram is studying transcranial magnetic stimulation changes in patients with PSP, and tracking the progression of these measures over two years as a marker of disease progression.

Ataxias

Spinocerebellar ataxias (SCAs) affect those parts of the brain that are concerned with coordination. Lyn Lindsay, part-time PhD student, is investigating the utility of a new portable battery of electronic tests of upper limb coordination, devised in conjunction with human/machine interface engineers at Monash Berwick.



Animal models of ataxia enable development of drug therapies.

Dementias

Dr Will Lee commenced a study to assess the clinical correlations and underlying factors that predict sleep benefit in PD, as it is estimated that 30% of patients with PD improve substantially following restful sleep, although the phenomenon is poorly understood. Professor Elsdon Storey is a CI on a study of the neurology of mistake recognition in normal and impaired elderly, led from Melbourne University, which commenced in 2011.

Awards

- Professor Elsdon Storey was awarded an \$850,000 NHMRC Project Grant 'SNORE-ASA: does sleep apnoea cause brain dysfunction by damaging small blood vessels, and can this be prevented with aspirin?' to commence in 2012.

Publications: 15 Journal Articles



PhD students in Associate Professor Frank Alderuccio's Autoimmunity and Gene Therapy Group.
L-R: Zeyad Nasa, Jie Chung and Amit Joglekar.

Immunology

Director: Professor Fabienne Mackay BBiomedEng, PhD

The Department of Immunology has extensive research programs in basic and translational immunology that target diseases including allergy, asthma, autoimmunity, inflammation, diabetes, 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 portfolio and biotech activity. In addition to collaboration with AMREP partners, research activities extend to the Monash Clayton campus cementing an effective link between basic science and translation/clinical trials at The Alfred.

Allergy, Immunology and Respiratory Medicine

Heads: Professor Robyn O'Hehir (AIRmed, The Alfred)
Emeritus Professor Jennifer Rolland

Clinical trials and *in vitro* studies are used to investigate mechanisms of allergen immunotherapy and optimal strategies for down regulation of the adverse T-cell response to allergens in allergic individuals.

Path to Peanut Allergy Vaccine

Peanut allergy is the most common cause of life-threatening food reactions, including anaphylaxis and, unlike most childhood food allergies, typically persists into adulthood. Supported by the NHMRC, Ilhan Food Allergy Foundation / Gandel Foundation and a recent Alfred Trusts Research Grant, Allergy Laboratory researchers identified the critical sequences of peanut proteins that can interact with T-cells and build immunological tolerance, without binding allergy antibody (IgE) to cause anaphylaxis. These are key requirements for a safe and effective vaccine to treat peanut allergy and the researchers are negotiating with a British-based biotechnology company to progress these findings to clinical development.

Pollen Allergen Characterisation: Novel Immunotherapy

Bahia grass (*Paspalum*) is a subtropical grass but is now grown widely for domestic use in temperate regions; it is reported to trigger allergic rhinitis late in the pollen season. We identified, cloned and sequenced the major group 1 and group 13 allergens of this pollen, Pas n 1 and Pas n 13. With this sequence information, we identified sites of dominant T-cell reactivity. Since Pas n 1 shows some IgE cross-reactivity with other grass pollen allergens from rye grass and Bermuda grass, key sites of T-cell cross-reactivity between the grass pollen allergens have been identified as well as regions that are

unique to individual grasses. Together these studies inform selection of the appropriate mix of peptides for a safe and effective treatment of seasonal allergic rhinitis and asthma in a population.

Prevention of Airway Inflammation: Follistatin or Inert Nanoparticles?

Activin A is a naturally occurring substance with roles in normal tissue function, maturation and repair. Follistatin is an endogenous negative regulator of Activin A. Our studies using murine models of allergic airway inflammation indicate that Activin A plays an important role in inflammatory lung pathogenesis and that follistatin can prevent progression of airway remodelling. We have also demonstrated the preventive effect of inert nanoparticles on the development of lung inflammation.

Awards

- Dr Sara Prickett and Astrid Voskamp were awarded the Professor Daniel Czarny Prize for best research poster during Alfred Week for their study entitled 'Ara h2 peptides containing dominant CD4⁺ T-cell epitopes: candidates for a peanut allergy therapeutic.'
- Jodie Abramovitch (BMS Hons student) was awarded the Nairn prize for top Immunology Honours student in 2011 and the Australian Postgraduate Award with a Faculty Postgraduate Excellence enhancement to undertake her PhD on shellfish allergy in the Allergy Laboratory.

Autoimmune Diseases

Head: Associate Professor Frank Alderuccio

The main focus of our laboratory is the application of gene therapy as a treatment for autoimmunity. Using this strategy we have demonstrated that transplantation of *ex vivo* genetic manipulated bone marrow stem cells can promote immune tolerance and disease resistance or long-term remission. Our recent findings have demonstrated that this approach induces both T- and B-cell deletion as a mechanism and that this can also be achieved using less toxic, non-myeloablative conditioning. These findings are adding to the feasibility of translation of this strategy to treat humans.

Awards

- Jie-Yu Chung was recipient of a three-year Multiple Sclerosis Research Australia Postgraduate Scholarship.
- Zeyad Nasa was the recipient of an Australasian Society of Immunology Student poster prize.

Diabetes Laboratory

Head: Associate Professor Robyn Slattery

The Autoimmune Diabetes Group is focused on understanding the immuno-pathogenesis of type 1 diabetes (T1D). The primary interest of the team is in elucidating the role of β 2M and MHC class I in directing the autoimmune response in diabetes. This is crucial for our understanding of how to regulate the disease in predisposed individuals. Using a sophisticated genetic engineering tool called 'cre/lox', we have been able to track the development of cytotoxic T lymphocytes (CTL) from the time they first become activated to attack the β cells, until the β cells are destroyed, insulin production is lost, and diabetes develops. Our team has identified an important mechanism by which B lymphocytes contribute to the pathogenesis of T1D. The findings demonstrate a crucial role for the CD19 molecule on B lymphocytes in the expansion of pathogenic CD8 T-cells.

Molecular Immunomodulation Laboratory

Head: Dr Di Yu

In the laboratory's first year in operation, research to investigate the blood marker for follicular helper T-cells has revealed a role for follicular helper T-cells and their correlation with autoimmune diseases.

Awards

- PhD student Louis Tsai submitted his thesis in February 2012. He also entered the final round of the New Investigator Award session at the Australasian Society of Immunology annual meeting held in Adelaide last year and gave a widely applauded presentation.
- Yew Ann Leong was awarded an NHMRC PhD scholarship.
- Xin Hu was awarded an NHMRC PhD scholarship with a top-up from the Juvenile Diabetes Research Foundation.

Leucocyte Membrane Protein Laboratory

Head: Associate Professor Mark Wright

The Leucocyte Membrane Protein Laboratory is studying the role of tetraspanin cell surface proteins in the immune system. Tetraspanins play a vital role in the molecular organisation of the cell surface. Our analyses of tetraspanin deficient mice show a key role for these molecules in all aspects of immunity, including pathogen recognition, antibody production, inflammation and cellular immunity. Key tetraspanins studied include CD37, TSSC6, CD82 and CD53.

Leukocyte Signalling Laboratory

Head: Associate Professor Margaret Hibbs

This laboratory, which joined the Department in August 2010, focuses on understanding mechanisms underlying autoimmune disease and inflammatory lung disease using a unique series of animal models.

Research Fellow Mhairi Maxwell published her first major paper. Her studies provide new insights into the development of chronic lung inflammation and antibody-mediated autoimmune disease, and show that susceptibility to these disorders is dependent on an inflammatory milieu that is present only in particular genetic backgrounds. Importantly, these studies indicate that identification of the disease-promoting loci in susceptible genetic backgrounds might reveal useful targets for therapeutic intervention.

Awards

- Ms Evelyn Tsantikos was awarded her PhD in mid-2011 for her thesis entitled 'Dissecting autoimmune disease development in Lyn-deficient mice'.

Vaccines and Infectious Diseases

Head: Professor Magdalena Plebanski

We aim to understand the process by which cancer (ovarian cancer, leukemia and myeloma) and infectious diseases (malaria) persist in the body and in human populations by sabotaging the immune system, for example by induction of inflammation or regulatory T-cells (T-regs). We are developing vaccines for these diseases based on synthetic nanoparticles.

Our research into how nanoparticles interact with the immune system recently challenged current dogma, showing that nanoparticles can promote a lung state resistant to allergic airways inflammation. This work, performed in collaboration with the Asthma and Allergy group, has been recently published in *Journal of Immunology*, and as a patented technology, has been licensed to the CRC for Asthma to be progressed for further study into potential useful human applications.

Our research into novel T-cell subsets has seen the identification of a novel Th13 subset, published in *European Journal of Immunology*, and has led to exciting new collaborations with clinical teams at The Alfred directed by Dr Andrew Wei and by Dr Andrew Spencer. The collaborative research addresses how such cells and T-regs reactive to inflammation react to the novel chemotherapies (some of them anti-inflammatory) being tested for the first time at The Alfred to fight leukaemia and myeloma.

Our team focuses on translational outcomes, with our vaccines being progressed to phase I trials in the first instance to treat ovarian cancer, supported by PX Biosolutions and the major international charity Reliable Cancer Therapies. We also believe it is important to rapidly translate our findings on immunomodulation by vaccines and nanoparticles into changes in health policy. Consistent with this aim, we have recently been invited to join CVIVA (Research Centre for Vitamins and Vaccines), a multinational \$20 million initiative to bring together leading clinicians and investigators to optimise the implementation of current vaccines in children, with evidence based approaches (www.cviva.dk).

Achievements

- Kirsty Wilson obtained an H1 in her honours year and a Monash PhD scholarship.

B-cells, BAFF and Autoimmunity Laboratory

Head: Professor Fabienne Mackay

BAFF is a cytokine from the tumour necrosis factor family that is essential for B-cell development and survival. BAFF production drives autoimmunity and is linked to many autoimmune conditions in humans, such as systemic lupus erythematosus (SLE), rheumatoid arthritis and Sjögren's syndrome. The BAFF gene was cloned by Professor Mackay in 1999 and her laboratory was the first to publish a role for BAFF in SLE. In 2009, the BAFF inhibitor belimumab showed efficacy in SLE clinical trials. On March 9th 2011, belimumab was approved by the FDA as a new treatment for lupus, the first new treatment in over 50 years.

New projects include:

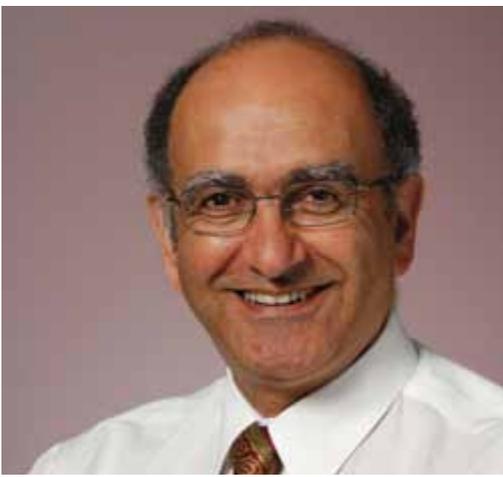
- Investigations into the role of BAFF in NK cell function in the solid tumours
- Development of novel immunomodulatory strategies for chronic leukaemia
- Exploring the development and function of novel B-cell subsets in autoimmunity and chronic viral infection

Postgraduate Students

34 PhD Students
1 MD Student
1 Masters Student

Publications

38 Journal Articles



Professor Hatem Salem was awarded a 'Member of the Order of Australia' on 26th January 2011 for service to medicine in the field of haematology as a clinician, educator and researcher, and for the establishment of the Australian Centre for Blood Diseases.

Australian Centre for Blood Diseases

Head: Professor Hatem Salem AM, MD, FRCPA, FRACP, LRCP, MRCS, MRCP

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

Research is focused on furthering our understanding of normal blood clotting (haemostasis), with the ultimate goal to discover innovative new therapies that selectively target pathological blood clots (thrombosis) without compromising haemostasis. Recent research has shown that a promising new class of anti-cancer drugs - BH3 mimetics (navitoclax) - not only reduce platelet numbers (thrombocytopenia), but also cause a thrombocytopeny, adversely affecting normal blood clotting function, potentially increasing bleeding risk in patients receiving these drugs (Schoenwaelder *et al*, *Blood*, 2011). Additional studies from the unit have highlighted the important role of the vWF receptor and its associated proteins in maintaining the mechanical stability of the plasma membrane of platelets, particularly under the conditions of fast blood flow (Cranmer *et al*, *Blood*, 2011).

Fibrinolysis and Gene Regulation Unit

Head: Associate Professor Robert Medcalf

Fibrinolysis is a naturally occurring process important for the removal of blood clots. We have established a number of *in vitro* models of brain cell permeability as well as *in vivo* models of traumatic brain injury (TBI) to study how the enzyme system involved in clot removal (plasminogen/plasmin/tissue-type plasminogen activator: t-PA) can also modulate brain function under normal and pathological conditions. Recent studies have shown that t-PA levels are altered in certain regions of the brain following TBI and also in a number of neurodegenerative conditions, including Alzheimer's disease and following epilepsy (Sashindranath *et al*, *Lab Invest*, 2011). Further research demonstrated how thrombin, an enzyme critical for coagulation, also has potent effects on brain cell function (Niego *et al*, *Brain Res*, 2011). A collaborative study with the University of Gothenburg in Sweden highlighted a transcriptional basis for differences

in t-PA levels in humans (Tjarnlund-Wolf *et al*, *Thromb Haemostas*, 2011).

Vascular Biology Unit

Head: Associate Professor Robert Andrews

Research undertaken in the Vascular Biology Unit has: (i) identified novel mechanisms for platelet receptor ectodomain shedding, via shear stress, coagulation or anti-platelet antibodies relevant to vascular metalloproteinase function; (ii) developed new assays for rapid analysis of glycoprotein (GP) VI-dependent intracellular reactive oxygen species (ROS) and proteolytic status of GPIIb/IIIa/GPVI in unfractionated blood independent of platelet count; and, (iii) analysed the shed soluble form of the platelet collagen receptor glycoprotein VI (sGPVI) (using an in-house ELISA) as a novel biomarker of platelet reactivity in plasma for conditions including stroke, autoimmune thrombocytopenia (e.g. idiopathic thrombocytopenic purpura and heparin-induced thrombocytopenia) and disseminated intravascular coagulation.

Serpin Biology Unit

Head: Associate Professor Paul Coughlin

The Serpin Biology Unit is studying the interaction between the main clot dissolving enzyme plasmin, and its principal regulator, antiplasmin. We aim to understand how the clot dissolving mechanism is activated, as well as how it is hijacked by cancer cells enabling spread through the body. Studies on the molecular interaction between plasmin and anti-plasmin (Lu *et al*, *JBC*, 2011) have provided clues to new methods of dissolving harmful blood clots that cause strokes, heart attacks and deep vein thrombosis.

Malignant Haematology and Stem Cell Transplantation: Division of Blood Cancers

Myeloma Research Group

Head: Professor Andrew Spencer

The Myeloma Research Group (MRG) focuses on the development of novel therapeutic approaches for multiple myeloma (MM) and the identification of the causes of disease progression and drug resistance. We received a compound validation grant from the US-based Multiple Myeloma Research Foundation to progress the pre-clinical development of JAK inhibitors for MM. Findings (Khong and Spencer, *Molecular Cancer Therapeutics*, 2011; Monaghan *et al*, *Leukaemia*, 2011) have informed the development of phase 1b and phase 2b novel therapeutic trials planned for 2012. In 2011, the MRG established itself

as a reference centre for both flow cytometric and molecular-based MM minimal residual disease testing for a number of multicentre Australia-wide clinical trials.

Stem Cell Transplantation Group

The Stem Cell Transplantation (SCT) Group conducted several programs throughout 2011, including:

- *Positive Change for Life* program promoting healthy behaviours in long-term survivors of SCT to address risk factors for future health problems prevalent in this population (Sharon Avery and Patricia Walker)
- Novel methods of minimal residual disease monitoring, including CD34 cell chimerism after reduced intensity allogeneic SCT (David Kipp and Andrew Spencer)
- Immune reconstitution studies following autologous stem cell transplantation related to choice of G-CSF used for stem cell mobilisation (David Kipp and Andrew Spencer)
- Prospective audit of posaconazole level monitoring during therapy for haematological malignancies (David Kipp and Andrew Spencer)

Haematology Clinical Research Unit

An increasing proportion of phase I and first-time-in-human studies were undertaken in 2011. During 2011, 33 trials were open with 84 newly recruited patients, 112 patients in follow-up and a total of 648 dedicated 'Trial Clinic' consultations. Multicentre investigator-initiated trials of novel therapeutic approaches to both MM and acute myeloid leukaemia (AML) were developed and initiated throughout 2011 and into 2012. We also acted as the national coordinating site for the ALLG-GIMEMA MM11 myeloma trial.

Leukaemia Research Group

Heads: Dr Mark Guthridge and Dr Andrew Wei

The aim of our group is to further understanding of the mechanisms which drive growth and proliferation in leukaemic cells. We bring together the strengths of signalling biology, mouse models, the molecular study of patient-derived AML blasts and the testing and validation of therapeutic candidate compounds in a coordinated pipeline that culminates in human clinical trials at The Alfred hospital. The group has a broad discovery and development program focusing on phosphatase regulation of kinases in leukaemia, targeting the regulators of survival in AML, creating novel high-throughput tools for AML diagnosis, interrogating the leukaemic stem cell niche, developing screens to discover novel therapeutic drug combinations and creating innovative *in vitro* and *in vivo* models to study the molecular mechanisms underpinning AML.

Stem Cell Research Unit

Heads: Associate Professor David Curtis and Dr Stephen Ting

Formed in July 2011, the focus of the Unit is to understand the regulation of the unique properties 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. A/Prof Curtis's research group studies T-cell acute lymphoblastic leukaemia and myelodysplasia. Research in 2011 has focused on understanding the control of cell cycle and programmed cell death (apoptosis) in normal and leukaemic stem cells. Dr Ting's group is studying the role of endocytosis in self-renewal, a critical property of stem cells. Dr Ting's discovery that overexpression of a subunit of the endosomal clathrin-complex significantly enhances stem cell activity suggests a new method of regulating stem cell self-renewal (Ting *et al*, *Blood*, Nov 2011).

Red Cell Research Group

Heads: Associate Professor David Curtis and Professor Stephen Jane

The Group studies the regulation of red cell production with a particular focus on globin 'switching', a process that involves suppression of foetal type globin and activation of adult-type globin at six months of life. Reactivation of foetal globin gene expression is a therapeutic objective in patients with β -thalassaemia and sickle cell disease and the enzyme PRMT5 thought to be involved in the regulation of foetal globin gene silencing is a molecular target for this strategy. In collaboration with the Cancer Therapeutics CRC, we examined the therapeutic potential of small molecule inhibitors of the enzyme PRMT5 to activate foetal globin expression for the treatment of thalassaemia and sickle cell disease and cancers including lymphoma. The Group also works with ENU (*N-ethyl-N-nitrosourea*) mutagenesis to discover critical regulators of red cell production. Research has shown that a phosphatase called SHIP is important for the control the macrophage inflammatory response (Nguyen *et al*, *Blood*, 2011).

Eastern Clinical Research Unit Translational Research Division

Head: Dr Anthony Dear

The ECRU TRD aims to expand the capabilities of ECRU beyond clinical research to a better understanding of the activity of existing pharmaceuticals and the development of new treatments. This in turn promises to deliver better treatment than is currently available. ECRU TRD activity is multi-disciplinary including the Departments of Endocrinology, Neurology and Oncology together with significant support from the pharmaceutical industry.

Achievements and Awards

Thrombosis Research Unit

- Professor Shaun Jackson received an International Society of Thrombosis and Haemostasis Biennial Award for Contributions to Haemostasis in recognition of his contribution to research and education in blood coagulation. Professor Jackson was one of five Society members whose accomplishments were internationally regarded as exemplary models of excellence in research and teaching.
- The Thrombosis Research Unit was awarded two NHMRC Project Grants which commenced in 2011.

Red Cell Research Group

- Associate Professor David Curtis received a Sylvia and Charles Viertel Senior Medical Research Fellowship, one of only two awarded each year for outstanding medical researchers with < 10 years postdoctoral experience. A/Prof. Curtis was also awarded an NHMRC Practitioner Fellowship and a Victorian Cancer Agency Clinical Research Fellowship.
- The Group was awarded an NHMRC Project Grant in 2011.

Vascular Biology Unit

- Dr Robert Andrews was awarded an NHMRC Senior Research Fellowship.
- Mr JianLin Qiao (PhD student) received an Australasian Society of Thrombosis & Haemostasis (ASTH) Travel award to attend the ASTH Sydney 2011 meeting, and was selected as ASTH Scientific Presentation Runner up.

Postgraduate Students

22 PhD Students
1 Masters Student

Publications

45 Journal Articles
2 Book Chapters



Deb Rhodes (R), Infection Prevention Project Nurse, and ICU Clinical Nurse Specialist, Leanne Heimann, (L) discuss an Alfred Health Quality Improvement Project aimed at preventing catheter associated urinary tract infection.

Infectious Diseases

Director: 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 (such as those with malignancy, in intensive care and post-splenectomy), influenza, drug resistant organisms, antibiotic use and infection prevention and hospital epidemiology.

HIV: When and Where it Hides in Cells?

Our HIV research ranges from laboratory-based through to clinical and public health research. We recently expanded our basic and clinical research programs aimed at understanding where HIV 'hides' in patients on treatment and how HIV can be eliminated in these long lived cells. Our laboratory model of HIV latency has helped us to understand how HIV can enter a resting T-cell with the help of a family of proteins called chemokines and we are using this model to identify new drugs that could potentially reverse latent infection. In collaboration with the Burnet Institute, we are investigating whether HIV uses different strategies to hide in T-cells and in cells in the brain.

Clinical Trial of an Anti-Cancer Drug in HIV

We are conducting one of the first clinical trials of the anti-cancer drug vorinostat in HIV-infected patients to determine if latent virus can be flushed out of resting T-cells. This clinical trial is currently recruiting patients and has attracted wide spread interest in the scientific and general media, including reports in the journals *Science*, *Nature* and *Nature Medicine*, and on ABC PM.

Non-AIDS Complications and Long Term Outcomes of HIV

An NHMRC Partnership Projects Grant (including funding from The Alfred, Australian Society for HIV Medicine and National Association for People Living with HIV/AIDS) awarded to Professor Sharon Lewin and Dr Julian Elliott in 2011 will fund an innovative new study to assess the role of patient-based management systems to reduce cardiovascular disease in patients with HIV. Professor Jenny Hoy and Dr Edwina Wright are continuing clinical studies to better understand the etiology and management of non-AIDS complications of HIV, including heart disease, bone disease and dementia. Dr Elliott has built a new network of investigators (from Melbourne-based hospitals and GP practices where HIV-infected patients are seen) to establish the Melbourne HIV Cohort - a long term cohort study of people with and without HIV to better understand the long term clinical outcomes of HIV.

HIV Co-infections

Co-infections with pathogens such as *Cryptococcus* and hepatitis B virus (HBV) still cause significant morbidity in patients with HIV, particularly in low-income countries. Drs Caroline Marshall and Julian Elliott are collaborating with Médecins Sans Frontières (MSF) to understand the burden of these and other pathogens in patients starting HIV treatment in low-income settings. Dr Christina Chang (PhD student with Professor Lewin and Dr Elliott) has completed a longitudinal study of HIV-infected patients with Cryptococcal meningitis in Durban, South Africa (in collaboration with University of Kwazulu Natal and University of Western Australia). She found that a significant risk factor for deterioration following initiation of antiretroviral therapy (ART) was the lack of clearance of *Cryptococcus* from the cerebrospinal fluid prior to initiation of ART.

Drs Megan Crane and Jennifer Audsley are studying the reasons why HBV-related disease is worse in patients infected with HIV as one of multiple collaborative studies with investigators in Sydney, Bangkok and the US. Megan recently identified that abnormalities in the mucosa of the gastrointestinal tract allowing for translocation of microbial products may play a role in driving more severe liver disease in HIV-HBV co-infected patients.

Viral Hepatitis

The appointment of Professor Margaret Hellard as head of hepatitis services in the Department of Infectious Diseases has considerably enhanced the collaborative projects between The Alfred and the Burnet Institute. A new database of all patients with the hepatitis C virus (HCV) seen in the Department of Infectious Diseases has been established. Several new clinical trials, including one trial funded by the US National Institutes of Health, will assess the optimal management of recently acquired HCV and aims to understand sexually transmitted HCV. Dr Joe Sasadeusz is leading an international multi-site study investigating HBV drug resistance in HIV-HBV co-infected patients.

Infections in the Immunosuppressed Host

Dr Michelle Yong (Infectious Diseases physician and PhD student with Professor Sharon Lewin and Dr Paul Cameron) is evaluating the role of a new test developed by an Australian company to determine which patients receiving a bone marrow transplant are at greatest risk of a severe viral illness caused by cytomegalovirus.

Dr Orla Morrissey and multiple collaborators within Australia completed a randomised controlled trial examining the efficacy and safety of a pre-emptive strategy for managing invasive *Aspergillosis*. They found that a pre-emptive strategy reduced the use of antifungal therapy without compromising survival. A number of sub-studies have arisen from this trial, including the examination of the cost-effectiveness of a pre-emptive strategy. Dr Michelle Ananda-Rajah (a PhD student in the Infectious Diseases Unit) is developing an automated surveillance system for invasive fungal infections, which may improve the early diagnosis and outcomes of invasive fungal infections.

Influenza

We coordinate a national hospital-based surveillance system for severe influenza. Our results suggest that influenza was responsible for at least 3,000 admissions to hospitals in Australia in 2011. In addition, the influenza vaccine appears to be associated with a 37% reduction in the risk of hospitalisation as a result of influenza. These results have important implications for public health and support the use of the influenza vaccine in 'at-risk' patients in the National Immunisation Program.

Drug Resistant Organisms and Antimicrobial Prescribing

The Infection Prevention and Epidemiology Team evaluated the role of topical disinfectants in eliminating carriage of a multidrug resistant organism called VRE. They also audited catheter use across the hospital and identified a number of interventions to improve clinical practice.

The implementation of a web-based antibiotic approval system at Alfred Health has helped decrease antibiotic usage across the hospital. An antimicrobial stewardship team reviews patients who have been prescribed antibiotics that do not conform to hospital policies and negotiation with the treating doctor has often resulted in modification to the prescription.

Spleen Registry

The aim of the spleen registry is to prevent post-splenectomy sepsis through education, immunisation and preventive antibiotics. The registry lists over 2,500 patients who have had their spleen removed. The development of new vaccines against organisms such as *Pneumococcus* has raised the important question of what is the best immunisation regime for splenectomised patients. We are currently participating in an NHMRC-funded research project to determine the optimal immunisation schedule for this patient group. The registry has also been pivotal in the development of a new test (IgM memory B-cells) to measure spleen function.

Achievements and Awards

Major Grants

- Professor Sharon Lewin and Dr Paul Cameron were part of a large international team that was awarded a collaborative program grant on HIV cure. A total of \$70 million was awarded by the National Institutes of Health to three US-based programs as part of the Martin Delaney 'Collaboratories'. Professor Lewin is one of seven project leaders and her collaboratory was awarded \$25 million over five years.
- Professor Lewin, Dr Paul Cameron and post-doctoral fellow Dr Vanessa Evans were awarded a grant from the American Foundation for AIDS Research to extend their work on dendritic cells and HIV latency.
- Professor Lewin and Dr Crane were awarded a four-year NHMRC Project Grant to study the pathogenesis of HIV-HBV co-infection.

- Professor Lewin was awarded a High Impact Research Grant from the University of Malaya to study why people's immune systems recover at different speeds after receiving combination ART with her University of Malaya collaborators Dr Reena Rajasuriar (recently awarded a PhD from Monash University under Professor Lewin's supervision) and Professor Adeeba Kamarulzaman (Dean, Faculty of Medicine, University of Malaya).
- Professor Jennifer Hoy and Dr Edwina Wright are co-investigators with colleagues from The Kirby Institute on a five-year NHMRC grant examining the best time to initiate treatment for HIV infection.
- Professor Hoy was awarded a four-year NHMRC Project Grant to investigate whether treating with an anti-osteoporotic drug or switching the HIV treatment regimen is the more effective way to manage low bone mineral density in HIV-infected adults.

Awards

- Professor Suzanne Crowe was awarded an AO in the Queen's Birthday Honours.
- Dr Julian Elliott was awarded an NHMRC Early Career Fellowship.
- Dr Edwina Wright was nominated President of the Australian Society for HIV Medicine, the peak national group that represents all health professionals working in HIV.
- Dr Michelle Yong was awarded the Priscilla Kincaid Smith Fellowship from the Royal Australian College of Physicians (RACP).
- Dr Anton Peleg was appointed to the Monash Research Accelerator Program 2011 for top early-mid career researchers who are thought of as future leaders. He also received the Sylvia and Charles Viertel Award to fund a study of the pharmacology of antibiotics and received the Frank Fenner Award from the Australian Society for Infectious Diseases (ASID).
- Dr Michelle Ananda-Rajah was awarded an Infectious Disease Fellow Travel Grant to the 51st Interscience Conference on Antimicrobial Agents, Sept 2011 and a travel fellowship to attend the Australian Society of Infectious Diseases meeting in Freemantle in 2012.

Prizes

Professor Sharon Lewin was awarded the Frank Fenner Prize for 2011 from the Burnet Institute. She was also awarded the Research Award for 2011 from the Victorian AIDS Council / Gay Mens Health Centre.



Gemma Klintworth (Infection Prevention Team) refers to infection prevention control in the Intensive Care Unit.

Postgraduate Students

17 PhD Students

Publications

62 Journal Articles



Psychiatry

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

The Monash Alfred Psychiatry research centre (MAPrc) is a clinical research centre with over 130 staff and students that is affiliated with both The Alfred hospital's Department of Psychiatry and Monash University. MAPrc is dedicated to working on the clinical translation of neuroscience into innovative treatments for people with severe mental illness. Staff at MAPrc are pioneering new applications and treatments for severe mental illnesses such as schizophrenia, bipolar affective disorder and depression. By drawing on novel technological advances and alliances with other disciplines, MAPrc cultivates a 'new thinking' approach to improve current treatment options for consumers of psychiatry.

MAPrc research is categorised into four key research areas:

- Women's Mental Health
- Psychiatric Neurotechnology
- Psychopharmacology
- Psychiatric Service Research

Investigative and observational studies aim to elucidate the aetiology and epidemiology of mental illness, with the hope that such information may improve the quality of life for people with these conditions, as well as adding to the growing body of knowledge of psychiatry, psychology, neuroimaging, neurocognition and other such areas.

Women's Mental Health

The focus of this research stream is to provide new understanding and innovative treatments for women with mental illnesses. The research conducted in this area adopts a biopsychosocial approach and has many different foci. One approach is to understand the role of the neuroendocrine system in mental illnesses and, specifically, the use of female hormones to improve the results of treatment. We are conducting ground-breaking research into the use of estrogen to improve symptoms in schizophrenia and the use of selective brain estrogens in women. We are also exploring possible links between the oral contraceptive pill and depression.

Estrogen-Related Treatments

In 2011 we completed a study known as ADEPT (A Definitive Estrogen Patch Trial), which involved 180 women. The results of the ADEPT study will inform clinical practice in the future. The use of selective estrogen receptor modulators (SERM) in schizophrenia is currently being trialed in women of all ages. This work follows on from our world first research of the role of estrogen in schizophrenia.

Antipsychotic Medication During Pregnancy

The National Register for Antipsychotic Medication in Pregnancy (NRAMP) is a world first register capturing information from women who are, or have been, taking antipsychotic medication during pregnancy. In 2011 NRAMP research was presented at international conferences as well as local and national clinical meetings. Our first Participant Ambassador was warmly welcomed this year, bringing a new understanding of life for women in this population group.

A Women's Clinic

Launched in 2010, Professor Jayashri Kulkarni set up a second opinion specialist women's mental health clinic. This unique clinic provides women with an overview of their current mental state and functioning, and offers a diagnosis with suggestions for new or different treatments. A detailed management plan is given to both the woman and her treating team, along with any relevant research or educational material. Appointments in the Women's Mental Health Clinic were in high demand in 2011, with over 180 women seen for a second opinion consultation with Professor Kulkarni and her expert team.

Research into Women's Mental health at MAPrc has achieved translation into clinical practice. Professor Kulkarni was part of the Committee that developed the new Service Guideline of Gender Sensitivity and Safety provided to Victorian hospitals at the end of 2011. It was during this work with the Department of Health that Professor Kulkarni secured funding for capital works to build a women's only area in a psychiatry ward of The Alfred hospital. In September 2011, the Honourable Mary Wooldridge MP, Minister for Mental Health, Women's Affairs and Community Services unveiled the new area and launched the new service guideline.

Psychiatric Neurotechnology

Brain Stimulation and Neuroimaging

The Brain Stimulation and Neuroimaging research program involves the use of transcranial magnetic stimulation (TMS), magnetic seizure therapy (MST), transcranial direct current stimulation and deep brain stimulation as methods of developing innovative treatments for depression, schizophrenia and bipolar affective disorder, as well as developing biomarkers for mental illnesses. There are currently 24 projects running, including nine clinical trials.

In 2011, we commenced three large-scale clinical trials, had 56 papers published, and over \$2 million dollars awarded in research funding. We initiated a world first trial of accelerated multi-coil TMS for depression.

We are also conducting one of first comparative trials of magnetic seizure therapy and electroconvulsive therapy, and have commenced a large study to establish biomarkers that predict response to repetitive TMS (rTMS) treatment. We are also in the later stages of completing world first trials assessing rTMS treatment in bipolar depression and in depression after head injury.

Cognitive Neuropsychology

Cognitive Neuropsychology has 11 projects running. This research involves the development and use of highly specific cognitive testing in conjunction with neuroimaging to understand the role of cognitive impairment in schizophrenia, bipolar disorder and body image disorders. Novel psychological treatments for persistent auditory hallucinations and individuals with long-standing cognitive deficits have been developed by this team.

The group has recently attracted significant funding to expand their investigations to examine the role of genes on the cognitive impairments of schizophrenia and bipolar disorder. This team is arguing that by focusing on specific symptoms within the disorders, for example difficulties with memory, planning or emotion perception, better genetic correspondence will be uncovered.

Neural Diagnostics

The Neural Diagnostics team is working on vestibular diagnostics, which involves measuring and recording activity in the vestibular system, middle-ear and brain structures that are responsible for balance and sensing the body's position in space using a patented technique known as EvestG.

By developing vestibular diagnostic techniques, we hope to find new and accurate ways to measure the efficacy of medications and other therapies used in mental illness and nervous system disorders such as Parkinson's disease, unipolar and bipolar depression, and schizophrenia.

In 2011, the team successfully completed a project funded by a Commercialisation Australia Grant. The project involved testing 40 people with bipolar depression, 40 with unipolar depression, and 40 healthy people. This data will be analysed to determine if a differentiating signal is provided by EvestG to use as a future diagnostic tool to separate bipolar depression from unipolar depression.

Psychopharmacology

With ten active projects ongoing, this program involves conducting phase 2, 3 and 4 clinical trials of new medications in schizophrenia, depression and anxiety disorder. 2011 saw several new adjunctive medications being successfully trialed, particularly in the areas of schizophrenia and depression. New medications that have more specific targeting sites and fewer side effects are desperately needed for people suffering from mental illnesses, and these trials may assist in providing novel and better drug treatment options.

Service Related Research

Service Evaluation

The Service Evaluation team supported the conduct of 14 research projects or program evaluations in 2011. Staff were authors on four publications detailing outcomes from related research. Highlights included:

- Victorian statewide problem gambling and mental health partnership (Winner of mental health award (see achievements and awards below))
- The first public performance of a choir for people with aphasia and commencement of filming for a documentary detailing the choir's work
- Demonstration of the outcomes of a mental health Prevention and Recovery Centre and Statewide Psychiatric Intensive Care Service

- Conduct of a review of The Alfred Psychiatry Consumer Participation Program and The Alfred Psychiatry Rehabilitation Program

Healthy Lifestyles

The Healthy Lifestyles Project team at MAPrc successfully recruited 79 participants into a study evaluating a healthy lifestyle intervention for cardiovascular disease risk reduction among people with psychotic disorders. This has brought the total number of participants to 236 across the three study sites involved in the intervention. We continued to provide individual treatment to all participants targeting smoking, diet and exercise, and follow-up assessments were completed every six months. NHMRC funding for the follow-up phase of the Healthy Lifestyles Project commenced in 2011 and will continue until 2013. Two journal publications in 2011 have arisen from this study.

Achievements and Awards

• MAPrc awarded Alfred Health Research Grant

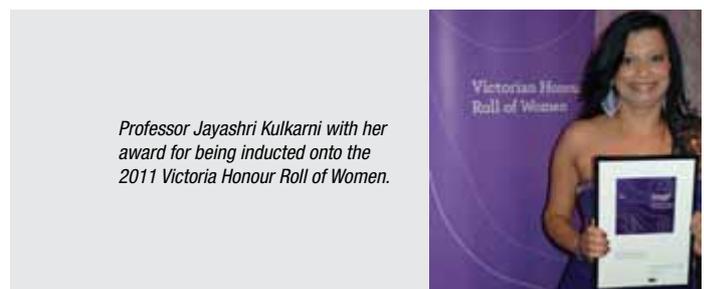
MAPrc researchers have been awarded one of three Alfred Health Research Grants (valued at \$485,817 over three years) to investigate the predictors of antidepressant response to TMS. One of the only substantially new treatments developed in recent years for treatment resistant depression has been rTMS. As participation in rTMS treatment involves a considerable time and resource commitment, it is essential to be able to identify patients who are more or less likely to respond. This research aims to provide a practical and clinically useful approach to predicting antidepressant response to rTMS treatment.

• Professor Jayashri Kulkarni inducted onto the 2011 Victorian Honour Roll of Women

Together with twenty inspirational women from around Victoria, Professor Jayashri Kulkarni was inducted onto the 2011 Victorian Honour Roll of Women in a ceremony held at the Victorian National Gallery on 16 March, 2011. Mary Wooldridge (MP), Minister for Women's Affairs, presented the award recognising Professor Kulkarni's excellence and leadership in mental health research, her success in developing new treatments and services for people with mental illnesses, and for helping to raise the profile and understanding of mental illness in the community.

• Winner of the Minister for Mental Health's Award

The Victorian Statewide Problem Gambling and Mental Health Partnership was the winner of the Minister for Mental Health's Award of Enabling Person and Family-Centred Mental Healthcare in the 2011 Victorian Public Healthcare Awards. The Partnership was built upon a collaborative project involving MAPrc, Alfred Psychiatry and Gambler's Help Southern and auspiced by the Department of Justice. It identified that a significant number of people presenting to crisis mental health services were experiencing problem gambling.



Professor Jayashri Kulkarni with her award for being inducted onto the 2011 Victoria Honour Roll of Women.

Postgraduate Students

31 PhD Students
9 Other Doctoral Students
3 Masters Students

Publications

35 Journal Articles
1 Book

The
ALLFRED





Alfred Health Departments Conducting Research

Chief Executive Alfred Health: Mr Andrew Way

*Medical and Surgical Departments	Medical Services	Nursing and Allied Health
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 Head: Assoc. Prof. Silvana Marasco	Nuclear Medicine Head: Assoc. Prof. Victor Kalff	Nutrition and Dietetics Head: Assoc. Prof. Ibolya Nyulasi
Cardiovascular Medicine Head: Prof. Anthony Dart	Pathology Services Head: Assoc. Prof. Hans Schneider	Occupational Therapy Head: Jacqui Morarty
Emergency and Trauma Centre Head: Dr De Villiers Smit	Pharmacy Head: Prof. Michael Dooley	Patient and Family Services Head: Bridget Wall
Endocrinology and Diabetes Head: Prof. Duncan Topliss		Physiotherapy: Head: James Sayer
Gastroenterology Head: Prof. Peter Gibson		Psychology Head: Lynda Katona
General Surgery Head: Prof. Jonathan Serpell		Speech Pathology Head: Janine Mahoney
Intensive Care Head: Prof. Carlos Scheinkestel		
Medical Oncology Head: Prof. Max Schwarz		
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		
Trauma Head: Prof. Russell Gruen		

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



Associate Professor Bronwyn Lewey
receives the Churchill Fellowship.

Allergy, Immunology and Respiratory Medicine

Director: Professor Robyn O'Hehir BSc, MBBS, FRACP, PhD, FRCP, FRCPATH

Clinical Director: Professor Trevor Williams MBBS, MD, FRACP

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, 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 competitive NHMRC, ARC, Cooperative Research Centre and other research grant 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.

Management of Sleep Apnoea: Clinical Trials

Bariatric Surgery

A seven-year multicentred randomised controlled trial (RCT) of bariatric surgery for sleep apnoea patients with obesity has been completed with the collaboration of the Centre for Obesity Research and Education (CORE), Monash University and Baker IDI plus patients from most sleep clinics across Melbourne. Although bariatric surgery has a powerful influence on reducing apnoea severity, patients are rarely cured. Further sub-studies are planned.

Continuous Positive Airway Pressure: CPAP

Data is currently being analysed from an 11-year RCT assessing the impact of sleep apnoea treatment with continuous positive airway pressure (CPAP) upon diabetic control in type 2 diabetics with apnoea.

Apnoeas in Heart Failure

Further investigational studies into the impact of sleep in heart failure culminated in the discovery of a new term, 'loop gain', to describe mathematically (and easily) the 'cycling' of apnoeas in heart failure patients. This NHMRC-funded work, a joint effort with colleagues at the Ritchie Centre for Baby Health and Monash Medical Centre, was published in 2011 in the top respiratory journal *American Journal of Respiratory and Critical Care Medicine* and has received additional NHMRC funding. The term 'loop gain' can also be applied to many other areas of sleep such as those seen in patients taking narcotics, siblings of SIDS patients and high altitude illnesses.

**Sands SA, Edwards BA, Kee K, Turton A, Skuza EM, Roebuck T, O'Driscoll DM, Hamilton GS, Naughton MT, Berger PJ. Loop gain as a means to predict a positive airway pressure suppression of Cheyne-Stokes respiration in heart failure patients. Am J Respir Crit Care Med. 2011;184(9):1067-1075.*

An off-shoot of the 20 plus years of research into sleep and heart failure we have undertaken, with collaborators in The Alfred's cardiology service, has been the recent publication 'Cheyne-Stokes Respiration: Friend or Foe' in the journal *Thorax*. This manuscript takes a controversial view that central apnoea may simply be a compensatory mechanism to fulminant heart failure with pulmonary oedema. The article was recently placed, by Faculty 1000, in the top 2% of published articles in biology and medicine.

***Naughton MT. Cheyne Stokes Respiration: Friend or Foe? Thorax. 2012; 67(4):357-60.*

Non-Invasive Ventilation Review

The Alfred's uniquely operational non-invasive ventilation (NIV) service is currently being compared with the orthodox provision of NIV in two similarly sized hospitals in Melbourne. Although data is still accumulating, early data suggest that the Alfred model of NIV is safe, effective and financially attractive. Finally, our NIV service led the first review of home NIV use in Australia and New Zealand, which is due to be published soon in the *European Respiratory Journal*. The major impact of this review will be in assisting the prediction of future respiratory care in an ageing and increasingly obese population world-wide.

From Research to Clinical Practice

Acute Oxygen Management Guideline

Oxygen: friend or foe? Empowering healthcare professionals to reduce risk to patients by using best practice in oxygen therapy management.

Senior respiratory scientist Brigitte Borg and co-investigators are undertaking a study exploring the use of acute oxygen therapy before and after the introduction of a hospital wide acute oxygen management guideline and education package.

Lung Health Promotion Centre

The Lung Health Promotion Centre at The Alfred (LHPC) has been conducting a Smoking Cessation Facilitator Course for health professionals since 2005. Since the inaugural course, 43 dedicated smoking cessation services have been established by participants of the course in Victoria, with five known services established in other states. An anonymous online survey was used to assess the knowledge, skills and confidence of the health professionals who attended the LHPC Smoking Cessation Course from March 2005 to March 2011 as well as noting changes participants made to their practice as a result of the course. The survey had a response rate of 41% and found that the course significantly improved the knowledge, confidence and skills of health professionals attending the course, who wanted to actively engage in smoking cessation interventions and education with their clients. This result demonstrated that the LHPC Smoking Cessation Facilitator Course is effective. Adrienne James won the Dr Denis Robertson Prize for her poster on 'Changing the Face of Support for Smokers in Australia'.

Idiopathic Pulmonary Fibrosis Registry: Early Phase Clinical Trials

Little is known about the frequency or severity of Idiopathic Pulmonary Fibrosis (IPF) in Australia. This is a rare lung disease that currently has no effective medical treatment and thus the Australian Lung Foundation has established the Australian IPF Registry together with an expert team of principal investigators from every state. A global network has also been established with support from the Royal Brompton Hospital in the UK and the University of San Francisco in the USA. The Registry will be a central database of IPF patients and their relevant medical history and investigations.

In Victoria, The Alfred AIRmed department is the centre that will be collecting the data and is currently recruiting participants actively. This is in conjunction with running the Interstitial Lung Disease (ILD) clinic, which offers patients the opportunity to be involved in early phase novel clinical trials, and is the only ILD multidisciplinary meeting in Victoria. The centre is led by principal researchers Dr Ian Glaspole and Dr Nicole Goh.

Achievements and Awards

- Bronwyn Levvey was awarded a Churchill fellowship in 2011. Bronwyn is set to embark on a tour to explore systems abroad that allow for lung donation to occur when an individual experiences sudden death outside an intensive care unit.
- Bruce Thompson was awarded the Australian and New Zealand Society of Respiratory Science (ANZSRS) Fellowship and Society Research Medal for exceptional contribution to the advancement of knowledge in respiratory science.
- Michael Abramson was joint winner of the Transplantation Society of Australia and New Zealand (TSANZ) Lifetime Research Award in recognition of outstanding contributions to the advancement of knowledge in respiratory medicine or science carried out primarily in Australia or New Zealand. The award also recognises an individual who has demonstrated sustained excellence in their field.



Brigitte Borg works on the Oxygen study 'Spotlight on Oxygen Therapy'.

- Jeremy Wrobel won 'Best Presentation' in the lung physiology/ sleep category for his talk 'The relationship between pulmonary hypertension and pulmonary arterial remodelling in COPD is lobe dependent' at the Annual Scientific Meeting of TSANZ/ANZSRS, Victorian Branch.
- Dan Garner won 'Best Presentation', Advanced Trainee Category at the Annual Scientific Meeting of TSANZ/ANZSRS, Victorian Branch and also the Dr Michael Hall Memorial Prize for 'Is venous blood gas analysis a safe alternative to arterial blood gas analysis for ventilatory status?'
- Aislin Meehan was awarded the NHMRC Dora Lush Postgraduate Research Scholarship for her research on immunological responses following human lung transplantation.
- Louise Rowntree, BSc Hons (2011), was awarded an Australian Postgraduate Scholarship to commence her PhD studies in 2012 entitled 'The combination of common viral hits and heterologous immunity strongly influences clinical outcomes in 'at risk' lungs'.

Selected Major Grants

- Robyn O'Hehir, Jenny Rolland and Charles Hardy were awarded an NHMRC Project Grant (2012-14; \$644,685) for their research on 'Impaired respiratory tolerance in obesity - the link with asthma?'
- Els Meeusen and Robyn O'Hehir were awarded an ARC Discovery Projects Grant (2012-14; \$315,000) for their research on 'Designing new generation adjuvants for allergy and parasite vaccines'.
- Robyn O'Hehir, Jenny Rolland, Fabienne Mackay and Charles Hardy were awarded a CASS Foundation Grant (2011; \$60,000) for research on 'Follistatin therapy for cystic fibrosis and other lung inflammatory disorders'.
- John Wilson was awarded funding from the Victorian Department of Health (2011-2012; \$450,000) for the Statewide CF Telemedicine Project.

Postgraduate Students

7 PhD Students
1 MD Student
1 Masters Student

Publications

49 Journal Articles



The rib prosthesis development team.

Cardiothoracic Surgery

Head: Associate Professor Silvana Marasco MBBS, FRACS, MSurg, MBioeth

The main areas of research in the Department of Cardiothoracic Surgery are rib fixation using novel absorbable plates, transplant donor heart preservation, analysis of transplant outcomes and integrative medicine research.

Rib Fixation Research and Commercialisation

Recruitment into the 'rib fixation in flail chest' trial has been completed and the results will be analysed over 2012. This prospective randomised clinical trial has run over five years and is investigating improving outcomes in ventilator dependent trauma patients with flail chest injury by rib fixation with absorbable plates. A successful grant application will enable the development of a novel rib fixation prosthesis at The Alfred with plans to commercialise the product.

Heart Transplant Research

In 2011 the cardiac transplant research team completed the 'Donation after Cardiac Death' (DCD) program, which explored methods of organ preservation in greyhound dogs. Conventional methods use cold storage and ice as a means of organ preservation; however, this study demonstrated that a novel technique of continuous perfusion produced excellent recovery of damaged DCD hearts. A device has been developed to facilitate continuous low temperature perfusion of

DCD hearts. Ethics approval has been obtained to utilise this device in unused human DCD hearts. An Australian company, Organ Perfusion Limited, has been established to commercialise the perfusion solution and device.

Integrative Medicine: Cardiac Massage Therapy

A recently completed study of massage therapy for post operative cardiac surgery patients demonstrated major relief of pain (50% reduction), reduction in muscle tension and lessening of anxiety. These findings have been presented at national meetings and have been accepted for publication. As a result of this project, massage therapy is now being provided to post operative cardiac surgery patients, transplant patients and patients with ventricular assist devices. This service is being provided free of charge to the hospital by Endeavour College of Natural Therapies.

Achievements

Associate Professor Silvana Marasco submitted a successful feasibility report for the development of a novel design of a rib fixation device, which has been granted \$1.5 million to develop and commercialise the design.



Dr Geraldine Lee (Cardiac Research Nurse) assesses a patient at the bedside for inclusion in the flail chest study.



Alfred Health and Ingeneus, a medical technology design company, worked together to explore feasible solutions to treating patients with multiple rib fractures. (L to R) Dr Geraldine Lee, Associate Professor Silvana Marasco, Pia Herbert (DBI) and Richard Walmsley (Ingeneus Pty Ltd).

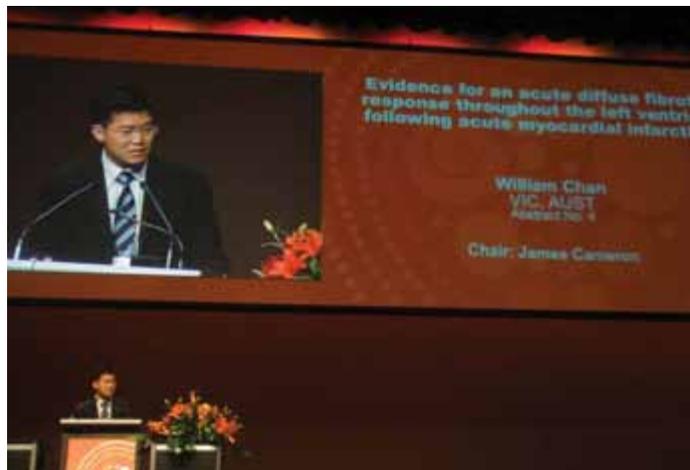
Postgraduate Students

- 1 PhD Student
- 1 Masters Student

Publications

- 6 Journal Articles

Dr William Chan won the Ralph Reader Prize for Clinical Research at the 2011 meeting of the Cardiac Society of Australia and New Zealand.



Cardiovascular Medicine

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

The Department of Cardiovascular Medicine undertakes investigation and treatment of all forms of adult cardiovascular disease. Inpatient services are operationally divided into Cardiology General (CAGE) and Cardiology Heart Failure (CAHF) headed by Drs Stephen Duffy and Peter Bergin respectively. Investigative services are operationally divided into invasive investigations (Catheter Laboratory and related activities) headed by Dr Arch Broughton and Non-Invasive Services including Echocardiography, Cardiac MRI (Magnetic Resonance Imaging) and Cardiac CT (Computed Tomography) headed by Dr Andrew Taylor. In the recent years the department has developed a strong program in non-coronary percutaneous intervention and this program is headed by Dr Anthony Walton. The department has an active postgraduate training program headed by Dr James Shaw.

AMREP Research Links

Research is actively undertaken in all clinical services. There are close research links with Baker IDI as well as other Alfred departments, in particular ICU, Radiology and the Department of Allergy, Immunology and Respiratory Medicine (AIRMed). Several departmental staff have joint appointments with Baker IDI including Professor Dart and Professor David Kaye, who leads heart failure research within the department. Other senior staff with joint Baker IDI appointments include Associate Professor Peter Kistler (Clinical Electrophysiology), Dr James Hare and Dr Justin Mariani.

Research Fields of Interest

In addition to continuing research in traditionally successful areas such as hypertension, hyperlipidaemia and heart failure, the department has increased research activity in the later stages of other heart disease and in evolving investigative methodologies. Of particular note is an increased activity in structural heart disease research and related activities such as percutaneous renal denervation. Similarly, there has been a growth in research into cardiac electrophysiology, particularly atrial fibrillation and its treatment.

The cardiac MRI service has continued to develop and establish itself as a leading site in Australia and there is now increased development in coronary CT. Both continue to be fertile grounds for research. In addition, there have been exciting new developments in investigating new treatment pathways for out-of-hospital cardiac arrest, including the use of early revascularisation and extra corporeal circulatory support in a project in conjunction with ICU.

As previously indicated, late stage heart failure remains a significant research topic within the department. Given the static numbers of patients able to receive cardiac transplantation, there is increasing interest in both short- and long-term further management of these patients, including the use of assist devices and novel interventional procedures. Dr Angeline Leet from the Heart Failure service will be leading a research project into ventricular assist devices in such patients.

In addition to investigator-led research, the department participates in many sponsored clinical trials. These include primary and secondary prevention of coronary artery disease, treatments of angina, trials of new anticoagulants in stroke prophylaxis and measurements following coronary stenting. Several investigator-led clinical trials conducted within the department were completed in 2011.

Myocardial Infarction

Dr William Chan investigated whether early administration of intravenous desferrioxamine to patients with myocardial infarction would reduce the extent of cardiac damage. The premise for this study was that there is much experimental work implicating reactive oxygen species in causing ischaemia reperfusion damage and that iron chelation would be a potential means to ameliorate this damage. Dr Chan used cardiac MRI to specifically assess the extent of cardiac damage. Whilst treatment was shown to satisfactorily lower iron levels, there was no significant impact on final myocardial size. This study involved more than 60 patients with ST-elevated infarct treated within one hour of their arrival.

In other studies, however, Dr Chan showed that MRI changes consistent with fibrosis were evident in the non-infarcted region of the myocardium following a myocardial infarction. These findings are relevant to the process of remodelling of the left ventricle, which occurs after myocardial infarction and have significant implications for appropriate therapy.

Dr Chan has also demonstrated that the occurrence of myocardial infarction at the time of major vascular surgery could be largely accounted for by haemodynamic changes rather than plaque instability.

Antiplatelet Therapy

The current widespread use of coronary stenting for the treatment of coronary artery disease has led to the common use of dual antiplatelet (DAPT) therapy for a substantial number of patients. Many of these patients are also prescribed proton pump inhibitors (PPIs) to lessen their chance of gastric irritation and haemorrhage. There has been

speculation that the co-administration of PPIs and drugs such as clopidogrel may lead to a lesser antiplatelet effect with adverse consequences. The clinical trial conducted within the department by Monash BMedSc student, Himavan Fernando, under the principal supervision of Dr James Shaw, showed that there appeared to be an interaction between the anti-PPI esomeprazol and the antiplatelet agent clopidogrel. In addition to publication of this study, a review of the topic was published by Dr Shaw's team.

Hypertension

Previous work in the department had investigated the role of percutaneous radio frequency ablation of the renal sympathetic system for the control of blood pressure in treatment resistant hypertension. The results from the earlier study were limited to a six month follow-up period. Extension of the follow-up period to two years has demonstrated persistence of the previously noted fall in blood pressure. Studies in renal denervation have now been extended to less severe cases and also to examine the possible benefit of such intervention in patients with heart failure.

Anaemia and Heart Failure

Professor David Kaye has led studies investigating the relationship between anaemia and heart failure. It is well recognised that anaemia is associated with a poorer outcome in patients with heart failure; however, Professor Kaye and his team have recently examined the novel hypothesis that iron deficiency may itself play a role in the worsening of heart failure directly. Studies to date have demonstrated that patients with heart failure have reduced levels of iron in the heart. The team is investigating how iron deficiency is affecting cardiac function.

Melbourne Interventional Group

Members of the department actively participate in the Melbourne Interventional Group Registry, a percutaneous coronary intervention registry, which collects standardised procedural and follow up data on consecutive patients across multiple sites in Victoria. Our departmental members have taken a lead in a number of the reports emanating from this group. Recent data have indicated poorer outcomes associated with the peri-procedural presence of atrial fibrillation and the use of intra-aortic balloon pumping in this setting.

Acute Coronary Syndrome and Plaque Instability

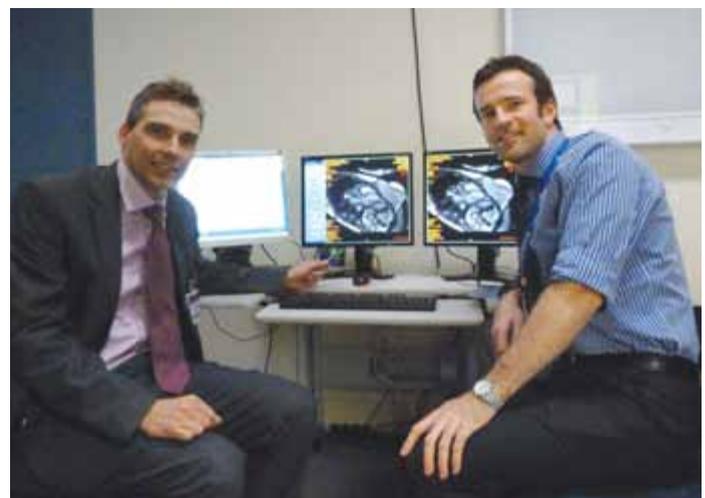
Acute coronary syndrome is now the most frequent cause for presentation to the cardiac catheter laboratory. It is widely believed that such acute presentations of coronary disease relate to atherosclerotic plaque instability. 'Unstable' plaques generally contain less collagen and more lipid than more stable plaques. In recent years, a species of monocyte derived circulating cells (fibrocytes) have been shown to be present in such plaques. Dr Karen Fang and Professor Dart have investigated whether circulating fibrocytes may play a role in determining plaque instability.

Studies completed in 2011 showed that, compared with stable coronary disease, patients with unstable angina have lower numbers of circulating fibrocytes and a lower propensity for monocytes to transform *in vitro* into fibrocytes, suggesting that this may contribute to the state of instability. In ongoing studies in association with Dr Andris Ellims and Dr Andrew Taylor, the role of fibrocytes in myocardial fibrosis is also being investigated. Preliminary results indicate an impact for circulating fibrocyte numbers and function on the presence of myocardial fibrosis as determined by cardiac MRI.

Achievements

Research related achievements in 2011 include:

- A five-year NHMRC Program Grant of over \$12 million was awarded to The Alfred/Baker IDI team of Professors Kaye, Dart, Esler, Jennings, Chin-Dusting, Kingwell and Sviridov. This is the third consecutive Program Grant awarded for a clinical research team at The Alfred hospital and will commence at the conclusion of the current quinquennium. This is in addition to the existing NHMRC Centre of Research Excellence awarded to Professors Dart, Kaye, Peter, Jennings, Kingwell and Chin-Dusting.
- Associate Professor Peter Kistler was awarded a five-year NHMRC Practitioner Fellowship to enable him to continue his research into clinical electrophysiology, particularly in relation to atrial fibrillation.
- Dr Andrew Taylor was awarded an NHMRC Project Grant for cardiac MRI research.
- Dr James Hare received a Cardiac Society of Australia and New Zealand (CSANZ) WCC Fellowship. (WCC is the World Congress of Cardiology Education Trust of CSANZ).
- Dr William Chan was awarded the CSANZ Ralph Reader Prize for Clinical Research.
- Professor Murray Esler was named The British Hypertension Society Anniversary Award Lecturer in recognition of his outstanding scientific contribution to hypertension research for his work on the sympathetic nervous system and renal denervation. Professor Esler was also elected as an Honorary Life Member of the British Hypertension Society.
- Dr Rahul Sharma won the CSANZ Victorian Division's Inaugural Registrar Research prize.



Dr Andrew Taylor, Head of Cardiac MRI and Cardiac CT, and Dr Andris Ellims study the role of fibrocytes in myocardial fibrosis.

Postgraduate Students

14 PhD Students
1 MD Student
1 Masters Student

Publications

52 Journal Articles
1 Book Chapter



TheAlfred



Radiology researcher Victoria Earl with the 480 Biomedical Bioresorbable Scaffold for the treatment of atherosclerosis of the superficial femoral artery.

Diagnostic and Interventional Radiology

Director: Professor Kenneth R Thomson MD, FRANZCR

The Alfred Radiology Department delivers diagnostic and interventional procedures using state-of-the-art facilities such as the first robotic digital radiography room, the lowest radiation dose Computed Tomography (CT) scanner in Victoria and 4D obstetric scanning.

Routine, specialist and research services span all medical disciplines including emergency and intensive care, trauma, comprehensive cancer services, respiratory medicine, neurosurgery and psychiatry. Research focuses on improving patient care, challenging clinical practice through evidence based medicine, working with the biomedical industry to facilitate innovation and translational research into clinical practice as well as promoting innovative health service delivery.

Current research projects include: blunt trauma vascular injuries of the aorta and vertebral arteries; interventional oncology treatments including non-thermal irreversible electroporation ablation of focal tumours; improving the planning and treatment of cerebral aneurysms, which cause haemorrhagic stroke, with 3D imaging technology; reducing radiation exposure through improved CT imaging protocols for cancer patients; and improving the detection of injuries of the spine in trauma patients.

First-in-Man Studies

Highlights of 2011 include our involvement in two first-in-man studies of new device technologies: the resorbable stent for the treatment of atherosclerosis and vena cava filters for the treatment of pulmonary embolism. Early data from both trials have been promising, and recruitment and follow-up is ongoing for both studies.

Atherosclerosis Treatment: The Resorbable Stent

The new Bioresorbable Scaffold System is being trialled to treat atherosclerosis of the thigh artery (superficial femoral artery). It is designed to work like a metal stent; that is, it ensures the artery does not immediately recoil and re-narrow but is absorbed over an appropriate period of time before any long-term complications, such as stent fracture, delayed blood clotting and low grade injury arise. The scaffold is made from a biocompatible polymer and does not cause inflammation as it is absorbed over a period of 6 to 12 months.

Pulmonary Embolism: NOVEL Trial

Radiology participated in the first-in-man NOVEL (NOVate MEDical Inferior Vena Cava FILter) Clinical Study. Vena cava filters are used to protect patients compromised by trauma or blood clotting abnormalities from pulmonary embolism (PE). The filters are placed in the vena cava while patients are at risk and are later removed. The new development

with these filters is the addition of a dissolvable component. The Novate filter is intended to temporarily protect against PE for up to 60 days. After this, the device converts into a non-filtering configuration, the filtration cone opens and the arms retract towards the vena cava wall. Consequently, a second procedure to remove the filter is not required.

Tumour Ablation

A non-thermal ablation technology is providing a treatment option for patients with previously inoperable tumours. Our safety study on irreversible electroporation for focal tumour ablation demonstrated that the procedure was safe, with 47% of patients experiencing minor to no pain post-procedure. We are currently reporting on limited efficacy studies in the liver and kidney. Following publication of our safety study in 2011, the procedure is a treatment option considered for patients with liver and kidney focal tumours.

Treatment for Gastric Varices

Gastric varices develop as a result of long-standing portal hypertension in chronic liver disease patients and are a significant cause of morbidity and mortality. Treatment is a challenge because of the underlying anatomy, and the condition is less responsive to standard endoscopic therapies. The widely used Transjugular Intrahepatic Portosystemic Shunt (TIPS) placement causes high rates of encephalopathy (40%). Our pilot study on an alternative treatment with polidocanol foam using Balloon-occluded Retrograde Transverse Obliteration (BRTO) was recently accepted for publication. We demonstrated that polidocanol foam can be used safely and effectively with complete endoscopic and radiologic resolution observed at six months post-procedure.

Achievements and Awards

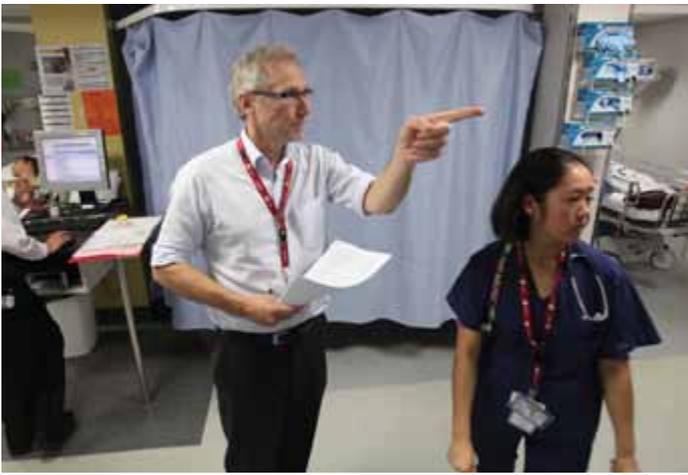
- Zoe Brady received the Australasian College of Physical Scientists and Engineers in Medicine Boyce Worthley Young Achiever Award.
- Amanda Perdomo received a Department of Health and Ageing scholarship to attend the Engineering and Physical Sciences in Medicine - Australian Biomedical Engineering Darwin Conference.
- Dinesh K Varma was awarded the 2011 Rohan Williams Travelling Professorship by the Royal Australian and New Zealand College of Radiologists.

Postgraduate Students

1 PhD Student
9 Masters Students

Publications

16 Journal Articles
1 Book Chapter



Professor Peter Cameron and a member of the emergency team in The Alfred Emergency and Trauma Centre.

Emergency and Trauma

Director: Dr De Villiers Smit MBChB, FACEM

The Emergency and Trauma Centre (ETC) concentrates on pre-hospital, emergency and trauma research with a particular focus on improving safety and quality in these areas. There has also been a strong focus on international development of emergency and trauma systems.

Continued work on evaluation of the Victorian State Trauma System, relative to other regions around the world has demonstrated that we have been able to reduce risk-adjusted mortality at the same time as reducing long term morbidity with improved coordination and management of trauma patients across the state. This is the first time that this has been shown anywhere in the world.

Hypothermia in Trauma Patients

Sharyn Ireland, Clinical Nurse Educator, began investigating the association of accidental hypothermia (defined as a recorded core temperature of $< 35^{\circ}\text{C}$) and major trauma patients (injury severity score >15) as part of her Professional Doctorate completed at La Trobe University in 2011. Her final study entitled 'The incidence and significance of accidental hypothermia in major trauma - a prospective observational study' was published in the journal *Resuscitation* in 2011. Co-authors of this paper were Professor Ruth Endacott, Professor Peter Cameron, Associate Professor Mark Fitzgerald and Eldho Paul.

The study prospectively identified and subsequently reviewed 732 medical records of major trauma patients presenting to an adult trauma centre in a 12-month period. The incidence of hypothermia in this population was found to be 13.25%, with overall mortality of 9.15% and for those with hypothermia, mortality was 29.9%. Determinants for

hypothermia before hospital arrival included the need to be intubated, increasing severity of injury, a blood pressure <100 mmHg and the injury occurring during winter months.

A best practice guideline developed for use in the ETC to support clinical staff in recognising hypothermia early, documenting patient's temperature (among other important vital signs) within 15 minutes of arrival to the ETC, recommending treatment options and advocating the need to evaluate the effectiveness of care delivered by way of repeat temperature recordings, is now used clinically at Southampton Hospital, United Kingdom.

Sharyn continues to mentor and support nurses on ways to improve the recognition, monitoring and management of patients at risk of developing hypothermia. In addition, Sharyn mentors both undergraduate and postgraduate nursing students from Malaysia, Europe, the United States of America and within Australia.

Achievements

- Sharyn Ireland completed a PhD on hypothermia in trauma patients.
- A major research project on safe elderly emergency discharge (SEED) was funded by The Alfred Research Trusts.
- Professor Peter Cameron and his team were awarded a five-year NHMRC Centre of Research Excellence grant (\$2.5 million) to support the Australian Resuscitation Outcomes Consortium (AUS-ROC): an initiative to improve resuscitation outcomes across Australia.
- Continued funding of State Trauma Registries.



The Alfred hospital's Emergency and Trauma Centre.



Postgraduate Students

3 PhD Students
1 Masters Student

Publications

38 Journal Articles



Dr Kathryn Hackman investigates the prevalence of diabetes in lung transplant patients.

Endocrinology and Diabetes

Head: Professor Duncan Topliss MBBS, MD, FRACP

The Department of Endocrinology and Diabetes performs clinical research in the areas of diabetes and thyroid cancer as well as basic research 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) containing 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 2011, the group studied the role of ERM proteins in podocytes, which are cells within the filtering apparatus of the kidney.

Professor Bach also completed a clinical study with Professor Dmitri Sviridov and Associate Professor Merlin Thomas from Baker IDI to investigate the effects of glucose modification on the anti-atherogenic properties of high density lipoprotein in diabetic patients.

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, cancer, and atherosclerosis. A family of six IGF binding proteins (IGFBPs) regulates the actions of IGFs. For many years, Professor Leon Bach's 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, which may be relevant for IGF-dependent diseases.

The group has previously shown that IGFBP-6 promotes migration of cancer cells in an IGF-independent manner. In 2011, the group identified a number of key interactions that may underlie the 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 is testing the effect of early insulin therapy using the long-acting analogue glargine insulin to prevent macrovascular disease in type 2 diabetes. Results are to be presented in mid-2012.
- The TECOS study is examining the potential long-term cardiovascular benefit of sitagliptin as an oral hypoglycaemic agent in type 2 diabetes and finishes recruitment in 2012.
- The CANVAS study is examining the efficacy and safety of the novel sodium-glucose linked transporter 2 (SGLT2) inhibitor canagliflozin on glycaemic control in type 2 diabetes.
- Trials of the novel VEGF inhibitor E7080 in advanced thyroid cancer (phase 2 and phase 3).

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. Dr Hackman showed that a glucose tolerance test, in which glucose is measured before and after a standardised glucose drink, is the most sensitive way to find diabetes and that nearly half of the patients on the waiting list, either have diabetes or abnormal glucose levels, which is a precursor to diabetes. The glucose tolerance test has become a standard screening test in these patients, allowing earlier detection and treatment of diabetes.

Achievements

- Professor Leon Bach gave invited lectures on his IGFBP-6 work at the 2011 Gordon Research Conference on 'IGFs in Physiology and Disease', Ventura, USA and at the 3rd Australia-China Biomedical Research Conference, Melbourne, 2011. Professor Bach was also awarded a Cancer Council Victoria Project Grant for research on IGFBP-6 and ovarian cancer.

Postgraduate Students

1 PhD Student
1 MD Student

Publications

8 Journal Articles



Professor Peter Gibson with Sue Shepherd receiving the Award for American Journal of Gastroenterology Lecturer for 2011 from the Journal editors. Prof. Gibson won the award for his invited plenary presentation at the American College of Gastroenterology meeting. The lecture showcased research on the low-FODMAP diet and role of gluten in IBS.

Gastroenterology

Head: Professor Peter Gibson MD, PhD, FRACP

Hepatology

Head: Associate Professor Stuart Roberts

Research continued to focus on optimising the management of patients with chronic liver disease, with particular emphasis on those with chronic viral hepatitis and primary liver cancer.

Hepatitis C and HIV: Studies evaluating treatment and pathogenesis included: (i) evaluation of the impact of anaemia onset with treatment and low-level viraemia on cure rates of hepatitis C virus (HCV) genotype 1 patients receiving standard therapy; (ii) examination of the association between baseline demographics and liver disease characteristics and IL28B genotype status that predicts response to peginterferon-based therapy; (iii) evaluation of new direct acting antiviral agents in patients with HCV either in combination with peginterferon plus ribavirin or as part of novel interferon free regimens - new agents show promise of advancing into late clinical development; (iv) investigation of the association between the innate immunity markers TLR2 and TLR4 and hepatic inflammation in HCV and HIV-HCV co-infection; and, (v) examination of the effect of hepatitis-G virus (GBV-C) on T-cell regulation pathways to help understand the hepato-protective nature of GBV-C in relation to liver disease severity in the HIV-HCV co-infected patient population.

Liver Cancer - Hepatocellular Carcinoma (HCC):

New treatment options explored for primary liver cancer included: (i) irreversible electroporation as a local ablative technique for early stage disease; and, (ii) several systemic multi-kinase inhibitors and monoclonal antibodies to key pathogenic proteins in advanced HCC patients. A retrospective review was conducted of survival in HCC patients seen at The Alfred over the past 15 years. The Alfred was the lead site in a multicentre Australian retrospective study evaluating the outcomes of radiofrequency ablation versus surgical resection in patients with early stage disease.

Endoscopy

Head: Associate Professor Gregor Brown

Research highlights include participation in the multicentre Australian colonic endoscopic mucosal resection (EMR) audit and the resulting *Gastroenterology* paper, which has had a major impact on polypectomy practice internationally. Previously, large polyps in the colon required surgical intervention to remove the polyp together with a segment of bowel until newer endoscopic techniques (namely EMR) were developed. This study defined best practice for the EMR procedure.

The Alfred was also the coordinating centre for an audit of small sessile colonic polypectomy, resulting in an oral presentation at this year's International Digestive Disease Week conference. Our fellow conducted a prospective study documenting the efficacy of cold snare polypectomy in terms of complete polyp excision. We collaborated with The Austin in a project examining the utility of oesophageal PillCam in the assessment of patients with upper gastrointestinal bleeding, and a separate study with St George's Hospital, Sydney, on the utility of the EndoCapsule in the assessment of small bowel Crohn's disease.

Gastroenterology

Joint Heads: Professor Peter Gibson and Dr Miles Sparrow

The major focus has been inflammatory bowel disease. Optimisation of thiopurines has revolutionised the use of azathiopurine and 6-mercaptopurine and breathed new life into an older group of drugs. A major part of this change was Dr Sparrow's recognition that allopurinol favourably alters the metabolism of the drugs leading to improved efficacy and reduced adverse effects. Dr Sparrow is the principal investigator on a current multicentre randomised controlled trial examining the safety and efficacy of different doses of allopurinol. Dr Sparrow has secured substantial funding from the Broad Foundation of USA for this project.

Translational Nutritional Science Group

Joint Heads: Dr Jane Muir and Professor Peter Gibson

This group has brought to the world the low FODMAP (Fermentable Oligosaccharides, Disaccharides, Monosaccharides and Polyols) diet, the first evidence-based dietary approach with efficacy in patients with irritable bowel syndrome (IBS). The diet recognises the role of poorly absorbed short-chain carbohydrates in functional gut symptoms. An additional randomised controlled trial identified that gluten can induce gastrointestinal symptoms and tiredness in patients with non-coeliac gluten sensitivity, which has re-shaped thinking in this field and led to increased research efforts. Both of these aspects of the group's work have been recognised across the world with invitations to deliver plenary lectures on dietary management of IBS by the British Society of Gastroenterology and the American College of Gastroenterology, and have sparked interest in diet as a therapy in functional gastrointestinal disorders.

Postgraduate Students

4 PhD Students
1 MD Student

Publications

25 Journal Articles
2 Book Chapters



Professor Jonathan Serpell uses a nerve stimulator when performing thyroidectomy.

General Surgery

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

The Department of General Surgery is committed to clinical research, databases, clinical registries and clinical trials, as well as audit and quality assurance processes. Those entering into surgical training are well supported in research projects.

The Upper Gastrointestinal Service, a sub-section of the department of General Surgery, has databases in hepatectomy, pancreatic surgery, oesophagectomy, gastrectomy and bariatric surgery. Along with their own research programs, members of the service have significant collaborations with investigators from the Monash University School of Public Health and Preventive Medicine and Monash Physiology.

Significant databases in thyroid surgery, parathyroid surgery, adrenal surgery, parotid surgery, soft tissue tumour surgery and a dedicated thyroid cancer database contribute to active clinical research projects.

Surgeons and trainees in the colorectal service contribute to clinical research projects within the department. Main areas of research include clinical outcomes in colorectal cancer. Other research areas are transanal endoscopic microsurgery for rectal tumours, surgery for pelvic floor disorders and laparoscopic surgery for rectal cancer. One of our surgeons is participating in an Australia-wide randomised clinical trial of laparoscopic versus open surgery for low rectal cancer.

Major Findings

Research into the anatomy and physiology of the recurrent laryngeal nerves at thyroid surgery has demonstrated a significant incidence of bifurcation and that the motor fibers to the larynx are in the anterior branch of the recurrent laryngeal nerve. The recurrent laryngeal nerve significantly increases in diameter during thyroid surgery but this has been shown to be unrelated to voice change following surgery. A five year analysis of the department's recurrent laryngeal nerve palsy rate has shown the overall rate to be low compared to international standards, and confirms the increased rate in preoperative surgery for both benign conditions and for primary malignancy. An analysis of thyroid surgery in those with Hashimoto's Thyroiditis has shown this condition to be associated with papillary thyroid cancer in addition to thyroid lymphoma.

A review of outcomes of transanal endoscopic microsurgery for rectal tumours found a low rate of complications and a low rate of long term recurrence for benign tumours and early cancers, but an unacceptable recurrence rate for more advanced cancers.

A review of magnetic resonance imaging (MRI) radiological reports for rectal cancer found a significant variation in report findings and important information required to make treatment decisions was sometimes missing. The study indicates the need for standardised synoptic reports of MRI for rectal cancer.

An audit of the management of penetrating rectal injuries treated at The Alfred in the last five years found no difference in outcomes whether they were treated with a defunctioning colostomy or not. This study indicates that a defunctioning stoma can be avoided in most cases of penetrating rectal injury.

Other Major Outcomes

- Publication of an algorithm for the emergency care of laparoscopic adjustable gastric banding patients. This work has been translated into a DVD resource for emergency departments.
- Description of complications from stenting after oesophageal cancer.
- The 12-month outcomes from a high volume public bariatric practice were accepted for presentation at a national meeting.
- A major collaboration with the Centre for Obesity Research and Education (CORE) and Monash Physiology was established.
- Participation in a multi-centre trial of a novel haemostatic agent for liver resections.

Major Achievements and Awards

- Mr Paul Burton was awarded both the Vice Chancellors and Monash University's SPHPM award for thesis excellence and a Royal Australasian College of Surgeons Postdoctoral Fellowship.
- Associate Professor Wendy Brown secured an NHMRC grant with St Vincent's orthopaedic unit to study the impact of weight loss prior to joint replacement and a Monash Strategic Grant (with Psychology, CORE and the Monash Obesity and Diabetes Institute) to study cognitive change with weight loss.
- Dr Lara Freeman was awarded the Obesity Surgery Society of Australia and New Zealand Young Investigator Award.

Postgraduate Students

2 PhD Students
1 Master of Surgery Student

Publications

12 Journal Articles
1 Book Chapter



DECRA study team members currently at The Alfred: (L to R) Professor Jeffrey Rosenfeld, Lynne Murray and Professor Jamie Cooper.

Intensive Care

Director: Professor Carlos Scheinkestel MBBS, FRACP, FCICM

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

Research conducted by The Alfred Department of Intensive Care extends to traumatic brain injury, trauma, sepsis, acute lung injury, transfusion, nutrition, renal failure, extracorporeal membrane oxygenation (ECMO) and Intensive Care Unit (ICU) outcomes. Ten research-active consultants have academic appointments in Monash University's School of Public Health and Preventive Medicine. The Department benefits from the AMREP co-location and linkage with the Australian and New Zealand Intensive Care Research Centre (ANZIC-RC) within the Department of Epidemiology and Preventive Medicine (DEPM) and with the Monash Central Clinical School through the Monash Partners Academic Health Science Centre (AHSC). This year 'Critical Care, Trauma and Perioperative Medicine' was selected as one of the key themes for the Monash Partners AHSC.

Practice-Changing Evidence Trials

In 2011 results from the DECRA and PROTECT clinical trials were reported in the *New England Journal of Medicine*. Both trials were definitive, practice changing, level 1 evidence trials and outcomes will be adopted in international clinical practice guidelines.

DEcompressive CRAniectomy in Diffuse Traumatic Brain Injury (DECRA)

DECRA was a randomised trial of 155 patients led from The Alfred and conducted in five countries. The trial assessed an increasingly popular but controversial neurosurgical procedure performed to decrease intracranial pressure in selected patients with severe traumatic brain injury. It was found that the surgical option led to improved outcomes in ICU and in hospital as anticipated but, unexpectedly, also led to poorer long term neurological performance.

The trial results have shaken the international neurotrauma community and led to practice change in many hospitals. The authors estimate that long term cost savings to the Australian health care system from modifying clinical practice in the light of these findings would exceed \$100 million annually. Translation studies are under development.

PROphylaxis for ThromboEmbolism in Critical Care Trial (PROTECT)

Alfred ICU is part of the PROTECT investigators group and was responsible for recruiting a large proportion of the 3,500 patients in the PROTECT multicentre, randomised trial. Results have shown that low molecular weight heparin prophylaxis led to less heparin induced thrombocytopenia and thrombosis (HITT) and fewer pulmonary emboli, despite a similar rate of measured deep venous thrombosis.

Major Achievements

Appointments

Alistair Nichol was appointed the inaugural Professor of Intensive Care Medicine at University College Dublin, Ireland. Professor Nichol is now an honorary Alfred Intensive Care Consultant and honorary Associate Professor at Monash University.

Competitive Funding

Active projects in the Department were supported by > \$26 million of competitive research grant funding, much from the NHMRC. In 2011 there were three new NHMRC Project Grants funded and a total of \$9.2 million of new grant funding awarded.

Higher Degrees

Dr Helen Ackland was awarded a PhD for her research 'Correlation of clinical and radiographic findings with long term outcomes in trauma patients with acute cervical discoligamentous injury'.

Awards and Prizes

- In the Department of Health 2011 Victorian Public Health Care Awards, Alfred ICU won the Excellence in Healthcare Outcomes award for 'Developing a new model of care that includes retrievals for Victorians requiring ECMO'.
- The Alfred ICU was awarded the International Nutrition Survey Best of the Best Award (Dr Audrey Tierney, Emma Ridley, Julia Price, Associate Professor Ibolya Nyulasi, Associate Professor Andrew Davies and Professor Carlos Scheinkestel).
- Emma Ridley was awarded the Peter Mitchell Churchill Fellowship for her project 'Indirect calorimetry: Assessing the nutritional needs of the critically ill patient'.
- Dr David Brewster was awarded first prize for the inaugural Alfred ICU Trainee Research Award. Equal second prize was awarded to Dr Vinodh Nanjaya (The Alfred) and Dr Neil Glassord (The Austin).

Postgraduate Students

9 PhD Students

Publications

71 Journal Articles



TheAlfred

Medical Oncology Research Nurse Marisa Cikos checks a trial patient's blood pressure.



Medical Oncology

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

The Medical Oncology Unit provides a high quality co-ordinated multidisciplinary comprehensive cancer service and is a major primary care facility for adult patients with malignancy. Working in collaboration with The Alfred Palliative Care Unit, as well as other specialist units, we aim to provide a wide range of clinical trial opportunities for our patient group. Primary areas of clinical research for the Unit are gastrointestinal, colorectal, melanoma and lung malignancies.

The Unit also collaborates with various major national and international cancer clinical research groups and pharmaceutical industry sponsors. This collaborative clinical research effort has resulted in important publications in international journals; the clinical outcomes serve to contribute to the body of knowledge on cancer treatment and have resulted in significant paradigm changes in therapy.

Psychosocial Issues in Cancer Survivorship

Specific Unit research activities this year have included a trial investigating psychosocial issues faced by bowel cancer survivors, coordinated by Peter MacCallum Cancer Centre. The introduction of such supportive care trials is providing recognition of the increasing survivorship issues for many patients, and the accompanying psychosocial implications and sequelae. As we move forward, treatment is focusing on a patient-centred approach, as well as the minimisation of illness associated stress. The patient group consists of those who have undergone curative surgery and completed chemotherapy/radiotherapy for bowel cancer, and are entering the survival period.

Melanoma Clinical Trials

The Unit has been heavily involved in clinical trials for the treatment of metastatic melanoma, an area that is changing rapidly, with the introduction of a number of new active agents. The Roche compound Vemurafanib, a B-Raf tyrosine kinase inhibitor, has been recently shown to improve disease-free and overall survival in metastatic melanoma patients whose tumours harbour an activating mutation in B-Raf. Our Unit was involved in a phase 1 study with this agent in 2010/2011. This year, 29 patients were screened, and 12 enrolled onto the phase 4 Vemurafanib Expanded Access Study.

The other agent we have studied is the GlaxoSmithKline (GSK) MEK inhibitor, another active agent in B-Raf mutant metastatic melanoma. This study compared the MEK inhibitor to standard chemotherapy as first line treatment for metastatic melanoma. The results (a positive study as detailed in a recent GSK press release), will be presented later

this year for the first time at a major international meeting. We will also be studying the combination of a B-Raf inhibitor with a MEK inhibitor in metastatic melanoma, and are planning to open an upcoming adjuvant placebo controlled trial of these two agents in resected stage III melanoma.

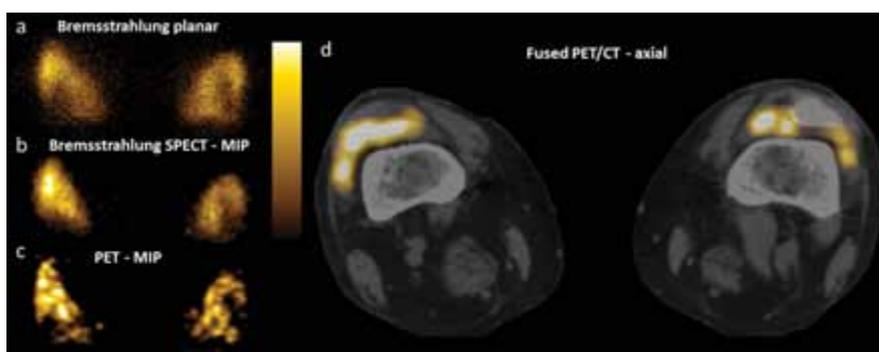
Pancreatic Cancer Clinical Trial

In 2011, results of a pancreatic cancer study in which our Unit previously participated were published in the *British Journal of Cancer*. The study, which commenced in 2005, involved patients with locally advanced pancreatic cancer who were treated with a regimen of gemcitabine plus oxaliplatin chemotherapy, both before and after three-dimensional conformal radiotherapy (3DCRT) with concomitant 5-fluorouracil (5FU). Results indicated that this treatment was associated with longer overall survival for patients, as well as reducing local recurrence at the site of the primary tumour. This combined chemo-radiation treatment program was found to be both safe and feasible for this patient group, and will continue to be explored in future clinical trials, together with the addition of other agents.



Publications

6 Journal Articles



This novel PET/CT scan of the knees post ^{90}Y administration, which appeared in a publication authored by Dr Tom Barber, Dr Kenneth Yap and Assoc. Prof. Victor Kalf, was awarded Image of the Month by the European Journal of Nuclear Medicine and Molecular Imaging. The scan demonstrates no extra-articular extravasation. SPECT=Single Photon Emission Computed Tomography. PET=Positron Emission Tomography. MIP=Maximum Intensity Projection.

Nuclear Medicine

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

The Department of Nuclear Medicine's long standing and continued objective has been to provide a comprehensive and timely clinical nuclear medicine service. The types of studies provided have evolved over time together with clinical needs. Older, albeit, still useful studies such as bone and lung scans are performed in conjunction with myocardial perfusion scans and more contemporary imaging technologies such as ^{18}F -FDG-positron emission tomography (PET). In excess of 6,000 studies were performed in 2011.

The department has a strong teaching role in training nuclear medicine specialists, radiology registrars and technologists. There is continued involvement in research not only in the field of nuclear medicine but also in other specialities via collaboration with various departments of the hospital and the Baker IDI Heart and Diabetes Institute.

PET Technology

Monitoring Arthritis Therapy

In patients with refractory arthritis treated with ^{90}Y radiation synovectomy, our department hypothesised that radioisotope administration could be visualised using PET imaging technology, rather than the standard Bremsstrahlung gamma camera imaging technology. The PET technology has the potential to permit high resolution images of the distribution of ^{90}Y . Early indications from these studies have confirmed that ^{90}Y administration can be accurately visualised with PET.

Further research is under way to determine the clinical utility of PET-computed tomography (CT) imaging in this patient group. It is hoped that this information would be useful in predicting which patients would respond to treatment and in monitoring potential adverse effects of therapy.

PET Utility Across AMREP

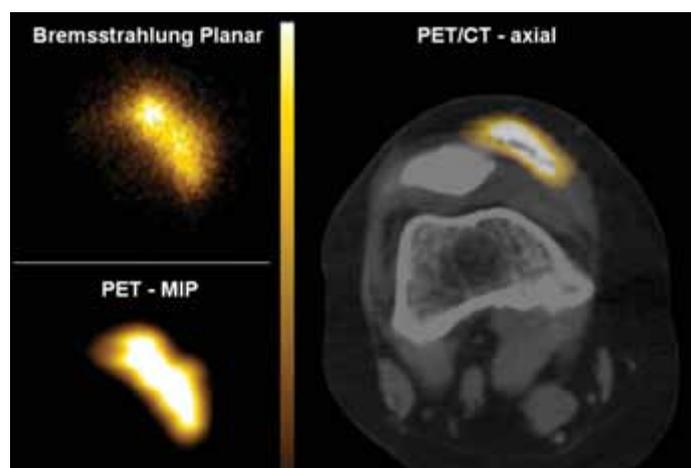
Much of our PET-based research includes collaborations with other departments. In collaboration with the Departments of Haematology, Gastroenterology and Anatomical Pathology, we are using ^{18}F -FDG-PET to non-invasively diagnose graft-versus-host disease. A collaboration with Baker IDI involves assessing the activation of cervical and upper thoracic brown adipose tissue in humans via β adrenergic stimulation using ^{18}F -FDG-PET. In collaboration with the Department of Psychiatry, we have had success in using PET technology to determine changes in regional brain glucose metabolism following Magnetic Seizure Therapy (MST) for the treatment of major depression.

Myocardial Perfusion Scanning for Cardiac Disease

In patients with cardiac disease, our department was unique in acquiring the first solid-state dedicated cardiac camera in Australia, which has resulted in the ability to perform myocardial perfusion scans more rapidly and at a lowered radiation dose to patients. Research involving this novel technology includes determining the reproducibility and precision of left ventricular ejection fraction (LVEF) measurements on this camera.

Parkinsonian Disorders

Cardiac ^{123}I -metaiodobenzylguanidine (MIBG) scintigraphy, which assesses cardiac sympathetic denervation and the University of Pennsylvania Smell Identification Test (UPSIT), which assesses olfactory function, have both been identified as potentially useful diagnostic tools in patients with Parkinsonian disorders; however, individually, these tests have diagnostic limitations. In conjunction with the Department of Neuroscience, we have investigated the discriminatory ability of these tests for the prediction of Lewy body versus non-Lewy body pathology and looked at whether the combination of these tests has the potential to increase diagnostic accuracy.



Bremsstrahlung and PET images performed following right knee ^{90}Y radiation synovectomy demonstrating a mainly focal ^{90}Y distribution pattern, which localised to mostly lie in the extra-articular space on fused PET/CT.

Publications

5 Journal Articles



Dr Sharyn Ireland, Clinical Nurse
Educator, Emergency and Trauma Centre.

Nursing Services

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

The Alfred/Deakin Nursing Research Centre and The La Trobe Alfred Clinical School both contribute to the Nursing Services research program.

The Alfred/Deakin Nursing Research Centre focuses on:

- Symptom management in the oncology context
- Patient participation and preferences for participation in recovery after cardiac surgery
- Quality of care of frail elderly in acute care to reduce functional decline

The La Trobe Alfred Clinical School focuses on:

- Fluid replacement therapy following severe burns
- Satellite unit dialysis
- Protection of the integument

Chronic Heart Failure Management Programs

Chronic Heart Failure (CHF) carries a high burden of disease and while CHF management programs (CHF-MPs) have been developed to improve clinical outcomes, the programs are heterogeneous in model and interventions. The Heart Failure Intervention Score (HF-IS) is a quality improvement tool developed to measure program complexity and improve patient outcomes through the application of evidence-based interventions. Elizabeth Oldland explored the relationship between the HF-IS and patient outcomes in four CHF-MPs for her Master of Nursing Practice thesis, which she completed at Deakin University. All four programs were found to have a high HF-IS, indicating optimal complexity of evidence-based interventions, and resulted in similar patient outcomes despite differences in patient

groups. These findings indicated that further exploration of the relationship between HF-IS and patient outcomes in programs with a wider range of HF-IS is warranted.

Pressure Injury Prevention

Associate Professor William McGuiness, Head of the La Trobe Alfred Clinical School, conducted a study to measure the effect of contemporary pressure relieving devices on heel perfusion. Heel perfusion was found to be significantly reduced when a leg was placed on contemporary off-load devices, which could account for the development of heel pressure ulcers. The reduction in flow as measured by laser Doppler was statistically significant while the reduction in associated levels of oxygen was not statistically significant, but trended down.

Achievements

Sharyn Ireland won the the Kathleen AB Smith Memorial Prize in Nursing for best Alfred nursing publication in 2011. 'The incidence and significance of accidental hypothermia in major trauma: A prospective observational study'. Ireland S, Endacott R, Cameron P, Fitzgerald M, Paul E. *Resuscitation* 2011. The article was listed in the top 25 most downloaded articles for 2011 according to Elsevier's SciVerse ScienceDirect.

Postgraduate Students

5 PhD Students
30 Masters Students

Publications

14 Journal Articles

Nutrition and Dietetics

from page 61

Achievements and Awards

- Julia Price was awarded the best poster prize at the 2011 Australasian Society of HIV Medicine conference in Canberra.
- Dr Susannah King was awarded the Lucy Battistel prize for best oral presentation for Allied Health during Alfred Week for her presentation entitled 'Long term Outcome in CF: Role of Nutrition'.
- The Alfred ICU and the Nutrition Department received the 2011 INS 'Best of the Best Award' for best feeding practices in the ICU.

- Emma Ridley was awarded the Peter Mitchell Churchill Fellowship in 2011 for her project 'Indirect Calorimetry: Assessing the nutritional needs of the critically ill patient' and a small project grant from AuSPEN to investigate Nutrition therapy in adult patients requiring extracorporeal membrane oxygenation (ECMO) in Australia and New Zealand.
- Clare Robinson was awarded an Alfred Research Trusts Small Project Grant to investigate the nutritional status of pregnant women with CF.
- Associate Professor Ibolya Nyulasi was appointed president of AuSPEN in 2011 and continues her role on the European Society of Parenteral and Enteral Nutrition (ESPEN) council.



Best of the Best Award: International Nutrition Survey 2011. L-R: Emma Ridley, Associate Professor Andrew Davies, Associate Professor Ibolya Nyulasi, Professor Carlos Scheinkestel, Dr Audrey Tierney and Julie Willmott.

Nutrition and Dietetics

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

The research focus in 2011 was primarily in intensive care, infectious diseases and cystic fibrosis (CF), with continuing and new research projects under way further strengthening collaborative links with other Alfred units. Research collaborations between the Nutrition Department and Monash and La Trobe Universities are continuing to grow with the appointment of Dr Audrey Tierney and Dr Susannah King to clinical research roles.

Intensive Care Research

Emma Ridley continued her role as the AuSPEN (Australasian Society for Parenteral and Enteral Nutrition) and ANZIC-RC (Australian and New Zealand Intensive Care Research Centre within Monash University's Department of Epidemiology and Preventive Medicine) Nutrition Research Fellow. Emma is conducting research with The Alfred Foundation-funded POLAR BEAR project, a study investigating the effect of prophylactic hypothermia on metabolic rate and the provision of nutrition to patients with traumatic brain injury.

Dr Audrey Tierney started research comparing energy requirements obtained either via indirect calorimetric measurements or from predictive equation methods in ventilated critically ill patients.

Cystic Fibrosis

Dr Susannah King's study of the role of nutrition in long-term outcomes in CF revealed that lower FEV1%, weight and albumin independently predicted poorer outcomes in adult CF. Low albumin may reflect chronic infection and might distinguish those with low FEV1% with poorer prognosis.

Metabolic Syndrome and HIV

Julia Price continued research with Dr Ian Woolley (Department of Infectious Diseases) investigating the prevalence of metabolic syndrome, lipodystrophy and cardiovascular disease (CVD) risk in an ambulant ageing HIV-infected male cohort. Despite a mean increase of 11 years of age, approximately 124 months of HIV duration and antiretroviral (ARV) treatment, the prevalence of lipodystrophy and metabolic syndrome was significantly reduced in 2010 compared with 1998, when the syndromes were last evaluated at The Alfred Victorian HIV service. Framingham CVD risk was only slightly higher in 2010 compared with the 1998 cohort. A significant reduction in protease inhibitor and thymidine analogue ARV therapy, more aggressive lipid management and significantly reduced smoking rates partly explains these findings. Julia presented her research at the International

AIDS Society Conference and International Drug and Adverse Events workshop in Rome.

Other Research

Amanda Cane assisted Associate Professor Barbora de Courten (Baker IDI) to investigate the effects of high and low advanced glycation end products in food on blood sugar control in a normal healthy population.

Rachelle Opie and Dr Audrey Tierney with Sandringham Maternity Unit (funded by Cybec) are investigating if early nutritional intervention and ongoing antenatal dietetic support in obese pregnant women achieves weight gain targets and reduces postnatal complications in both mother and child.

Evidence to Clinical Practice: ICU Nutrition

The International Nutrition Survey (INS) is a Canadian-led initiative, which compares Intensive Care Unit (ICU) nutrition practices within and across countries to improve nutrition therapy for critically ill patients. The Alfred has participated since 2007 and was recognised with the INS Best of the Best award – jointly in 2009 and solely in 2011. Commencement of nutrition therapy within 24 hours of ICU admission is a Nutrition department key performance indicator and INS results have played an integral role in their quality improvement process.

Data from the 2008 survey revealed that 53% of patients commenced enteral nutrition (EN) within 24 hours of ICU admission and 47% of patients commenced after 24 hours. Alfred policy had been not to allow commencement of EN prior to dietetic review; however, this source of delay was recognised and access to standard EN solutions for commencement without dietetic approval was instigated. Subsequent surveys revealed improved feeding practices, with 72% and 80% of patients commencing EN within 24 hours of ICU admission in 2009 and 2011, respectively.

Continued on page 60

Publications

7 Journal Articles
2 Book Chapters



Occupational Therapist Nicola Bacon uses the Nintendo Wii in her research program.

Occupational Therapy

Head: Jacqui Morarty BAppSc(OT), MOT

Occupational Therapy focuses on enabling people to live satisfying and meaningful lives by helping them participate in the occupations they want to do, need to do and are expected to do. Occupations addressed in therapy sessions may include self-care and domestic tasks, work and/or study and leisure activities. Research conducted within the Occupational Therapy Department provides information that is directly relevant to clinical practice to help improve patient outcomes.

The main areas of research in 2011 included:

- Investigating the effectiveness of an occupational therapy home visit discharge planning program for older adults
- Optimising upper limb function in patients with neurological impairments such as stroke
- Reviewing the evidence for interventions found to be effective for people with cerebral palsy
- Maximising the ability of patients undergoing chemotherapy or radiotherapy to perform activities of daily living
- Examining care costs and long term outcomes of patients with traumatic brain injury
- Evaluation of return to work and study programs for patients post neurological event
- Improving occupational therapy services for patients with severe burn injuries

Natasha Lannin, an occupational therapist from Sydney Medical School, The University of Sydney, was appointed as Associate Professor in Occupational Therapy in 2011. This new position was established with joint funding from Alfred Health and La Trobe University. Associate Professor Lannin has extensive clinical and research experience in neurology, including aspects of acute brain injury and stroke, rehabilitation and long-term outcome.

Mental Health and Obesity

Nicola Bacon conducted a study to determine whether regular use of the Nintendo Wii Fit (interactive gaming program) could alter attitude and increase daily activity levels in forensic mental health patients at risk of obesity. Study participants achieved minimal weight loss; however, they reported feeling fitter and more aware of the need to exercise following the intervention, which has implications for The Alfred Psychiatry Service.

Splint Trial

Lisa O'Brien conducted a multi-centre randomised controlled trial to identify the optimal method of splinting for mallet finger. Three types of splints assessed in the study were comparable in terms of clinical outcomes; however, thermoplastic splints resulted in fewer complications, making them less prone to treatment failure.

Trauma Patients: Interventions and Assessments

Lisa O'Brien, Shai Bynon and Jacqui Morarty demonstrated that a targeted occupational therapy intervention for older patients admitted following trauma resulted in shorter average length of stay and significantly increased functional performance for those receiving the intervention compared with a control group.

Jacqui Morarty and Michelle Farquhar investigated use of an abbreviated assessment tool to measure the presence of post-traumatic amnesia in patients with traumatic brain injury. The tool improved accuracy of assessment and has streamlined services for this patient group.

BoTox Treatment for Rehabilitation

Denita Wild, along with colleagues in Physiotherapy and Medicine, investigated the goals set by patients who receive *Botulinum* toxin injections for management of muscle overactivity during rehabilitation. The study confirmed that passive goals (such as those addressing hygiene) were less likely to be set by carers but more likely to be achieved than active goals (such as improved walking and use of the arm). This has led to changes in the education that is provided to patients and their carers about realistic expectations following injection.

Achievements

Our department secured several grants in 2011 including funding from the: NHMRC; National Stroke Foundation; Cerebral Palsy Institute; Lifetime Care and Support Authority (NSW); Southern Melbourne Integrated Cancer Service; Occupational Therapy Registration Board; Julian Burton Burns Trust; Alfred Research Trusts; and, education grants from commercial sponsors (Allergan and Ipsen).

Staff members presented results of one study at a state conference and eight papers at national conferences.

Postgraduate Students

2 PhD Students
4 Masters Students
1 Doctor of Clinical Science Student

Publications

2 Journal Articles
1 Book Chapter



Dr Adam Dowrick received an NHMRC Overseas Research Fellowship for his research project 'Fluid Lavage of Open Wounds (FLOW): A multi-centre, blinded, factorial trial'.

Orthopaedic Surgery

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

In 2011 the Department of Orthopaedic Surgery continued to participate in multicentre randomised controlled orthopaedic studies.

Overseas Research Fellow: Dr Adam Dowrick

Dr Adam Dowrick, a Research Fellow within the department, spent 2011 undertaking the first year of his NHMRC Overseas Training Fellowship at McMaster University in Ontario, Canada under the mentorship of Professor Mohit Bhandari. Professor Bhandari has been setting new benchmarks in the conduct of international, multicentre surgical trials. The McMaster Orthopaedics research program in musculoskeletal trauma, evidence-based orthopaedics, and methodological aspects of surgical trials presented a unique and valuable opportunity for Dr Dowrick to further develop his aptitude for and knowledge of the conduct of orthopaedic clinical trials in a hospital setting.

The main focus of Dr Dowrick's research program at McMaster was advancing the debate on the ethical conduct of surgical clinical trials with a placebo or sham surgery arm. To this end, he wrote a journal article outlining the ethical issues in the design of randomised trials with a sham surgery arm (to be published in the leading orthopaedic journal, *The Journal of Bone and Joint Surgery, American Volume*). In addition, he helped lead a systematic review of trials with a sham surgery arm that reviewed over 36,000 articles for their eligibility in the review. The review investigates the magnitude of the effect of the placebo surgery and associated measure of precision.

During his time at McMaster, Dr Dowrick published a book chapter and two papers that describe research methodology for a clinical audience and are a valuable source of information for clinical investigators who have limited knowledge of research methodology in line with the International Conference on Harmonisation-Good Clinical Practice (ICH-GCP) guidelines.

Femoroacetabular Impingement

In order to demonstrate that it is possible to perform sham surgery trials in the modern era of medical science, Dr Dowrick wrote the protocol and obtained ethical approval for a three-arm randomised trial that was designed to investigate the outcomes in patients with femoroacetabular impingement (FAI). FAI refers to an abnormal morphology of the hip joint that results in the abutment of the proximal femur against the acetabular rim. The abnormal morphology can involve either a prominence at the head-neck junction (known as a 'cam-type' lesion) or local or global overgrowth of the acetabular rim (known as a 'pincer-type' lesion), though commonly both types of lesion ('mixed' lesion) are observed in

the same joint. In theory, chronic abutment leads to labral and cartilage damage, which may progress to early osteoarthritis (OA). Patients tend to present in early or mid-adulthood with chronic, intermittent pain and decreased functional ability that has progressively worsened.

Surgical treatment aims to correct the morphology of the hip joint by resecting the bone causing the impingement. Initially this was done using an open technique with surgical hip dislocation. The requirement for extensive dissection, resultant large scar, and a long rehabilitation time led surgeons to develop less-invasive ways of resecting the bone. Hip arthroscopy, with its minimal dissection and shorter recovery time, has become a popular treatment option for the generally young, active patient population with FAI. However, the method is relatively new and most of the evidence supporting its use comes from case reports and retrospective reviews. Further, the natural history of untreated FAI is unknown.

According to the Millennium Research Group, hip arthroscopy is growing at a rate of 15% annually, making it one of the fastest growing subspecialty areas within orthopaedic surgery. As the popularity of hip arthroscopy for the treatment of FAI grows, it is important that evidence for the procedure is of the highest level and that patient selection is optimised. A successful pilot study will provide a persuasive argument in favour of a large, multi-centre, randomised, controlled trial to evaluate optimal strategies for the management of patients with FAI.



Associate Professor Susan Liew presents pilot data from an international multicentre trial (FLOW - Fluid Lavage of Open Wounds) at the Royal College of Orthopaedic Surgeons of Thailand 2011 Annual Scientific Meeting.

Publications

6 Journal Articles



TheAlfred

Dr Mandy Davis (Haematologist) and Geoff Magrin (Principal Scientist) observe Chris Akers (Transfusion Nurse) using the BloodTrack device to check patient identity prior to red cell transfusion.



Pathology Services

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

Clinical Biochemistry Unit

Head: Associate Professor Hans Schneider

Clinical Biochemistry is primarily a service department providing a wide range of testing to Alfred Health. This includes both common automated as well as more specialised tests from areas such as clinical chemistry, endocrinology, therapeutic drug monitoring and protein testing. Interests focus on specific patient populations at The Alfred.

Troponin 1 detection has been refined in our laboratory allowing an increase in sensitivity of cardiac damage diagnosis. We validated a method to safely reduce the cut-off used for detection in the point of care analyser to 50% of the published value. This potentially has implications for how the cut-off points of analysers are defined worldwide.

Urinary and serum markers of acute kidney injury can predict risk of future hospitalisation and cardiac events. In an effort to identify such markers, we are measuring NGAL (neutrophil gelatinase-associated lipocalin) by a point-of-care test in patients from a previous study that looked at B-type natriuretic peptide in shortness of breath.

Bone turnover markers: We developed a more reliable method for the detection of vitamin D using liquid chromatography tandem-mass spectrometry (LCMS-MS). This has become the gold standard and has been implemented in our laboratory as routine for 2012.

A posaconazole assay developed in our laboratory using high-performance liquid chromatography (HPLC) was used in 2011 to improve patient dosing of this anti-fungal agent. An outcome review of the improvement in infection rates is awaited.

Laboratory Haematology

Head: Dr Susan Whitehead

Laboratory haematology is primarily a diagnostic, developmental and educational service comprising Blood Bank, flow cytometry and general haematology, including morphology and coagulation. Collaborations have been established and continue with local and national groups including the Clinical Haematology and Trauma Units at The Alfred, the Australian Centre for Blood Diseases, the Transfusion Outcomes Research Collaborative, Nucleus Network, the Australasian Leukaemia and Lymphoma Group and the Australian and New Zealand Intensive Care Society (ANZICS).

Transfusion Medicine

BloodTrack is an electronic 2D barcode system, which assists with patient identification when administering red cells and platelets on the haematology/oncology day ward. The Alfred introduced BloodTrack in 2011 and is the first Australian centre to implement this technology, albeit as a proof-of-concept. The technology systematically guides users through the blood checking process to avoid omission of crucial steps. Repeat audit demonstrated that the 2D barcode system significantly improved the process for bedside transfusion administration.

The ANZICS pilot feasibility trial, which aimed to compare the allocation of freshest available red cells versus standard of care to critically ill patients, demonstrated a clinically relevant degree of storage duration separation between the two groups. This has resulted in funding for a larger study to test this approach (TRANSFUSE), which will require Blood Bank support.

The Sequenom Leukemia Chip

In acute myeloid leukemia (AML) the number of known lesions with clinical relevance has increased beyond the capacity of standard hospital-based tests to deliver rapid and cost-effectiveness diagnosis. A collaboration with Sequenom, a global molecular technology provider, has enabled the development of a customised molecular diagnosis chip that allows for the analysis of up to 40 multiple mutations in a single assay reaction. This highly sensitive technology analyses PCR products using a proprietary chemistry that is resolved by mass spectrometry.

The Sequenom Leukaemia Chip has been piloted successfully on 48 diagnostic AML samples with 100% concordance with standard techniques. This technology may well provide an ideal platform for bringing personalised genetic results to the clinic for the benefit of cancer patients and their treating physicians. Once established, the model could potentially be applied to other cancers and accelerate the introduction of next generation DNA technologies into standard clinical practice.

Publications

16 Journal Articles



HIV social workers Tess McAloon (left) and Lou Kerven with their poster from the Australasian Society for HIV Medicine conference 2011.

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, whose guidance has enabled a number of research projects and staff enrolments for higher degrees in 2011.

Infectious Diseases Team

Psychosocial Interventions in People Living with HIV

In February 2011 the Infectious Diseases Social Work Team, in collaboration with the HIV Mental Health Service, developed and ran a six-week support group program for young people (aged between 18 and 25) living with HIV. The group was set up to provide these young people a safe and confidential space where they could discuss and share their experiences of living with HIV, working towards a goal of improving their sense of social connection with other young people living with the condition.

The group provided psycho-education around living with HIV, focusing on topics that included mental health and self-care, HIV transmission, sex and relationships, stigma and discrimination, and disclosure. A formal evaluation of the six-week program was completed by the group participants and facilitators. The results were presented at the Australasian Society for HIV Medicine (ASHM) HIV/AIDS Conference in Canberra in September 2011 as a poster entitled 'The next generation: a support group for young people living with HIV'.

The Infectious Diseases team, in collaboration with Associate Professor Lou Harms, is also currently working on a data mining project, which involves auditing the files of 60 HIV-positive patients who have received a service from the HIV Chronic and Complex Care Social Work Program.

Chronic Illness Team

Stem Cell Donation: Psychosocial Research

The Chronic Illness team completed research in 2011 on the impact of stem cell donation on sibling donors. The study demonstrated that the donors experienced a broad range of both positive and negative emotions throughout the donation process, highlighting the need for routine provision of psychosocial support to donors as well as recipients. The study resulted in a publication entitled 'The psychosocial impact of haematopoietic SCT on sibling donors' appearing in the

Journal of Bone Marrow Transplantation in 2012 (L Katona, S De Bono, B Pillay, S Lee, S Burney and J Fletcher).

Other work in this area, which commenced in 2011, has included 'Exploring the factors predicting psychological distress in stem cell haematopoietic transplant patients', which involves Brindha Pillay, a Doctor of Psychology (Clinical) Candidate supervised by Dr Sue Burney and Dr Stuart Lee. In addition, Lynda Katona (Manager, Psychology Services) and Sue De Bono (Social Work) are the chief investigators of a project entitled 'Evaluating the effect of a workbook intervention in psychological distress in haematopoietic stem cell transplant (HSCT) patients'.

Cystic Fibrosis

Mary Fantidis, a cystic fibrosis social worker, is currently working with Associate Professor Lou Harms to explore the fertility issues with young female cystic fibrosis patients.

Pastoral Care

The Pastoral Care group is working on a pilot project that is nearing completion entitled 'The spiritual dimensions of the experience of illness'. Interviews have been completed and data analysis is currently under way.



Pastoral Care Coordinator Marilyn Hope (pictured) and Prof. Paul Komesaroff, Director of the Monash Centre for the Study of Ethics in Medicine and Society, are working on the project 'The spiritual dimensions of the experience of illness'.



Pharmacists Shevon Fernando and Linda Graudins discuss pharmacokinetic monitoring of vancomycin therapy.

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 classified under the themes of medication, safety, therapeutics, practice research and outcomes research.

The Pharmacy Department is involved in a wide range of studies from NHMRC and ARC multicentre funded collaborations through to industry partnerships and investigator-initiated practice evaluation programs.

Therapeutics: Pharmacokinetic Modelling Software

A series of projects involved the clinical use and pharmacokinetics of the antibiotic vancomycin. The assessment of time to a therapeutic concentration and the predictive accuracy of the pharmacokinetic modelling software program 'MM-USC Pack' were evaluated in both critical care (a three-month study with 48 patients) and ward (a six-week study with 77 patients) settings. In the intensive care setting, factors correlating with poorer prediction capacities were a change in renal function, obesity and the magnitude of organ dysfunction on commencement of vancomycin. In the non-intensive care setting, predictions were poorer in obese patients (body mass index >35 kg/m²) and in patients with unstable renal function. However, overall the pharmacokinetic modelling software was shown to be a potential tool to improve the timeliness of achieving adequate dosing by allowing concentrations to be determined prior to steady-state. The program was able to predict vancomycin concentrations across a heterogeneous patient population with little systematic bias, albeit with moderate precision.

Lessons from this work, together with previous studies, can now be integrated into routine practice at The Alfred with pharmacist-managed therapeutic drug monitoring for aminoglycosides and vancomycin being implemented into standard practice throughout Alfred Health by January 2012. Further work has been initiated to implement and evaluate the predictive software in the haematology and oncology clinical areas. The Pharmacy Department has also been involved in pharmacokinetic studies relating to cefepime in ICU, colistin in cystic fibrosis and tacrolimus in solid organ transplantation.

Evaluation of Technology Adoption into Practice

In 2011, Alfred Health embarked on a significant network-wide (across three sites) implementation and real time assessment of wireless-enabled smart infusion pumps and alerts to reduce intravenous infusion errors. Alerts generated from all three sites are downloaded and reviewed every 24 hours. Alerts identified as infusion errors are cross referenced with hospital systems and investigated by clinical pharmacists for adverse effects, additional monitoring and further ward level education and quality assurance of the medication library. Where necessary, medication library changes are uploaded across the network in real time. Evidence of errors prevented with the use of smart infusion pumps is routinely disseminated to key stakeholders throughout the network to promote continued adherence and use as a safety tool.

Medication Safety Initiatives

CMUS Alfred Health is collaborating with Melbourne University in an ARC Linkage Project to identify clinical communication issues that may influence how medications are managed across transition points of care in the emergency department setting. In-depth interviews of 71 health professionals, 10 consumers and 10 carers were conducted. Key barriers to accurate communication of medication-related problems occurring at transition points included ineffective use of communication media, geographical location of medications, availability of personnel, and accessibility to medical records. Consumer and carer satisfaction with communication at transition points varied depending on the level of activity in the environment. Implications arising from these results enable identification of strategies to reduce the risk of medication-related problems across transition points.

Major Awards

An ARC Linkage Grant has been awarded to a collaborative group including Monash Faculty of Pharmacy and Pharmaceutical Sciences, Department of Epidemiology and Preventive Medicine, Pharmacy departments of Alfred Health, Austin Health, Barwon Health, and the University of Newcastle. The three-year randomised controlled study will investigate the benefits of a pharmacist-led intensive smoking cessation program for hospitalised patients. The project commenced in Nov 2011, with patient recruitment expected to commence in 2012.

Postgraduate Students

10 Masters Students

Publications

39 Journal Articles
1 Book Chapter



Sara Calthorpe and Lara Kimmel are conducting studies that advance our understanding of the role of physiotherapy following trauma.

Physiotherapy

Manager: James Sayer BAppSc(Physio), GradDipExercise&SportsSc MHIthSc(ManipPhysio), MBA

The Alfred Physiotherapy Department's research focus is on physical activity and rehabilitation in hospitalised patients and people with chronic illness. Research programs investigate new models of rehabilitation for people with respiratory disorders, early mobilisation following surgery, physical activity in chronic disease, and physiotherapy in intensive care.

Physical Activity in Chronic Disease

Kate Hayes completed the first randomised controlled trial investigating the role of gym-based exercise training at an early phase post left ventricular assist device (LVAD) implantation. Outpatient exercise training was found to be both safe and feasible in this group of patients. Encouraging improvements in exercise capacity following the training program suggest that this intervention may be useful to improve function and wellbeing in a group that has previously not been considered eligible for rehabilitation.

Physical Activity and HIV

Soula Fillipas investigated the role of physical activity in people living with HIV for her PhD awarded through Monash University in 2011. Soula's work defined the relationship between physical activity and cardiovascular risk, body composition, bone health and body image in this complex patient group. The study, which was the first to evaluate long term physical activity behaviours in HIV-infected individuals, showed an increased risk of poor health due to low levels of physical activity, providing a sound basis for future interventional studies in this group.

Pulmonary Rehabilitation

Associate Professor Anne Holland's research program investigates new models of pulmonary rehabilitation for people with chronic lung disease, including methods to improve access to rehabilitation for disabled patients and defining the benefits of pulmonary rehabilitation in new patient groups. This program has attracted significant grant funding during 2011, which includes: (i) a grant from the Australian Lung Foundation to fund a trial comparing a new, low cost model of home-based rehabilitation to a traditional outpatient pulmonary rehabilitation program for people with chronic obstructive pulmonary disease (COPD); and, (ii) funding from Helse Nord (Norway) for a collaborative study investigating long-term tele-rehabilitation for COPD.

Associate Professor Holland received a grant from the American Thoracic Society to fund a trial of pulmonary rehabilitation for people

with idiopathic pulmonary fibrosis (IPF). She previously conducted the first ever randomised controlled trial of pulmonary rehabilitation for IPF, which was recognised in 2011 by recommendations in international guidelines for inclusion of pulmonary rehabilitation for IPF treatment.

Physiotherapy and Trauma Recovery

In 2011 Sara Calthorpe and Elizabeth Barber were awarded the RACV Sir Edmund Herring Memorial Scholarship from the RACV to conduct a randomised controlled trial entitled 'Is more better: does a more intensive physiotherapy program result in accelerated recovery for trauma patients?' This study, being conducted in the acute trauma setting, will provide valuable information regarding the optimal intensity and frequency of physiotherapy treatment, to ensure maximum benefit for the patient, their families and the health care system.

Lara Kimmel continues her PhD studies investigating the role and outcomes of rehabilitation for trauma patients. In 2011, she published a model which used administrative data to predict the need for inpatient rehabilitation in patients admitted with lower limb trauma. This model will be an important tool to optimise patient outcomes and refine discharge planning in patients following trauma.

Evidence into Practice: Cystic Fibrosis (CF)

Associate Professors Brenda Button and Anne Holland led the development a Consensus Statement in 2008 to optimise physiotherapy management of people with CF in Australia and ensure translation of evidence into practice. In 2011, they conducted an evaluation to measure knowledge and acceptance of the Consensus Statement recommendations. The evaluation revealed that physiotherapists are aware of the statement's recommendations for physiotherapy treatment of people with CF in common areas of practice such as airway clearance and exercise. However, knowledge of recommendations is lower for specialised areas of practice and outside of specialist CF centres. The evaluation confirmed the uptake of the Consensus Statement recommendations and reinforced the need for strategies to improve awareness amongst physiotherapists outside of specialist CF centres. The evaluation outcomes will inform the update being led by Brenda and Anne in 2012.

Postgraduate Students

7 PhD Students
1 Doctor of Physiotherapy Student

Publications

16 Journal Articles



TheAlfred



Dr Birgit Pfitzer and Lynda Katona, Head of Department, discuss their research within the Psychology Department.

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. We provide research and evaluation as well as education and consultation to staff and community organisations. Clinical psychologists, who are attached to the Cystic Fibrosis, Oncology and HIV services and the Hospital Admission Risk Program, are involved in the assessment and treatment of patients who present with problems such as depression, anxiety and adjustment issues. Neuropsychology assessment and treatment services are provided to patients of all psychiatry programs and all medical and surgical units of the hospital. We are also committed to training of postgraduate students.

Psychosocial Effects of Black Saturday

Dr Birgit Pfitzer is studying the challenges of bushfire burns rehabilitation in burns patients of the 2009 Black Saturday bushfires in a long-term follow-up of previously administered measures of generic health, distress and QoL. A specific assessment of post-traumatic stress disorder, depression, anger and anxiety symptoms is being undertaken. The study explores the subjective experiences of patients and carers with emphasis placed on how patients and their families felt supported during their time at The Alfred, and following discharge.

HIV: Behavioural Risk

Dr Michelle Earle is investigating psychological factors among Victorian men who are seeking help for sexual behaviour placing them at risk of HIV infection. The study is the first of its kind in Australia and has shown that men who exhibit sexual risk behaviour (unprotected anal intercourse and/or multiple casual partners) have high rates of general mental health symptoms and sex-specific psychological problems (e.g. sexual compulsivity).

This group of men appear to experience rates of general mental health and sex-specific psychological difficulties above those of the general population, but consistent with those of their peers in other developed nations. Rates of suicidality indicate that sexual risk behaviour may be an expression of suicidal or self-harm intentions among some men. The implication is that systematic prevention of HIV transmission may require access to psychological treatments to assist with addressing these difficulties.

Stem Cell Transplant

Lynda Katona is an investigator on both a project undertaken by doctoral student Brindha Pillay entitled 'Exploring the factors predicting psychological distress and health-related QoL in haematopoietic stem cell transplant (HSCT) patients' and an Adjunct Workbook Intervention Pilot Study. Many transplant patients experience physical discomfort and complications as well as emotional distress. Emotional distress can reduce coping with the symptoms and treatment, both while in hospital and after returning home resulting in a reduced QoL. A link between significant emotional distress and rate of survival has also been found. The study explores the level of emotional distress and QoL immediately prior to transplant, during the acute phase and immediately afterward and examines factors which may predict psychosocial distress. The experience of some HSCT patients in using a workbook prior to undergoing the transplant is also examined.

Neuropsychology: Cognitive Function

Dr Rubina Alptsis continues to examine the cognitive effects of Hepatitis C and whether the virus has a direct effect on the central nervous system. Dr Jacqueline Anderson leads a study examining the long term neuropsychological outcomes of patients with arteriovenous malformation (AVM) undergoing stereotactic radiotherapy.

Other Research Highlights

- The Building Resilience and Strengths project led by Dr Jenny Makross promotes better outcomes in patients transitioned from community mental health to primary care, through combining a brief pre-discharge educational intervention with enhanced primary care provider communication.
- An NHMRC-funded randomised, controlled trial of acceptance and commitment therapy for medication-resistant psychosis, led by Dr Neil Thomas, completed provision of psychological therapy to 96 participants. Follow-up data collection will be completed in 2012.
- Dr Maxine Braithwaite continued a trial of motivational interviewing and direct dispensing to improve rates of treatment adherence in cystic fibrosis patients.

Postgraduate Students

- 1 PhD Student
- 1 Doctor of Psychology Student
- 1 Masters Student

Publications

6 Journal Articles



TheAlfred

www.wbrc.org.au

WBRO staff involved in the stereotactic body radiosurgery program. This program seeks to develop treatment protocols using carefully shaped small beams of radiation for moving targets within the body using real time imaging, breathing correction and robotic 6D movements.

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 with treatment facilities at The Alfred and at the Gippsland regional centre in Traralgon. The service is the busiest cancer unit in Alfred Health, seeing almost 2,000 new cases each year. WBRO's academic program comprises undergraduate and postgraduate teaching in various cancer-related disciplines complemented by an active research program in radiation oncology-related areas, from basic biology and physics, through to clinical trials and translation of research outcomes into clinical practice. Areas of interest include prostate cancer, especially brachytherapy (BT), as well as stereotactic (ST) or image-guided external beam radiation techniques.

Our association with the Trans Tasman Radiation Oncology Group (TROG) continued throughout 2011. We ran several clinical trials involving melanoma, brain tumours and bone metastases as well as cancers of the breast, prostate, lung and, head and neck. Mainly these trials were initiated by TROG; however, some are run in collaboration with international research groups such as the European Organisation for Research and Treatment of Cancer (EORTC) and the National Cancer Institute of Canada (NCIC).

Radiation Therapy (RT) Trials

- We were selected to participate in the Department of Health and Ageing commissioned project 'Assessment of New Radiation Oncology Treatments and Technologies (ANROTAT)' to assess the safety, clinical efficacy and cost effectiveness of Intensity Modulated RT (IMRT) and Image Guided RT (IGRT).
- We were involved in development of technologies to participate in 'A randomised phase 3 trial of highly conformal hypo-fractionated IGRT versus conventionally fractionated RT for inoperable early stage I non-small cell lung cancer (CHISEL)'. This included assessing fiducial markers for implanting into the lung and the appropriate imaging of them for accurate treatment delivery.

Treatment Advances and Achievements

- We treated our first image-guided gated lung tumour patient.
- The BT team treated their 800th seed BT case and became the first group in Victoria to use the high-tech 'thin-strand' seeds.
- Physics introduced the 'AA' algorithm to more accurately predict patient dose (in most situations) compared with the old pencil beam algorithms.

- Wireless tablet systems for use by patients to enter data were developed by University of Melbourne students together with Ryan Smith and Karen Scott.
- We installed, commissioned and commenced treatments with a new linear accelerator at our satellite centre in Gippsland.

Training Developments

- We ran the first Australian-based BrainLab Training Academy to provide ongoing training on the use and developments of the BrainLab ST RT techniques. We are one of only three centres globally to run the course.

Competitive Funding

Staff were successful in obtaining external competitive funding totalling \$2.6 million from sources including NHMRC, Victorian Cancer Agency and the Victorian Department of Health. These grants include:

- START: A phase III study of active surveillance therapy against radical treatment in patients diagnosed with favourable risk prostate cancer
- Expansion of the Prostate Cancer Registry to Grampians Regional Integrated Cancer Service and Epworth Healthcare Groups in Victoria
- Determining the causes of observed variation in survival after a diagnosis of prostate cancer
- The Victorian Lung Cancer Registry, Victorian Lung Cancer Initiative
- Curing Cancer with Synchrotron Radiation

Achievements and Awards

- Craig Lancaster achieved his Accreditation in RT Equipment Commissioning and Quality Assurance.
- Jeff Crosbie received travel awards from the Australasian College of Physical Scientists and Engineers in Melbourne (ACPSEM) and the Australian Institute of Nuclear Science and Engineering (AINSE).
- Clem Conheady was awarded a travel grant from the Victorian ACPSEM Medical Physicist Education Bursary funded by the Victorian Department of Health to attend a European Society for RT and Oncology (ESTRO) BT course.

Postgraduate Students

1 PhD Student
1 Doctor of Psychology (Clinical) Student
1 Masters Student

Publications

8 Journal Articles

Ester Mebalds, Occupational Therapist (left), discusses the Return to Work and Study Project (in collaboration with Speech Pathology).



Rehabilitation, Aged and Community Care

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

Rehabilitation, Aged and Community Care based at Caulfield Hospital (CH) strives to significantly contribute to the implementation of effective translational research and interdisciplinary and person centred models of care, with links to defined clinical outcomes in areas of greatest need. Research growth is strong across the hospital with interdisciplinary relationships being a key factor to success.

Community and Ambulatory Services

The Caulfield Pain Management and Research Centre

Major areas of current research activity include:

- Three NHMRC-funded randomised controlled trials of therapeutic treatments for chronic pain; acupuncture, caloric vestibular and simple analgesics.
- Development of better outcome measures for the assessment of chronic pain conditions.
- Phenomenology of phantom limb pain.
- Age differences in the chronic pain experience, particularly in those older persons with cognitive impairment or dementia.

Senior researchers include: Associate Professor Stephen Gibson, Dr Carolyn Arnold, Alison Johnson and Dr Melita Giummarra.

Cardiac Rehabilitation Unit

The following projects were completed during 2011:

- Phase 3 cardiac rehabilitation: a collaborative pilot project between CRU and Caulfield Community Health Service.
- Determination of the minimal clinically important difference for the six minute walk test in heart failure.
- Return to work following cardiac rehabilitation.

The Phase 3 Cardiac Rehabilitation Project

Cardiovascular disease is the greatest cause of mortality in Australia with 48,313 major coronary events per year. Cardiac Rehabilitation (CR) aims to assist patients in recovery following cardiac events and contribute to risk-factor reduction. There is some suggestion that longer-term or maintenance CR can lead to a reduction in morbidity and mortality along with improved risk factors and quality of life; however, studies of maintenance programs in Australia are lacking.

Our randomised controlled study aimed at ascertaining whether a six-month maintenance program incorporating exercise, education and support/coaching was more effective than usual care in assisting

former CR patients to successfully maintain healthy cardiac behaviours. A total of 103 CR patients (51 controls; 52 intervention subjects) completed either a six-month maintenance program or usual care (no follow-up intervention).

When compared with the control group, those participating in the maintenance CR program demonstrated: (i) significantly improved objective fitness levels; (ii) significantly greater perception of improved fitness and health; (iii) significantly improved triglycerides; (iv) greater awareness of their own risk factors; and, (v) significantly improved health-related quality of life, especially in physical domains such as 'role-physical' and 'general health'. The intervention resulted in improved objective and subjective patient outcomes, and provides evidence to support the establishment of a maintenance cardiac rehabilitation program. The project was funded through the Caulfield Hospital Major Project Grants.

Cognitive, Dementia and Memory Service

The major research focus within the Cognitive, Dementia and Memory Service (CDAMS) has been ongoing work on the NHMRC-funded project into the evaluation of a memory strategies group program for people with mild cognitive impairment (collaboration with La Trobe University). A further collaborative project with Deakin University and the Monash Accident Research Unit investigating driving behaviour in people with mild cognitive impairment or early Alzheimer's disease completed recruitment and analysis.

Community and Ambulatory Services: Other Research

- Recommendations of a Falls Clinic: Does written feedback improve client recall of risks and compliance with falls prevention strategies (Caulfield Community Rehabilitation).
- End stage renal disease as an independent risk factor for foot ulceration (Caulfield Community Health Service).
- Evaluation by the Caulfield Aged Care Assessment Services (ACAS) of clients on the centralised waitlist for an Aged Care Package.
- Indwelling urethral catheter management post hip fracture (Continence Service).

Allied Health

Allied Health offers an intensive and diverse range of services to CH's rehabilitation and aged care clients in an interdisciplinary team environment.

Physiotherapy

The following projects were published in 2011 through the Physiotherapy Department:

- Training conditions influence walking kinematics and self-selected walking speed in patients with neurological impairments.
- Resistance exercise in cardiac rehabilitation.
- What prevents people with chronic obstructive pulmonary disease (COPD) from attending pulmonary rehabilitation? A systematic review.
- Lack of perceived benefit and inadequate transport influence uptake and completion of pulmonary rehabilitation in people with COPD: A qualitative study.

Occupational Therapy

CH welcomed the appointment of Natasha Lannin in her new role as Associate Professor in Occupational Therapy across Alfred Health. Research and other related activities at CH included:

- Factors influencing participation in the workforce: perspectives of people with upper limb amputations and limb deficiencies.
- Implementation of a 2:1 collaborative model of supervision: perspectives of students and practice educators.
- Multitasking on return to work after an acquired brain injury.

Speech Pathology

- Does the Caulfield dementia mealtime program improve nutritional status in patients with dementia?

Interdisciplinary Projects in Allied Health

- Return to Work and Study Project. (Occupational Therapy/Speech Pathology).
- A pilot study exploring the relationship between hand function and the ability to open medication containers in individuals aged 65-85. (Occupational Therapy/Pharmacy).

Aged Care Services

In 2011, Associate Professor Peter Hunter and his team commenced an NHMRC-funded study of a hormonal and nutritional supplement to prevent hospitalisation in undernourished older persons in the community.

The Department also collaborated with The Alfred Trauma Research Unit investigating outcomes of trauma in older patients. Other areas of research in 2011 involved advanced trainees working closely with consultant geriatricians with support from Dr Nicole Austin (Research Coordinator). These projects cover the areas of osteoporosis, delirium, medication use, advance care planning and frailty.

Advance Care Planning Program

The Advance Care Planning program was successful in an application to the Victorian Department of Health for a \$22,868 grant for the project 'Can community dwelling older adults complete a person based advance care directive to provide useful information to substitute decision makers?'

Other collaborative projects completed by the Advance Care Planning Program included:

- Advance care planning and pulmonary rehabilitation: a pilot project.
- Does offering an advance care planning service to people recently diagnosed with dementia or mild cognitive impairment by the CDAMS clinic lead to completion of advance care planning documentation?

Aged Psychiatry

The main research activities for the year have involved ongoing work on two large, industry-funded clinical trials examining the safety and efficacy of potential disease-modifying concepts in Alzheimer's disease. In investigator initiated research, the unit is currently partnering with a number of sites around Melbourne to examine models of care within psychogeriatric nursing homes. In addition, the unit is conducting research into the area of senile squalor, partnering with a number of local NGOs and the Metropolitan Fire Brigade in this endeavour, with the aim to collect the largest series of neuropsychology reports on such individuals to support the hypothesis that frontal lobe deficits invariably underlie the syndrome.

Rehabilitation

The Spinal Rehabilitation Unit

The Unit offers a specialised statewide interdisciplinary clinical service for individuals with spinal cord damage or disease from any cause. A number of projects were completed in 2011:

- Quality of life in adults with spinal cord injury living in the community.
- Comparison of patients managed in specialised spinal rehabilitation units with those managed in non-specialised rehabilitation units.
- Key stakeholders' perceptions of barriers to admission and discharge from inpatient subacute care in Australia.

Acquired Brain Injury Rehabilitation Service

In 2011 extensive planning work was undertaken for the development of a new statewide acquired brain injury rehabilitation service to be built at CH. This new service development, planned for opening in 2014, will provide unique opportunities for expanded research activity in neuro-rehabilitation.

Residential Care

Two research projects in the area of infectious diseases and prevention were carried out during 2011 across Residential Aged Care Facilities at CH.

- Surveillance of infection burden in residential aged care facilities.
- Point prevalence study of multidrug-resistant organism colonisation among aged care residents.

Achievements and Awards

- Dr Ettie Ben-Shabat (Physiotherapy) was awarded an Alfred Health Physiotherapy Research Fellowship.
- Natalie Fini (Physiotherapy) received a Victorian Stroke Clinical Network Postgraduate Scholarship.
- Melanie Pinfold (Physiotherapy) received La Trobe University's VPGH Postgraduate Prize in Gerontology.
- Dr Michael Tan (2011 Rehabilitation Medicine Advanced Trainee with the Spinal Rehabilitation Unit) received the 'Adrian Paul Prize' for the best presentation or published research by trainee or first year fellow.
- Dr Kim Tew (2011 Advanced Trainee in Aged Care) received the Australian and New Zealand Society for Geriatric Medicine poster prize for best poster.
- Veronica Delafosse received a Health Libraries Inc (HLInc) Life Membership Award for an outstanding contribution to HLInc and Health Librarianship.

Postgraduate Students

14 PhD Students
1 Doctor of Clinical Science Student
13 Masters Students

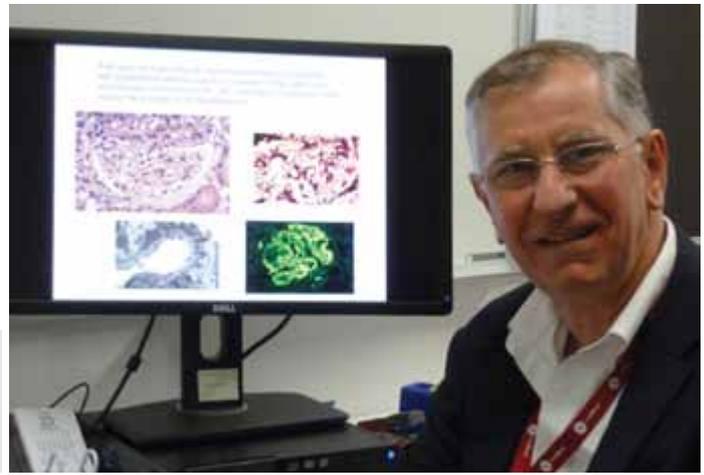
Publications

27 Journal Articles



TheAlfred

Professor Rowan Walker joined The Alfred in mid-2011 as Director of Renal Medicine.



Renal Medicine

Director: Professor Rowan G Walker MBBS, FRACP, MD, MPH

The Department's research activities during 2011 have centred around a series of randomised controlled trials across the spectrum of kidney disease, including dialysis, transplantation and chronic kidney disease. We have also been involved in implementation projects related to the evidence-based clinical practice guidelines for Caring for Australians with Renal Impairment (CARI). In addition, we have been establishing a Renal Specific Disease Registry in conjunction with the Monash Department of Epidemiology and Preventive Medicine.

Clinical Trials

Two major multicentre international studies involving The Alfred have been published in the last 18 months.

Early or Late Initiation of Dialysis?

The Initiating Dialysis Early and Late (IDEAL) study was a randomised controlled trial that examined the merits of early-start versus late-start dialysis in 828 adults. A measure of kidney function known as estimated glomerular filtration rate (eGFR) was used to define either early- or late-start dialysis groups; eGFR was between 10 and 14 ml/min in the early-start group while in the late-start group eGFR had deteriorated to between 5 and 7 ml/min. The hypothesis being tested was that early-start dialysis would have superior outcomes to late-start dialysis. The primary endpoint of the trial was death from any cause.

During a median follow-up period of 3.59 years, 152 of 404 patients (37.6%) in the early-start group and 155 of 424 patients (36.6%) in the late-start group had died. This finding indicated that early initiation of dialysis did not appear to be associated with a survival advantage. There was also no significant difference between the groups in the frequency of adverse events such as cardiovascular events, infections, or complications of dialysis. The study has important clinical implications and potential cost implications, but certainly indicates that dialysis commencement should largely be guided by symptoms and not just eGFR.



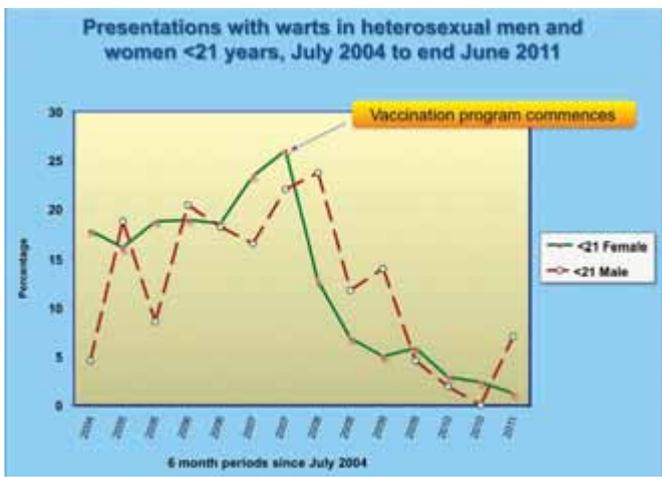
Chronic Kidney Disease and Lipid Lowering Agents

The Study of Heart and Renal Protection (SHARP) aimed to assess the safety and efficacy of reducing low-density lipoprotein (LDL) cholesterol in patients with chronic kidney disease. The study was a randomised double-blinded trial conducted in 9,270 patients (3,023 on dialysis and 6,247 not on dialysis) with no known history of myocardial infarction or coronary revascularisation. Patients were randomly assigned to either combination therapy of a low-dose statin (20 mg of simvastatin) plus a cholesterol absorption inhibitor (10 mg of ezetimibe) taken daily or matching placebo.

The key pre-specified outcome was first major atherosclerotic event defined as non-fatal myocardial infarction or coronary death, non-haemorrhagic stroke, or any arterial revascularisation procedure. Allocation to simvastatin plus ezetimibe yielded an average LDL cholesterol difference of 0.85 mmol/L (SE 0.02; with about two-thirds compliance) during a median follow-up of 4.9 years and produced a 17% proportional reduction in major atherosclerotic events. This is the first study involving dialysis patients that showed a potential benefit to using lipid lowering agents.



Haemodialysis machines - The Alfred.



Presentations with warts in heterosexual men and women <21 years, July 2004 to end June 2011.

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 the services offered at MSHC.

Prevalence of Bacterial STIs

Our data suggest that *Chlamydia trachomatis* (Chlamydia) prevalence in men who have sex with women (MSW) is rising by 4% per year and that Chlamydia and *Neisseria gonorrhoea* prevalence among men who have sex with men (MSM) is stable or declining. Trend differences between MSM and MSW may be due to high STI testing rates among MSM in Australia.

In Australian women aged 16 to 25, we found significant prevalence of Chlamydia (4.9%) and *Mycoplasma genitalium* (MG) (2.9%). Younger women were more likely to have Chlamydia, while younger age was not associated with MG infection. MG was associated with vaginal discharge while Chlamydia showed no associations with any reported symptoms. Chlamydia showed a stronger association than MG with having two or more partners in the last 12 months.

HIV: Will a Rapid Test Decrease Incidence?

Mathematical modelling suggests that increased frequency of HIV testing among MSM will lead to a reduction in new HIV cases. The SMARTest study is a randomised trial designed to compare whether the HIV testing frequency will differ in two MSM groups offered either a rapid finger prick test giving a result in 20 minutes or normal lab-based tests. Participants will be followed for 18 months and results are expected at the end of 2012.

Hepatitis C: A Cohort Study

Our cohort study, which determined the incidence of hepatitis C (HCV) infection among HIV-infected MSM, was the first in Australia to report presumed sexual transmission of HCV among HIV-infected MSM who do not inject drugs. We identified 40 cases of HCV, of which 16 were injecting drug users (IDUs) and 24 were non-IDUs. Our study suggests that HIV-positive MSM, who have never injected drugs, have a low but significant risk of HCV infection of about 0.5% per year. The most common reason for HCV testing among HCV-positive individuals in our study was the development of abnormal liver function tests.

Human Papilloma Virus in Men

The Hyper Study is examining the prevalence, incidence and natural history of oral and anogenital human papilloma virus (HPV) among young MSM, with a view to informing policy on HPV vaccination of MSM. A study in MSM found that approximately 13% had oral HPV infection. HPV causes anal cancer and so we are also investigating screening for HPV in a cohort of 100 HIV-infected MSM.

Bacterial Vaginosis

The bacterial vaginosis (BV) antibiotic and probiotic study (BVAPS), a placebo-controlled randomised trial completed in January 2011, demonstrated that the addition of vaginal clindamycin or the vaginal probiotic (Gynoflor®) to oral metronidazole did not alter six month BV recurrence rates.

A two-year cohort study to determine the behavioural and microbial risk factors associated with incident BV in women with female partners is expected to be completed in October 2013. A designated study website called WOW Health can be found at www.wowhealth.org.au.

Achievements and Awards

- Royal Australasian College of Physicians, 2011 Australasian Chapter of Sexual Health Awards: Prof. Christopher Fairley received the Outstanding Contribution to Research in Sexual Health Medicine (SHM) Award; A/Prof. Marcus Chen received the SHM Award for significant contribution to SHM by a Fellow of < 10 years standing.
- Our 'Let Them Know' website was a Silver winner in the Victorian Public Healthcare Awards 2011 in the category of 'Excellence in enhanced quality healthcare through e-health and communications technology'.
- Partnership Award 2011 for providing long standing support to Inner South Community Health Service and Resourcing Health and Education in the Sex Industry (RhED).
- Dr Catriona Bradshaw was awarded an NHMRC Project Grant 'Investigation of candidate aetiologic organisms of bacterial vaginosis in diverse and unique epidemiological and clinical studies.'
- Melanie Bissessor secured an NHMRC Postgraduate Scholarship to commence in 2012.

Postgraduate Students

6 PhD Students
6 Masters Students

Publications

33 Journal Articles
1 Book
4 Book Chapters



TheAlfred



Miriam Voortman performs a voice analysis using the lingWAVES voice analysis system.

Speech Pathology

Head: Janine Mahoney BAppSc(SpPath)

Thyroid Surgery and Voice Changes

An ongoing collaborative project between Endocrine Surgery (Professor Jonathan Serpell), ENT and Speech Pathology (Miriam Voortman) is examining the changes in the diameter of the recurrent laryngeal nerve during thyroid surgery and the relationship of this to voice changes following surgery. To date, 80 participants have had objective measures taken of vocal function using the lingWAVES voice analysis system. These assessments have been performed before surgery and one day post surgery. A smaller cohort of 18 participants has completed a three-month post surgery assessment. The participants complete a subjective assessment of the voice using a standardised scale and this is compared to the objective data including the intra-operative nerve measurements. Preliminary analysis of the data for 30 participants has demonstrated that there is a close correlation between the participants' subjective judgements and the objective results.

Head and Neck Cancer: Swallowing Outcomes

The Southern Melbourne Integrated Cancer Service has funded a pilot study to investigate 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. Over the past year, the principal researcher Amanda Dwyer has recruited 16 participants, out of 18 eligible patients, to this study. Recruitment is expected to continue for the first half of 2012. The study examines the efficacy of an exercise program aimed at improving swallowing function following radiotherapy. Fluoroscopic assessments of swallowing function are performed at baseline and at three and six months after treatment. The study also examines the participants' compliance with the exercise program, in particular, the accuracy of performing the exercises and reasons why the exercises are not completed. Quality of life is also evaluated throughout the study and a database has been developed to monitor the participants' progress.

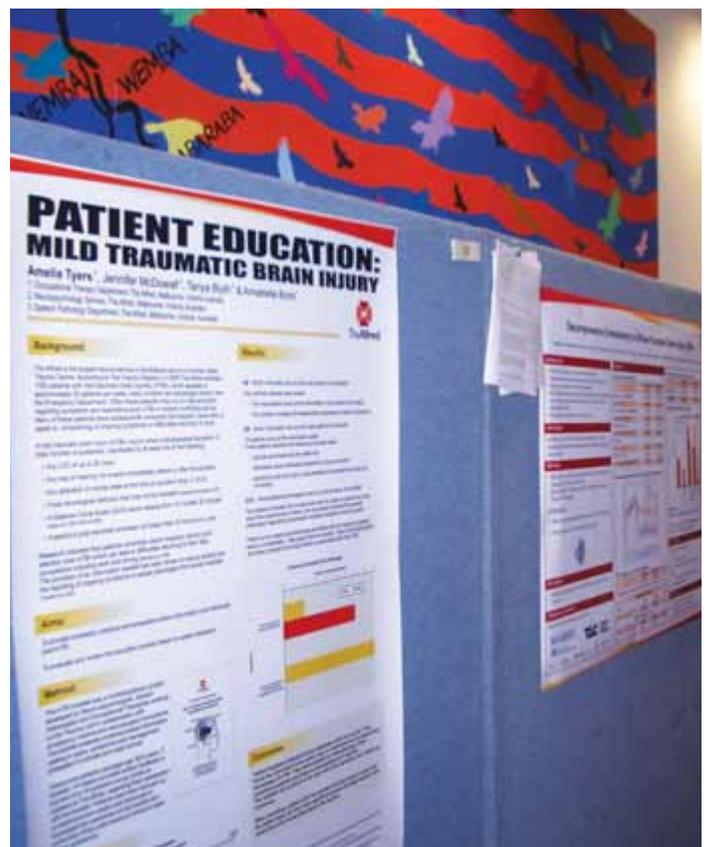
Cognitive Testing for Language Impairment

Prompted by feedback from rehabilitation facilities that high-level language function impairment was going undetected in mild traumatic brain injury (TBI) patients at The Alfred, we initiated a study comparing two screening assessment methods. We compared the 'Cognitive Linguistic Quick Test' (CLQT) with the Cognistat analysis system in patients with mild TBI and found that the CLQT identified significantly more individuals with a high-level language deficit than the Cognistat test. The results have led to a change in clinical practice, with the

Speech Pathology Department now endeavouring to screen all patients with mild TBI using the CLQT. Ultimately, this should lead to an improvement in the lives of affected individuals, especially since many patients with mild TBI are young and engaged in study or employment, and even a mild impairment in language function can have a serious impact on their lives.

Achievements

A paper reporting the results of a collaborative study between Speech Pathology and Occupational Therapy entitled 'A comparison of two assessments of high level cognitive communication disorders in mild traumatic brain injury' has been accepted for publication in the journal *Brain Injury*. The study was funded by a Sir Edmund Herring Scholarship through the RACV.





Professor Russell Gruen, Director of the National Trauma Research Institute.

Trauma

Director: Professor Russell Gruen MBBS, PhD, FRACS

The National Trauma Research Institute (NTRI) aims to improve care of the injured through more effective treatments, higher quality care, and better trauma systems. The NTRI, in collaboration with other groups at AMREP, works with governments, health care organisations, clinicians and the community, to improve care at the roadside, in hospital, and throughout rehabilitation, thereby increasing survival and quality of life among seriously injured people. The Institute is a partner in the Critical Care, Trauma and Perioperative Medicine Theme in the evolving Monash Partners Academic Health Science Centre. In 2011, the NTRI launched a four-year strategic plan with a clear statement regarding the Institute's role in 'improving care of the injured'.

Global Evidence Mapping Initiative

The Global Evidence Mapping (GEM) Initiative is in its fourth year, funded by the TAC, to make available existing evidence in key questions about traumatic brain injury (TBI) and spinal cord injury. The GEM Initiative has developed novel methods of question development, prioritisation, mapping existing research, and identification of research gaps. This was enhanced by development of software tools and methods to facilitate groups working together to develop and maintain up-to-date reviews of the evidence, in a project called the Health Knowledge Exchange, funded by the Victorian Department of Innovation, Industry and Regional Development. The culmination of this work is EvidenceMap, a new resource for accessing research about what works in the care of brain and spinal cord injured patients.

NTRI Research Laboratory

The NTRI research laboratory, headed by Associate Professor Cristina Morganti-Kossmann, continued to look at the multifunctional cytokine erythropoietin (EPO) and the brain-derived neurotrophic factor (BDNF), and its ability to enhance neurogenesis to promote repair following TBI. The team is also looking to confirm the contribution of neurogenesis to functional recovery, using an established mouse model. In 2011 the team commenced a collaborative project to validate the utility of novel lipid-based, biocompatible nanoparticles (cubosomes) developed at CSIRO to visualise blood macrophages accumulating in the mouse brain following injury.

The team is also participating in a multicentre randomised clinical trial to assess EPO's efficacy in improving outcomes in TBI patients by exploring whether neuroprotection conferred by EPO therapy correlates with the reduction of specific biomarkers of brain injury in blood samples. This unprecedented use of these markers in a clinical

trial will provide future pharmacological studies with crucial molecular correlates to neurological scores.

In April 2011 Associate Professor Morganti-Kossmann was recognised at the 10th International Neurotrauma Symposium in Shanghai, where she was invited to give a plenary lecture and chair a session on inflammation in brain and spinal cord injury.



Associate Professor Cristina Morganti-Kossmann (L), former head of the NTRI Research Laboratory, and NTRI Research Fellow Dr Nicole Bye.

National Neurotrauma Stakeholder Forum

The NTRI hosted a national stakeholder forum in February 2011 at the Melbourne Cricket Ground to discuss and plan a neurotrauma research agenda for the next five years. Over 160 researchers, clinicians, research managers, patient representatives and government officials from Australia and New Zealand attended, and engaged in large and small group dialogue work. The discussion was stimulated by presentations from the CEO of the NHMRC, Professor Warwick Anderson, American neurosurgeon and research leader, Professor Ross Bullock, and Canadian spinal cord injury rehabilitation researcher and expert, Professor Keith Hayes.

NTRI Conference 2011

The NTRI's annual scientific conference held in November focused on the development and maintenance of high quality systems of trauma care, in particular 10 years of the Victorian State Trauma System. A high quality program of national and international speakers delivered presentations on all aspects of trauma systems, from developing, monitoring and improving systems of trauma care, to innovations in trauma care and systems of rehabilitation. Over 180 delegates were treated to highlights including a keynote speech from Australian Chief Medical Officer, Professor Chris Baggoley, on Australia's systems approach to disaster management; and a presentation by UK National Director for Trauma Care, Professor Keith Willett, outlining how he has based the new UK trauma system on the Victorian State Trauma System.

A Collaboration for Trauma Quality Improvement

The Australian Trauma Quality Improvement Program (AusTQIP) is a collaboration with the 26 designated Australian Major Trauma Centres (MTCs) and established state-based trauma registries to further develop quality improvement systems, underpinned by the development of an Australian Trauma Registry. Current funding has been provided for two years (2011-2012) by the National Critical Care and Trauma Response Centre (NCCTRC) in Darwin and Alfred Health through the NTRI. In 2011, a Steering Committee and Working Groups were convened to facilitate national participation.

The AusTQIP team undertook site visits to all MTCs and State Trauma Registries to establish a collaborative network and undertake a survey of trauma quality improvement systems and data capabilities, the results of which have informed the design of the Australian Trauma Registry. A Bi-National Trauma Minimum Dataset and data dictionary was completed and endorsed as the national standard for trauma data collection. In November, AusTQIP hosted a national trauma quality improvement workshop in conjunction with the Royal Australasian College of Surgeons, which featured Australian Chief Medical Officer, Professor Chris Baggoley, Canadian Performance Indicators expert, Dr Tom Stelfox, and the manager of the American National Trauma Data Bank, Melanie Neal.

WHO Trauma Care Checklist Study

The NTRI participated in this project designed to determine the usefulness and effectiveness of a trauma care checklist and to evaluate the impact on safety culture, acceptability and implementation of the checklist. The NTRI oversaw this study at The Alfred as one in only three high income countries participating in this worldwide QI evaluation. Registrars were observed and data collected pre- and post-implementation of the checklist by a group of 15 dedicated medical students who attended the resuscitations of 238 severely injured patients at all times of the day and night. The checklist and observational data are currently being analysed and compared to other participating hospitals worldwide and are expected to be available mid-2012.

P.A.R.T.Y. Program

The Prevent Alcohol and Risk-related Trauma in Youth Program (P.A.R.T.Y.) is an in-hospital trauma prevention program introducing young people to the real consequences of risk taking behaviour. Commenced in 2009, the program includes a Schools Program; an Intervention Program for young offenders; a Defence Force Program; a Regional Outreach Program; and a new program for parents piloted in August 2011 aimed at exposing parents of teens who have attended the Schools Program to some of the messages their young person received, and provided them with resources to handle these issues. In 2011 The Alfred volunteers who work with P.A.R.T.Y. were recognised with the Minister for Health Volunteer Award for the most outstanding volunteer group in a Public Health Service.

Postgraduate Students

19 PhD Students
1 Doctor of Psychology Student
2 Masters Students

Publications

44 Journal Articles
1 Book Chapter



Major Grants



Listed are the major national competitive, peer-reviewed research grants held by AMREP staff in 2011; inclusion is based on the Australian Competitive Grants Register (ACGR). Major international grants are also listed.

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, Bouillet P, Colman P, Cory S, Gerondakis S, Huang D, Lindeman G, Strasser A, Vaux D, Visvader J. Roles of impaired apoptosis and differentiation in tumourigenesis and therapy. 2007-2011: \$21,228,860. 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.

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.

Mackay C, Sprent J, Goodnow C, Basten T, de St Fazekas B, Mackay F, Tangye S, Vinuesa C, Brink R. Molecular and cellular studies of the adaptive immune response in health and disease. 2007-2011: \$15,544,453. Administering institution: Garvan Institute of Medical Research.

Owen N, Bauman A, Wendy B. 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

Eades S. Making a difference: building research capacity for health interventions to improve Aboriginal health. 2010-2011: \$2,317,125. Administering institution: Baker IDI.

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.

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.

Health Services Research Grants

Cameron P, Sprivilis P, Stoelwinder J, Forbes A, McNeil J, Campbell J. Using data to improve quality of health care. 2007-2011: \$2,629,000. Administering institution: Monash University.

Cass A, Brown A, Patel A, Eades S, Hayman N, Isbel N, Jan S, Ring I, Stewart G, Tonkin A, Weeramanthri T. Improving health outcomes for Aboriginal Australians with chronic disease through strategies to reduce systems barriers to necessary care. 2006-2011: \$2,800,000. Administering institution: University of Sydney.

McNeil J, Peeters A, Oldenburg B, Hollingsworth B, Nelson M, de Courten M. Better targeting of preventative services using epidemiological modelling. 2007-2011: \$1,823,750. Administering institution: Monash University.

Scott A, Joyce C. Understanding the dynamics of the medical workforce to improve population health and equity of access: the Australian Longitudinal Survey of Doctors. 2007-2011: \$2,133,430. Administering institution: University of Melbourne.

Stewart S, Scuffham P, Marwick T, Horowitz J, Krum H, Davidson P, MacDonald P. Which heart failure intervention is most cost-effective and consumer friendly in reducing hospital care: the WHICH Study. 2007-2011: \$878,702. Administering institution: Baker IDI.

Preventive Healthcare and Strengthening Australia's Social and Economic Fabric Research Grants

Kinner S, Alati R, Williams G, Lennox N, Boyle F, Jamrozik K, Vlack S, Haswell-Ekins M, Taylor D. Passports to advantage: health and capacity building as a basis for social integration. 2007-2011: \$1,564,095. Administering institution: Burnet Institute.

Loff B, Lawrence M, Peeters A, Ackland M, Swinburn B. A comprehensive regulatory strategy for obesity prevention in Australia. 2007-2011: \$761,184. Administering institution: Monash University.

Development Grants

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

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

Kaye D, Krippner G. Novel soluble guanylate cyclase activators for pulmonary artery hypertension. 2010-2011: \$470,100. Administering institution: Baker IDI.

Mitchell A, Nesbitt WS, Jackson SP. Microfluidic device for the quantitative assessment of blood platelet aggregation behaviour. 2010-2011: \$267,750. Administering institution: RMIT University.

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.

Partnership Projects

Leder K, Stevenson C, Sinclair M. Establishing Australian health based targets for microbial water quality. 2010-2011: \$173,240. Administering institution: Monash University.

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.

Project Grants

Abramson M, Benke GP, Croft RJ, Sim MR. Do mobile phones affect cognitive development in children? 2009-2011: \$531,000. Administering institution: Monash University.

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, 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, Cranmer SL, Ramshaw H, Salem H. The role of platelet receptor glycoprotein Ib-V-IX in thrombosis. 2009-2011: \$576,750. Administering institution: Monash University.

Andrews RK, Speare R, Carapetis J, McCarthy J, Cheng A, Kearns T, Mulholland E, Holt D, Markey P. Impact of an ivermectin mass drug administration program against endemic scabies and strongyloidiasis. 2010-2012: \$1,257,125. Administering institution: Menzies School of Health Research.

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

Bach LA, Rice GE, Fu P. How do proteins regulate cell behaviour? 2009-2011: \$528,750. Administering institution: Monash University.

Baker AL, Richmond RL, Castle D, Kulkarni J, Williams JM, Kay-Lambkin FJ. Improving the lifestyle of people with psychotic illnesses. 2009-2012: \$773,000. Administering institution: University of Newcastle.

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.

Beeson J, Rogerson S, Hommel M. Immunity to malaria during pregnancy. 2010-2011: \$224,160. Administering institution: Burnet Institute.

Bellomo R, Cameron P, Cooper DJ, Peake S, Webb S, Delaney A, Holdgate A. The Australasian resuscitation in sepsis evaluation – randomised controlled trial. 2008-2011: \$1,718,130. 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.

Bennell K, Buchbinder R, Wrigley T, Harris A, Pua Y. Is physiotherapy beneficial for people with osteoarthritis? 2010-2012: \$607,488. Administering institution: University of Melbourne.

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.

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.

Bruce C. Sphingosine kinase as a target therapeutic for obesity induced insulin resistance. 2009-2011: \$432,750. Administering institution: Baker IDI.

- Bruce C, Febbraio M. The CDP ethanolamine pathway: a new player in obesity induced insulin resistance. 2011-2013: \$566,706. Administering institution: Baker IDI.
- Bryant A, Bennell K, Lloyd D, Cicuttini F, Wrigley T. Young people with old knees: knee ligament reconstruction and early joint changes. 2010-2013: \$747,800. Administering institution: University of Melbourne.
- Budge M, Storey E, Tonkin A, Wong T, Reid C, Ames D. Aspirin for the prevention of cognitive decline in the Elderly: a Neuro-Vascular Imaging Study (ENVIS-ion) from ASPREE. 2008-2012: \$1,316,242. Administering institution: Australian National University.
- Buttery JP, Barnes CD, Monagle P, Spelman D, Lindeman R. Optimal immunisation schedules for children and adults with poor or non-functioning spleens. 2009-2011: \$455,188. Administering institution: Murdoch Childrens Research Institute.
- Campbell DJ, Prior DL, Liew D, Wolfe RC. Targeting those at risk of chronic heart failure. 2009-2013: \$1,420,375. Administering institution: St Vincent's Institute of Medical Research.
- Chapman I, Visvanathan R, Naganathan V, Hunter P, Karnon J, Horowitz M, Lange K, Cameron I. Testosterone and a nutritional supplement treatment for undernourished older people. 2010-2012: \$1,018,438. Administering institution: University of Adelaide.
- Chin-Dusting J, Dusting G. Targeting arginase in peripheral arterial occlusive disease. 2009-2011: \$234,250. 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.
- Cohen MM, Smit DV, Taylor D, Cameron P, Xue CC. Multiple emergency department acupuncture trials (MEDACT). 2009-2011: \$416,301. Administering institution: RMIT 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 chromatin remodelling in diabetic renal and vascular complications: *in vivo* studies. 2009-2011: \$456,000. Administering institution: Baker IDI.
- Cooper M, Kantharidis P, Twigg S. Growth factors and their effect on microRNAs and transcription factors in tubulointerstitial fibrosis in diabetes. 2009-2011: \$471,000. 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.
- Currie B, Cheng A, Giffard P, Mayo M, Spratt B. Diversity and virulence determinants among 100 clinical and environmental isolates of *Burkholderia pseudomallei*. 2010-2012: \$499,500. Administering institution: Menzies School of Health Research.
- Curtis D, McCormack M, Goodell M. The function of bHLH factors in adult haemopoiesis. 2009-2011: \$556,500. Administering institution: Monash University.
- Danta M, Matthews GV, Hellard M, Sasadeusz J, Prestage GP. Defining sexual transmission of hepatitis C among gay men. 2009-2011: \$380,050. Administering institution: University of New South Wales.
- 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.
- de Courten B, Forbes J, Walker K, de Courten M. Will a reduction in dietary AGEs improve insulin sensitivity and secretion in overweight individuals? 2010-2011: \$234,700. Administering institution: Baker IDI.
- 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.
- de Haan J, Cooper M. Antioxidant glutathione peroxidase (GPx) mimetics and atherosclerosis: a role for targeted antioxidant therapy. 2009-2011: \$344,250. Administering institution: Baker IDI.
- Dharmage S, Walters E, Abramson AJ, Thomas P, Erbas B, Matheson M. What increases the reactivity of airways in middle-age? 2009-2011: \$585,313. Administering institution: University of Melbourne.
- Dietze P, Aitken C, Jolley D, Hickman M, Kerr T, Stoovalé M. The natural history of injecting drug use among IDU in Melbourne. 2009-2013: \$739,698. Administering institution: Monash University.
- Ding C, Jones G, Cicuttini F, Winzenberg TM, Wluka AE, Quinn S. Does vitamin D supplementation prevent progression of knee osteoarthritis? A randomised controlled trial. 2010-2012: \$980,188. Administering institution: University of Tasmania.
- Drummer HE, Pountourios P. Role of the hepatitis C virus glycoprotein E2 variable regions in viral entry and antibody mediated neutralization. 2009-2011: \$521,250. Administering institution: Burnet Institute.
- Drummer H, Pountourios 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.
- Dunstan D, Shaw J, Salmon J, Zimmet P, Cerin E. Understanding the acute and cumulative metabolic effects of prolonged sitting in adults. 2009-2011: \$400,050. Administering institution: Baker IDI.
- 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.
- El-Osta A, Du X-J. Understanding the opposing roles of SWI/SNF in the control of gene programs for pathological cardiac hypertrophy. 2009-2011: \$457,689. Administering institution: Baker IDI.

- Emery S, Hoy J, Pett S, Roth N, Wright E. Strategic Timing of AntiRetroviral Treatment (START). 2009-2011: \$405,400. Administering institution: University of New South Wales.
- Enticott PG. Examining the brain basis of social cognitive impairment in autism spectrum disorders. 2009-2011: \$144,500. Administering institution: Monash University.
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- Guthridge M, Nilsson S. The role of osteopontin in leukaemia. 2011-2013: \$585,048. Administering institution: Monash University.
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- 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.
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- 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.
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- Mak J, Hijnen M. Biochemical and structural analysis of virus-host interactions during HIV-1 assembly. 2009-2011: \$324,250. Administering institution: Burnet Institute.
- McCormack M, Curtis D. Therapeutic targeting of precancerous stem cells in T cell leukaemia. 2011-2013: \$612,241. Administering institution: Walter and Eliza Hall Institute.
- McLachlan A, Naganathan V, Le Couteur D, Hilmer S, Gibson SJ. Optimising pain management in frail older people. 2009-2011: \$393,750. Administering institution: University of Sydney.
- 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.
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- 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.
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- Myles P, Leslie K, Silbert B, Peyton P, Paech M. Nitrous oxide anaesthesia and cardiac morbidity in major surgery. 2007-2011: \$2,782,500. 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.
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- 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.
- Perkovic V, Hillis G, Thomas M, Lowe G. Utility of novel biomarkers in the prediction of major complications of Type II Diabetes Mellitus. 2010-2012: \$494,563. Administering institution: University of Sydney.
- Peter K. CD40L/Mac-1 as therapeutic target in inflammatory diseases in particular atherosclerosis. 2010-2012: \$539,500. Administering institution: Baker IDI.
- Peter K. Platelet-activating and pro-inflammatory effects of proteins secreted by *Staphylococcus aureus*. 2009-2011: \$496,000. 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.
- Pirotta M, Teede H. Randomised sham-controlled trial of acupuncture for post-menopausal hot flashes. 2011-2013: \$491,664. Administering institution: University of Melbourne.
- 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.
- Poumbourios P, Drummer HE, Wilce M. Structural and functional role of HIV-1 gp41 terminal interactions in the membrane fusion mechanism. 2009-2011: \$508,500. Administering institution: Burnet Institute.
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- 2013: \$615,074. Administering institution: Burnet Institute.
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- Power D. Waste control in kidney disease. 2009-2011: \$438,000. Administering institution: Burnet Institute.
- Ramsland PA, Wines BD. Bacterial evasion of IgA immunity. 2009-2011: \$462,750. Administering institution: Burnet Institute.
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- Ritchie R, McMullen J, Jandeleit-Dahm K. Targeting ROS-induced damage rescues the diabetic heart. 2009-2011: \$469,000. Administering institution: Baker IDI.
- Rogerson S, Jaworowski A, Kain K. Phagocytic clearance and immune activation in malaria. 2010-2012: \$544,500. Administering institution: University of Melbourne.
- Salmon JL, Hume C, Hesketh K, Dunstan D, Daly R, Cerin E. An intervention to reduce sedentary behaviour, promote physical activity and improve children's health. 2009-2013: \$815,025. Administering institution: Deakin University.
- Sambrook P, Little D, March L, Buchbinder R. A randomised controlled trial to evaluate the effectiveness of zoledronate therapy in osteonecrosis of the hip. 2010-2014: \$511,425. Administering institution: University of Sydney.
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- 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, Wingler K, Armitage M. Role and mechanism of NADPH oxidase in ischemic stroke and neurotrauma. 2010-2012: \$560,250. Administering institution: Monash University.
- Schoenwaelder SM, Salem HH. Investigation of new approaches to dissolve blood clots. 2009-2011: \$479,375. Administering institution: Monash University.
- Scott AM, Ramsland PA, Ravetch JV. Using the immune system to treat cancers. 2009-2011: \$543,500. Administering institution: Ludwig Institute for Cancer Research.
- 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.
- Smyth IM, Sviridov D, Kile BT. How the ABCA12 protein transporter controls lipid levels and affects the biology of the skin and cardiovascular system. 2009-2011: \$496,250. Administering institution: Monash University.
- Stewart AG, Medcalf RL, Banwell MG, Hughes RA. New treatments for cancer. 2009-2011: \$355,750. Administering institution: University of Melbourne.
- 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.
- Sviridov D, Bukrinsky M. Atherosclerosis and HIV. 2009-2011: \$349,500. 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, Thomas M, Bach L. Impact of advanced glycation on anti-atherogenic properties of high density lipoprotein. 2009-2011: \$357,750. Administering institution: Baker IDI.
- 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.
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- Tang MLK, Samuel CS, Royce SG, Giraud AS, Wilson JW, Schulz H. Lung function genes in asthma. 2009-2011: \$559,500. Administering institution: Murdoch Childrens Research Institute.
- Taylor DA, Knott JK, Castle D, Kong D. Droperidol and olanzapine as adjuncts to midazolam for the acutely agitated patient: a randomised clinical trial. 2010-2011: \$186,247. Administering institution: University of Melbourne.
- 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, Cooper M, Brown R. The role of angiotensin converting enzyme 2 in diabetic complications. 2009-2011: \$435,375. Administering institution: Baker IDI.
- Thompson B, Kotsimbos T, Snell G. Why does peripheral airway dysfunction lead to bronchiolitis obliterans syndrome in lung transplantation? 2008-2011: \$248,250. Administering institution: The Alfred.
- Thompson B, Thien F, Douglass J, King G, O'Hehir R. Physiological aetiology of refractory asthma. 2011-2013: \$344,208. Administering institution: Monash University.
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- Weickert TW, Weickert CS, Schofield PR, Kulkarni J, Carr VJ. Cognitive enhancement in schizophrenia via selective oestrogen receptor modulator. 2009-2011: \$381,150. Administering institution: University of New South Wales.
- Wilkinson-Berka J, Campbell D, Slattery R, Miler 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 JL, Miller AG. Aldosterone and diabetic retinopathy. 2009-2011: \$491,250. 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.

Wolfe R, Forbes A. Missing data and risk prediction. 2009-2011: \$435,125. Administering institution: Monash University.

Wong TY, Shaw JE, Cheung ND, Kawasaki R, McGeechan K, Lee ML. Novel retinal architectural vascular signs and risk of cardiovascular disease: the AusDiab Study. 2010-2012: \$727,375. Administering institution: Centre for Eye Research Australia.

Woodcock E. Cardiac-specific therapy targeting hypertrophy and apoptosis. 2009-2011: \$526,500. Administering institution: Baker IDI.

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. A novel cardiac inotropic mechanism that provides functional benefit. 2009-2011: \$397,750. Administering institution: Baker IDI.

Woodcock E, Kistler P. Phospholipase C 1b, a target to limit atrial dilatation. 2011-2013: \$526,299. Administering institution: Baker IDI.

Wright MD, Hickey MJ. How tetraspanin proteins control the movement of white blood cells. 2009-2011: \$402,750. Administering institution: Monash University.

Xue CC, Thien F, Story DF. A clinical trial on acupuncture for hay fever. 2009-2011: \$169,725. Administering institution: RMIT University.

Xue C, Zheng Z, Gibson SJ, Helme RD. Electroacupuncture on opioid consumption by patients with chronic musculoskeletal pain: a randomised controlled trial. 2009-2011: \$353,650. Administering institution: RMIT 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.

Bobik A. 2006-2011. Administering institution: Baker IDI.

Chin-Dusting J. 2006-2011. 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. 2007-2011. Administering institution: Baker IDI.

Forbes J. 2011-2015. Administering institution: Baker IDI.

Gerondakis S. 2011-2015. Administering institution: Burnet Institute.

Gowans E. 2009-2013. Administering institution: Burnet Institute.

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. 2007-2011. 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.

Cooper DJ. 2007-2011. Administering institution: Monash University.

Fitzgerald P. 2010-2014. Administering institution: Monash University.

Lewin SR. 2008-2012. Administering institution: The Alfred.

Myles P. 2007-2011. Administering institution: Monash University.

Career Development Fellowships (previously Career Development Awards)

Benke G. 2007-2011. Administering institution: Monash University.

Bruce C. 2010-2013. Administering institution: Baker IDI.

Cheng A. 2011-2014. Administering institution: Monash University.

Cherry C. 2009-2012. Administering institution: Burnet Institute.

de Courten B. 2006-2012. Administering institution: Baker IDI.

Drummer H. 2007-2011. Administering institution: Burnet Institute.

Eades S. 2011-2014. Administering institution: Baker IDI.

Gabbe B. 2007-2011. Administering institution: Monash University.

Gicquel C. 2008-2011. Administering institution: Baker IDI.

Gorry P. 2009-2012. Administering institution: Burnet Institute.

Gruen R. 2008-2011. Administering institution: Monash University.

Hagemeyer C. 2008-2011. Administering institution: Baker IDI.

Hughan S. 2009-2012. Administering institution: Monash University.

Jowett J. 2010-2013. Administering institution: Baker IDI.

Kinner S. 2011-2014. Administering institution: Burnet Institute.
Leder K. 2011-2014. Administering institution: Monash University.
O’Keeffe M. 2011-2014. Administering institution: Burnet Institute.
Urquhart D. 2011-2014. Administering institution: Monash University.
Wluka A. 2009-2012. Administering institution: Monash University.

Early Career Fellowships (previously Training Fellowships)

Abbott A. 2008-2012. Administering institution: Baker IDI.
Ahimastos A. 2007-2011. Administering institution: Monash University.
Audsley J. 2009-2013. Administering institution: Monash University.
Bilardi J. 2011-2014. Administering institution: Monash University.
Carrington M. 2008-2011. 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. 2009-2012. Administering institution: Baker IDI.
Driscoll A. 2009-2012. Administering institution: Monash University.
Enticott P. 2009-2012. Administering institution: Monash University.
Evans SM. 2008-2011. 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.
Gurvich C. 2009-2012. Administering institution: Monash University.
Fu Y. 2010-2011. Administering institution: Baker IDI.
Hanna F. 2007-2012. Administering institution: Baker IDI.
Hoy K. 2009-2012. Administering institution: Monash University.
Kammoun H. 2010-2011. Administering institution: Baker IDI.
Keegel T. 2009-2012. Administering institution: Monash University.
Lim M. 2009-2012. Administering institution: Burnet Institute.
Lundie R. 2011-2012. Administering institution: Burnet Institute.
Lynch B. 2010-2014. Administering institution: Baker IDI.
McNamara B. 2010-2014. Administering institution: Baker IDI.
McKenzie D. 2009-2012. Administering institution: Monash University.
Ng T. 2011-2014. Administering institution: Baker IDI.
O’Connor D. 2010-2013. Administering institution: Monash University.
Peleg AY. 2010-2013. Administering institution: Monash University.
Smith MZ. 2008-2013. Administering institution: Monash University.
Thompson K. 2007-2011. Administering institution: Alfred Health.
Watson A. 2008-2013. Administering institution: Baker IDI.
Wong C. 2008-2011. Administering institution: Baker IDI.
Wright E. 2011-2014. Administering institution: Burnet Institute.
Zatta A. 2010-2013. Administering institution: Monash University.

Other Australian Grants

Arthritis Australia – Fellowships

Wang Y. Identification of novel risk factors for hip osteoarthritis. 2011. Administering institution: Monash University.

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: \$1,331,750. Administering institution: Burnet Institute.

Toole M. Tingim Laip project, Papua New Guinea. 2007-2011: \$10,239,816. Administering institution: Burnet Institute.

AusAID – Development Research Awards

Power R. Investigating the role of drug and alcohol use in the spread of HIV and other STIs in the Pacific. 2007-2011: \$181,252. Administering institution: Burnet Institute.

Toole M. Modelling sexual and social networks of urban men who have sex with men and women in Vietnam and the Lao PDR. 2008-2011: \$763,442. Administering institution: Burnet Institute.

AusAID – NGO Cooperation Program Innovations Fund

Whitney R. Health across African Borders: improving the health of women and children along the Mozambique-Zimbabwe border. 2010-2011: \$150,000. Administering institution: Burnet Institute.

AusAID – NGO Project Grants

Drenkhan G, Asproloupos D, Tennent M. Cyclone Nargis relief – local resource centre for community based responses, Myanmar (Burma). 2008-2011: \$1,680,561. Administering institution: Burnet Institute.

Dorning K. Periodic Fund for Humanitarian Assistance to Burma (PFHAB). 2011: \$50,478. Administering institution: Burnet Institute.

Holmes W. Women’s and Children’s Health Knowledge Hub. 2008-2011: \$5,059,161. 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. Australian partnerships with African communities. 2005-2011: \$3,245,227. 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. 2001-2011: \$2,672,450. Administering institution: Burnet Institute.

Australian and New Zealand College of Anaesthetists – Research Grants

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

Australian Centre for HIV and Hepatitis Virology – Project Grant

Elliott J, Cameron P, Peter K, Lewin S, Hoy J. Investigation of biological mechanisms linking abacavir use and cardiovascular disease using mRNA profiling. 2010-2011: \$135,000. Administering institution: Monash University.

Australian Government National Water Commission – Research Fellowship

O’Toole J. Water recycling: identifying data gaps and refining estimates of pathogen health risks. 2010-2011. Administering institution: Monash University.

Australian Primary Health Care Research Institute - Cross Boundary Primary Health Care Research

Clifton P, Sexton P, Shaw J, Matthews C. Will voluntary patient registration, performance incentives plus capitated payments to general practice for care for people with diabetes results in improved access, coordination and outcomes? 2011: \$149,164. Administering

institution: Baker IDI.

Australian Research Council – Discovery Grants

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.

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 institute: Monash University.

Mitchell C, McLean C. Regulation of neurite outgrowth by an inhibitor of PI3K signalling. 2011-2013: \$420,000. Administering institution: Monash University.

Pattison PE, Robins GL, McBryde E, Hellard M. The structure and dynamics of social contact for human disease transmission models. 2009-2012: \$550,000. Administering institution: University of Melbourne.

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.

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

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

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

Australian Research Council – Linkage Grants

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.

Manias E, Gerdtz M, Dooley M, Williams A. Examining the complexity of communication processes across transition points from the emergency department to improve medication safety. 2009-2011: \$65,000. Administering institution: University of Melbourne.

Oldenburg BF, Lin V, Joyce C, Eagar K, Dugdale P, Segal L, Mutch AJ, Hartz Karp JF, Gericke CA, Tennant MJ, O'Donoghue R, Panter D. Citizen engagement: listening to citizen's view about Australia's health system and prevention. 2009-2011: \$250,000. Administering institution: Monash University.

Peeters A, de Courten M, Bilsborough SA. Global corporate challenge evaluation - evaluation of a low-cost, low-impact physical-activity workplace intervention. 2009-2011: \$113,000. 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.

Australia Stem Cell Centre – Program Grant

Elliott D, Kaye D, Pouton C, Elefany A. Stem cell derived cardiomyocytes: tools for investigating cardiac disease. 2010-2011: \$820,000. Administering institution: Monash University.

beyondblue Victorian Centre of Excellence in Depression and Related Disorders – Research Grant

O'Donnell M, Creamer M, Bryant R, Ellen S, Holmes A, Kossmann T, Judson R. Telephone-administered early psychological intervention for depression and anxiety following serious injury. 2009-2011: \$300,000. Administering institution: Australian Centre for Posttraumatic Mental Health.

BUPA Health Foundation – Project Grants

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

Davis SR, Bell RJ. Metformin for the management of insulin resistance in overweight women at midlife. 2010-2011: \$158,611. 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 – Grants-in-Aid

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

Liu JP. Investigating the control mechanisms of telomere maintenance in cancer: a new interaction between telomerase and GAPDH. 2009-2011: \$300,000. Administering institution: Monash University.

Slape C, Curtis D, Janes S. Molecular analysis of myelodysplasia in the Nup98HoxD13 mouse model. 2009-2011: \$300,000. Administering institution: Monash University.

Wright MD. The role of tetraspanin in cellular immunity. 2009-2011: \$294,800. 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

O'Hehir RE, Rolland JM, Mackay F, Hardy C. Follistatin therapy for cystic fibrosis and other lung inflammatory disorders. 2011: \$60,000. Administering institution: Monash University.

O'Keefe M. Dendritic cell populations of human bone marrow. 2011: \$27,500. Administering institution: Burnet Institute.

Siebel A. Novel metabolic actions of HDL-cholesterol with therapeutic potential for diabetes. 2011: \$55,000. Administering institution: Baker IDI.

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). 2010-2011: \$115,009. 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). 2010-2011: \$107,019. Administering institution: University of New South Wales.

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

Sim M, Blackman J, Kelsall H. Sequelae of psychiatric conditions and multisymptom illness. 2009-2011: \$1,223,463. Administering institution: Monash University.

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

Department of Health (Victorian Government)

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.

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: The Alfred.

Department of Innovation, Industry, Science and Research (Victorian Government) – International Science Linkages Competitive Grant

Hagemeyer C, Peter K. Novel antibody-targeted nanoparticles for magnetic resonance imaging of atherosclerosis. 2009-2011: \$392,673. Administering institution: Baker IDI.

Diabetes Australia Research Trust – Research Grants

Allen T, Jandeleit-Dahm K. Novel role for the angiotensin AT2 receptor and AT1P in diabetic atherosclerosis. 2011: \$58,972. Administering institution: Baker IDI

Bach L. The role of ezrin in podocyte damage caused by advanced glycation end-products. 2011: \$60,000. Administering institution: Monash University.

Bruce C, Febbraio M. Hepatic lipid secretion in obesity and insulin resistance. 2011: \$60,000. Administering institution: Baker IDI.

McMullen J, Bernardo B, Febbraio M. Targeting novel regulators of physiological heart growth to improve function of the diabetic heart. 2011: \$60,000. Administering institution: Baker IDI.

Ritchie R, Davidoff A. A new link between altered glucose handling and impaired myocardial function in the diabetic heart. 2011: \$60,000. 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.

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: \$95,239. Administering institution: Monash University.

Guthridge M. New approaches to targeting the survival of AML cells. 2011: \$99,736. Administering institution: Monash University.

McCormack M, Slape C. Targeting stem cells that cause T-cell leukaemia. 2011: \$100,000. Administering institution: Monash University.

Wei A, Mitchell C. Defining the role of phosphoinositides in acute leukaemia. 2011: \$100,000. Administering institution: Monash University.

Motor Neuron Disease Research Institute of Australia – Research Grant

McLean C. Motor Neuron Disease research brain bank. 2011: \$10,000. Administering institution: The Alfred.

National Heart Foundation of Australia – Career Development Fellowship

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.

Du XJ, Zhang Y. Chronic b-AR stimulation activates NADPH oxidase/p-38 MAPK signal pathway in heart failure. 2010-2011: \$129,000. Administering institution: Baker IDI.

El-Osta A, Thomas M, Tikellis C. Understanding glucose induced gene regulatory events associated with hyperglycaemic memory in

endothelial cells. 2010-2011: \$129,000. Administering institution: Baker IDI.

Hagemeyer C. Novel single-chain antibody targeted virus particles for genetic transfer of fusion proteins to inhibit atherosclerosis. 2010-2011: \$129,000. Administering institution: Baker IDI.

Jandeleit-Dahm K, Schmidt H, de Haan J, Winkler K. Nox isoforms in diabetic micro-and macrovascular complications. 2010-2011: \$129,000. 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. 2009-2012. Administering institution: Baker IDI.

National Heart Foundation of Australia – Postdoctoral Fellowships

Brown A. Outlining the burden and correlates of heart failure and vascular risk in Aboriginal people in central Australia: the Heart of the Heart Study. 2009-2011. Administering institution: Baker IDI.

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. 2010-2011. Administering institution: Baker IDI.

Rajapakse N. Renal L-arginine transport mechanisms in hypertension. 2011-2012. Administering institution: Baker IDI.

Ta H. Novel contrast nanoparticles for early diagnosis of vascular disease using magnetic resonance imaging, computed tomography and synchrotron-based imaging. 2010-2011. Administering institution: Baker IDI.

Thorp A. Can reducing workplace sedentary time improve cardio-metabolic health? 2011-2012. Administering institution: Baker IDI.

Venardos K. Mitochondrial L-arginine transport and its role in the pathogenesis of heart failure. 2010-2011. Administering institution: Baker IDI.

Pfizer – Cardiovascular Lipid Research Grants

Htun N. Monomeric C-reactive protein as pathogenic factor and therapeutic target in atherothrombotic disease. 2011: \$49,500. Administering institution: Baker IDI.

Ling LH. Examination of left ventricular systolic and diastolic reserve in patients with lone paroxysmal and persistent atrial fibrillation. 2011: \$50,000. Administering institution: Baker IDI.

Stub D. Investigating a novel treatment paradigm to manage refractory out of hospital cardiac arrest. 2011: \$48,500. Administering institution: Baker IDI.

Pfizer – Neuroscience Research Grants

Chang C, Lewin SR, Elliott J, French M, Moosa Y. Immunopathogenesis of cryptococcal meningitis and paradoxical cryptococcal meningitis immune restoration disease in persons living with HIV – comparison of immune responses in the central nervous system and blood compartments. 2011: \$33,000. Administering institution: Monash University.

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: \$75,000. 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.

Cameron P, Gabbe B, McNeil J. The operation and utilisation of the Victorian State Trauma Registry. 2009-2011: \$2,315,384. Administering institution: Monash University.

Cooper DJ, Rosenfeld J. Continuation of DECRA project. 2007-2011: \$566,373. Administering institution: The Alfred.

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.

Magliano D. Public Health. 2011-2012. Administering institution: Baker IDI.

Wei A. Clinical. 2011-2012. Administering institution: Monash University.

Victorian Cancer Agency – Research Grant

Spencer A. Epigenetics and cancer therapy. 2010-2012: \$512,280. Administering institution: The Alfred.

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 – Neurotrauma Fellowships

Bye N. 2009-2011. Administering institution: The Alfred.

Maller J. 2008-2011. Administering institution: Monash University.

Miller S. 2008-2011. Administering institution: Monash University.

Morganti-Kossmann C. 2008-2011. Administering institution: The Alfred.

Nichol A. 2009-2011. Administering institution: Monash University.

Yan E. 2009-2011. Administering institution: The Alfred.

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.

Cooper DJ, Rosenfeld J, Murry L. Multi-centre prospective randomised trial of early decompressive craniectomy in patients with severe traumatic brain injury (DECRA). 2008-2011: \$90,000. Administering institution: The Alfred.

Finfer S, Myburgh J, Cooper DJ, Higgins A. Normoglycaemia in intensive care traumatic brain injury (NICE TBI) study. 2008-2011: \$98,797. Administering institution: The Alfred.

Water Quality Research Australia and Smart Water Fund (Victoria Water Trust) – Research Grant

Sinclair M, Leder K, O'Toole J, Hamilton A, Halliwell D. Greywater use in the backyard: what are the health risks? 2010-2011: \$181,396. 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.

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

Mill AG. The contribution of the (pro)renin receptor to diabetic retinopathy. 2009-2011. Administering institution: Monash University.

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. 2009-2011: US\$500,000. Administering institution: Baker IDI.

Forbes J. Synergistic methods for mitochondrial rescue in diabetic nephropathy. 2010-2011: US\$500,000. Administering institution: Baker IDI.

Sakoda M. Diabetic nephropathy: role of renin-angiotensin system and memory. 2011-2013: US \$154,704. Administering institution: Baker IDI.

Leukaemia and Lymphoma Society – Specialised Centre of Research Program

Gerondakis S. Apoptosis in haematopoiesis. 2011: US\$81,312. Administering institution: Burnet Institute.

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.

Mak J. Elucidating the interplay of protease substrate recognition and drug resistance. 2010-2011: \$191,268. Administering institution: Burnet Institute.

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.

Tachedjian G. Development of dendrimer and combination microbicides. 2008-2011: US\$218,393. Administering institution: Burnet Institute.

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 2012

Program Grants (funding commencing in 2013)

Kaye D, Jennings G, Esler M, Dart AM, Kingwell B, Chin-Dusting J, Sviridov D. A program of translational cardiovascular medicine: identifying new targets for prevention and treatment. \$12,406,615. Administering institution: Baker IDI.

Centres of Research Excellence

Cooper DJ. Centre of Research Excellence for Patient Blood Management in Critical Illness and Trauma. \$2,498,407. Administering institution: Monash University.

Stewart S. Centre of Research Excellence to Reduce Inequality in Heart Disease. \$2,493,649. Administering institution: Baker IDI.

NHMRC-European Union Collaborative Research Grants

Jowett J. Identification of epigenetic markers underlying increased risk of T2D in South Asians. \$218,078. Administering institution: Baker IDI.

Project Grants

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

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

Bellomo R. The Australasian Resuscitation in Sepsis Evaluation – Randomised Controlled Trial – continuation funding request. \$349,790. Administering institution: Monash University.

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

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

Bruce C, Lee-Young R. Sphingosine kinase: a target for obesity-induced insulin resistance. \$533,675. Administering institution: Baker IDI.

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

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 M, El-Osta A, Jandeleit-Dahm K. Role of Set7 in diabetes related end-organ injury. \$864,770. Administering institution: Baker IDI.

Degenhardt L. Pharmaceutical opioid prescription for chronic pain in Australia: trajectories of prescribing, risk of adverse events, and predictors of harm. \$1,041,601. Administering institution: Burnet Institute.

Drummer H. Roles of the hepatitis C virus glycoprotein E2 variable regions in virus entry, immunogenicity and immune evasion. \$659,685. Administering institution: Burnet Institute.

El-Osta A, Du XJ. Regulating gene expression changes in cardiac hypertrophy. \$667,350. Administering institution: Baker IDI.

Fisher J. A brief couple-focused psychoeducational intervention to prevent postnatal mental health problems in women: a cluster randomised trial. \$679,499. 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. \$151,755. Administering institution: Monash University.

Glass D. Immunological and respiratory effects among workers exposed to engineered nanoparticles. \$499,222. Administering institution: Monash University.

Gerondakis S. The NF- κ B transcription factors c-Rel and RelA control multiple steps in natural CD4 regulatory T cell development. \$548,005. Administering institution: Burnet Institute.

Gorry P. Elucidating unique molecular mechanisms involved in HIV-1 subtype C pathogenicity. \$686,365. Administering institution: Burnet Institute.

Guthridge M. Dual inhibition of independent cell survival pathways as a new approach for targeting leukaemic stem cells. \$543,675. 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. \$518,675. Administering institution: Baker IDI.

Jackson S. Investigation of a new leukocyte recruitment mechanism at sites of vascular injury. \$528,675. Administering institution: Monash University.

Jane S. A novel genetic element controlling adult haemoglobin production. \$477,260. Administering institution: Monash University.

Jane S. Identification of critical factors for the establishment and maintenance of the epidermal barrier. \$648,675. Administering institution: Monash University.

Jowett J, Blangero J. Genetics to function: identifying transcripts mediating the biological effects of GWAS SNPs. \$423,579. Administering institution: Baker IDI.

Jowett J, Blangero J, Nyholt D. Exome sequencing by NGS to identify rare variants affecting Type 2 diabetes. \$553,510. Administering institution: Baker IDI.

Lewin S. Liver disease in HIV-HBV co-infection. \$682,330. Administering institution: Monash University.

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. \$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. \$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. \$341,175. 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. \$384,002. Administering institution: Baker IDI.

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. \$847,185. Administering institution: Baker IDI.

Nichol A. A multi-centre RCT of an open lung strategy including permissive hypercapnia, alveolar recruitment and low airway pressure in patients with ARDS. \$997,535. Administering institution: Monash University.

O'Hehir R. Impaired respiratory tolerance in obesity – the link with asthma? \$644,685. Administering institution: Monash University.

Oldenburg B. A prospective cohort study investigating the relationships between negative emotions, biomarkers and long term functioning in post-MI patients. \$851,071. Administering institution: Monash University.

Peeters A. Predicting the impact of current obesity and diabetes trends on future prevalence of cardiovascular disease in Australia. \$217,430. 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. \$553,510. Administering institution: Baker IDI.

Ponsford J. Efficacy of melatonin for sleep disturbance following traumatic brain injury. \$217,407. Administering institution: Monash University.

Porello E. Regulation of mammalian heart regeneration by the miR-15 family. \$421,175. Administering institution: Baker IDI.

Schlaich M, Lambert G. Renal denervation for uncontrolled hypertension. \$2,073,675. Administering institution: Baker IDI.

Schoenwaelder S. Investigating the contribution of distinct mitochondrial cell death pathways to platelet survival and function. \$613,375. Administering institution: Monash University.

Stoové M. 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. \$956,019. Administering institution: Burnet Institute.

Storey E. The SNORE-ASA study: a study of neurocognitive outcomes, radiological and retinal effects of aspirin in sleep apnoea. \$850,000. Administering institution: Monash University.

Sviridov D, Bukrinsky M, Slobedman B, Mukhamedova N. ABCA1 – an intersection between infection, atherosclerosis and metabolic disorders. \$631,671. Administering institution: Baker IDI.

Sviridov D, Smyth I, Jowett J, Fu Y, Kelsell D. ABCA12 – a new regulator of cellular lipid metabolism. \$699,685. Administering institution: Baker IDI.

Tachedjian G. Lactic acid as a natural microbicide for HIV. \$577,350. Administering institution: Burnet Institute.

Taylor A. The role of diffuse myocardial fibrosis in myocardial stiffness. \$479,940. Administering institution: Baker IDI.

Teede H. Preventing weight gain in young to mid-aged women living in rural communities: a cluster randomised controlled trial. \$863,888. Administering institution: Monash University.

Thomas M, Tikellis C. Exploring the therapeutic potential of TRAIL in diabetes and the metabolic syndrome. \$431,250. Administering institution: Baker IDI.

Urquhart D. 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. \$296,155. Administering institution: Monash University.

Wright M. The role of the tetraspanins CD37 and CD82 in leukocyte migration. \$358,510. Administering institution: Monash University.

Woodcock E, Iismaa S. Identification of novel targets for treatment of heart failure. \$470,286. Administering institution: Baker IDI.

Development Grants

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

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

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

Research Fellowships

Clifton P. PRF. 2012-2016. Administering institution: Baker IDI.

Febbraio M. SPRF. 2012-2016. Administering institution: Baker IDI.

Mackay F. SRF-B. 2012-2016. Administering institution: Monash University.

Practitioner Fellowships

Gruen R. PF1. 2012-2016. Administering institution: Monash University.

Kistler P. PF1. 2012-2016. Administering institution: Baker IDI.

Krum H. PF1. 2012-2016. Administering institution: Monash University.

Career Development Fellowships

Carrington M. NHMRC/PHCRED Level 1 Population Health. 2012-2015. Administering institution: Baker IDI.

Weller C. NHMRC/PHCRED Level 1 Population Health. 2012-2015. Administering institution: Monash University.

Early Career Fellowships

Binger K. 2012-2015. Administering institution: Baker IDI.

Elliott J. 2012-2015. Administering institution: Monash University.

Hodgson C. 2012-2015. Administering institution: Monash University.

Panjari M. 2012-2015. Administering institution: Monash University.

Richards J. 2012-2015. Administering institution: Burnet Institute.

Ta H. 2012-2015. Administering institution: Baker IDI.

Postgraduate Degrees Completed and Passed 2011



PhD

Abdullah A. Decentralised health planning and resources allocation (case study in Indonesia). Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Ademi Z. Efficacy and benefits of treatment in the Second National Australian Blood Pressure Study (ANBP2). Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Al-Tamimi M. Platelet receptor shedding – platelet specific collagen receptor glycoprotein VI. Monash University. *Department of Immunology, Monash / Australian Centre for Blood Diseases, Monash.*

Bayles R. Examination of the noradrenaline transporter in major depressive disorder: delineating mechanisms of cardiac risk. Deakin University. *Department of Cardiovascular Medicine, Alfred / Baker IDI.*

Beauchamp A. Socioeconomic status as a determinant of cardiovascular disease in the Melbourne Collaborative Cohort study. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Bennett C. The impact of environmental exposures to particulate air pollution on respiratory health. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Berry P. The role of lifestyle factors on hip cartilage volume and rate of cartilage loss in a normal community-based population a longitudinal study. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Department of Rheumatology, Alfred.*

Bingham G. Identifying susceptible critically ill patients who desaturate following hyperbaric treatment: their characteristics and outcomes. La Trobe University. *Nursing, Alfred / Hyperbaric Service, Alfred.*

Bohensky M. Using routine hospital data to measure and improve the quality of patient care. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Botlero R. Investigating women's health issues: urinary incontinence and lower back pain. Monash University. *Women's Health Program, Monash / Department of Rheumatology, Alfred / Department of Medicine, Monash.*

Brennan SL. How does bone metabolism affect knee cartilage in healthy women? Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Department of Rheumatology, Alfred.*

Chellapah J. Surveillance and modification cardiovascular risk factors in children and young adults. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Chen YCB. Targeting stem cell to the sites of endothelial damage and atherosclerotic lesions. Monash University. *Department of Medicine, Monash / Baker IDI.*

Cowley D. Molecular studies of the astrocyte reservoir of HIV-1 in the central nervous system. Monash University. *Department of Medicine, Monash / Burnet.*

D'Arcy C. The role of FHL proteins in the pathology of muscular dystrophies: identification of novel therapeutic targets. Monash University. *Department of Anatomical Pathology, Alfred.*

Dean J. Thiol disulfide exchange in HCV glycoproteins E1 and E2. Monash University. *Burnet.*

Evans V. Dendritic cells and their role in HIV-1 pathogenesis. Monash University. *Infectious Diseases Unit, Alfred / Department of Medicine, Monash / Burnet.*

Fethers K. The epidemiology of bacterial vaginosis in Australian women. University of Melbourne. *Melbourne Sexual Health Centre, Alfred.*

Fitzgibbon B. Synaesthesia for pain in phantom limb patients. Monash University. *Monash Alfred Psychiatry Research Centre.*

Flynn J. Stimulation and maintenance of T cell responses in acute HCV infection. Monash University. *Department of Immunology, Monash / Burnet.*

Giummarra M. Phantom limb phenomena: unity of body and self. Monash University. *Rehab, Aged and Community Care, Alfred.*

Goeman D. Improving the quality and content of General Practice consultations for people with asthma. Monash University. *Department of Allergy, Immunology and Respiratory Medicine, Alfred / Department of Medicine, Monash.*

Gold J. The medium and the message: an investigation of how youth access, interpret and implement sexual health information. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Burnet.*

Gorzin A. The role of the NS2 protein in the hepatitis C virus life cycle. Monash University. *Burnet.*

Gouklani H. Functional interactions of the structural and non-structural proteins of HCV. Monash University. *Burnet.*

Harcourt B. Interactions between receptors for advanced glycation end products and estrogen substrates in Type 2 diabetes and its complications. Monash University. *Department of Immunology, Monash / Baker IDI.*

Hawkes D. Rearrangement of the virion plasma membrane in HIV-1. Monash University. *Burnet.*

Iser D. Interactions between HIV and hepatitis B virus. University of Melbourne. *Infectious Diseases Unit, Alfred / Burnet.*

Jeavons T. Fungal exposure and asthma. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Keating C. Neuroendocrine mechanisms in mental illness. Monash University. *Monash Alfred Psychiatry Research Centre.*

Lai ZW. Characterisation of ectodomain shedding of angiotensin-converting enzyme 2. Monash University. *Australian Centre for Blood Diseases, Monash.*

Liu Y. Macrophage migration inhibitory factor: pathological and therapeutic significance in cardiac ischemic injury. Monash University. *Department of Medicine, Monash / Baker IDI.*

McCaffrey K. Characterisation of a novel HCV vaccine candidate. University of Melbourne. *Burnet.*

McKenzie J. Methodological issues in meta-analysis of randomised controlled trials with continuous outcomes. Monash University. *Australasian Cochrane Centre, Monash.*

Medi C. Atrial remodelling in pulmonary and systemic hypertension. University of Melbourne. *Department of Cardiovascular Medicine, Alfred.*

Monaghan K. Microenvironmental factors impacting on multiple myeloma drug resistance. Monash University. *Australian Centre for Blood Diseases, Monash.*

Nataraj S. Bioethics and HIV interventions. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Nicholls H. The role of FAT/CD36 in fatty acid induced macrophage inflammation and obesity induced insulin resistance. Monash University. *Baker IDI.*

Paszek J. The functional significance of SMA for the origin of tics in Gilles de la Tourette syndrome. Heinrich Heine University, Dusseldorf, Germany. *Monash Alfred Psychiatry Research Centre.*

Peyton P. The effect of V/Q inhomogeneity on the second gas effect during anaesthesia. University of Melbourne. *Department of Allergy, Immunology and Respiratory Medicine, Alfred.*

Pritchett S. Processed EEG monitor development in anaesthesia. Monash University. *Department of Anaesthesia and Perioperative Medicine, Alfred.*

Rajasuriar R. Biological determinants of immune reconstitution. Monash University. *Infectious Diseases Unit, Alfred / Department of Medicine, Monash / Burnet.*

Selathurai A. CD4+ CD25+ T cells regulating atherosclerosis: mechanisms and therapeutic targets. Monash University. *Department of Cardiovascular Medicine, Alfred / Baker IDI.*

Soh S-E. Health-related quality of life of Australians with Parkinson's disease. University of Melbourne. *Department of Physiotherapy, Alfred.*

Teh A. Electrical and structural changes associated with atrial fibrillation. University of Melbourne. *Department of Cardiovascular Medicine, Alfred.*

Thallas-Bonke V. Advanced glycation end products by protein kinase C dependent pathways play a role in diabetic vascular complications. University of Melbourne. *Baker IDI / Department of Endocrinology and Diabetes, Alfred.*

To YYK. The mechanisms of action and suppression of natural killer T cells in atherosclerosis. Monash University. *Department of Immunology, Monash / Baker IDI / Department of Cardiovascular Medicine, Alfred.*

Tran L. Therapeutic targeting of signalling pathways in cardiovascular disease. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Clinical Pharmacology Unit, Alfred.*

Walker J. Chlamydia incidence and re-infection rates: a longitudinal study of young Australian women. University of Melbourne. *Melbourne Sexual Health Centre, Alfred.*

Weller C. Chronic wounds: outcomes for people attending specialist wound clinics. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Wright E. Neuropathogenesis of HIV dementia. Monash University. *Infectious Diseases Unit, Alfred / Department of Medicine, Monash / Burnet.*

Yang E. Targeting oncoproteins by combined immunotherapy for breast and prostate cancer. University of Melbourne. *Burnet.*

Other Doctorates

Andrews S. Mirror neuron system in schizophrenia. Doctor of Psychology, Monash University. *Monash Alfred Psychiatry Research Centre.*

For a list of all current postgraduate students, go to www.amrep.org.au

High Impact Publications 2011



*2010 impact factors > 7.000

ORIGINAL RESEARCH ARTICLES

Cooper DJ, Rosenfeld JV, Murray L, Arabi YM, Davies AR, D'Urso P, Kossmann T, Ponsford J, Seppelt I, Reilly P, Wolfe R; DECRA Trial Investigators; Australian and New Zealand Intensive Care Society Clinical Trials Group. Decompressive craniectomy in diffuse traumatic brain injury. *N Engl J Med* 2011;364(16):1493-502. [IF: 53.484]

O'Connor CM, Starling RC, Hernandez AF, Armstrong PW, Dickstein K, Hasselblad V, Heizer GM, Komajda M, Massie BM, McMurray JJ, Nieminen MS, Reist CJ, Rouleau JL, Swedberg K, Adams KF Jr, Anker SD, Atar D, Battler A, Botero R, Bohidar NR, Butler J, Clausell N, Corbalán R, Costanzo MR, Dahlstrom U, Deckelbaum LI, Diaz R, Dunlap ME, Ezekowitz JA, Feldman D, Felker GM, Fonarow GC, Gennevois D, Gottlieb SS, Hill JA, Hollander JE, Howlett JG, Hudson MP, Kociol RD, Krum H, Laucevicius A, Levy WC, Méndez GF, Metra M, Mittal S, Oh BH, Pereira NL, Ponikowski P, Tang WH, Tanomsup S, Teerlink JR, Triposkiadis F, Troughton RW, Voors AA, Whellan DJ, Zannad F, Califf RM. Effect of nesiritide in patients with acute decompensated heart failure. *N Engl J Med* 2011;365(1):32-43. [IF: 53.484]

PROTECT Investigators for the Canadian Critical Care Trials Group and the Australian and New Zealand Intensive Care Society Clinical Trials Group, Cook D, Meade M, Guyatt G, Walter S, Heels-Ansdell D, Warkentin TE, Zytaruk N, Crowther M, Geerts W, Cooper DJ, Vallance S, Qushmaq I, Rocha M, Berwanger O, Vlahakis NE. Dalteparin versus unfractionated heparin in critically ill patients. *N Engl J Med* 2011;364(14):1305-14. [IF: 53.484]

Slamon D, Eiermann W, Robert N, Pienkowski T, Martin M, Press M, Mackey J, Glaspy J, Chan A, Pawlicki M, Pinter T, Valero V, Liu MC, Sauter G, von Minckwitz G, Visco F, Bee V, Buyse M, Bendahmane B, Tabah-Fisch I, Lindsay MA, Riva A, Crown J; Breast Cancer International Research Group. Adjuvant trastuzumab in HER2-positive breast cancer. *N Engl J Med* 2011;365(14):1273-83. [IF: 53.484]

Zannad F, McMurray JJ, Krum H, van Veldhuisen DJ, Swedberg K, Shi H, Vincent J, Pocock SJ, Pitt B; EMPHASIS-HF Study Group. Eplerenone in patients with systolic heart failure and mild symptoms. *N Engl J Med* 2011;364(1):11-21. [IF: 53.484]

Zeuzem S, Andreone P, Pol S, Lawitz E, Diago M, Roberts S, Focaccia R, Younossi Z, Foster GR, Horban A, Ferenci P, Nevens F, Müllhaupt B, Pockros P, Terg R, Shouval D, van Hoek B, Weiland O, Van Heeswijk R, De Meyer S, Luo D, Boogaerts G, Polo R, Picchio G, Beumont M; REALIZE Study Team. Telaprevir for retreatment of HCV infection. *N Engl J Med* 2011;364(25):2417-28. [IF: 53.484]

Höglinger GU, Melhem NM, Dickson DW, Sleiman PM, Wang LS, Klei L, Rademakers R, de Silva R, Litvan I, Riley DE, van Swieten JC, Heutink P, Wszolek ZK, Uitti RJ, Vandrovcova J, Hurtig HI, Gross RG, Maetzler W, Goldwurm S, Tolosa E, Borroni B, Pastor P; PSP Genetics Study Group, Cantwell LB, Han MR, Dillman A, van der Brug MP, Gibbs JR, Cookson MR, Hernandez DG, Singleton AB,

Farrer MJ, Yu CE, Golbe LI, Revesz T, Hardy J, Lees AJ, Devlin B, Hakonarson H, Müller U, Schellenberg GD. Identification of common variants influencing risk of the tauopathy progressive supranuclear palsy. *Nat Genet* 2011;43(7):699-705. [IF: 36.377]

Kooner JS, Saleheen D, Sim X, Sehmi J, Zhang W, Frossard P, Been LF, Chia KS, Dimas AS, Hassanali N, Jafar T, Jowett JB, Li X, Radha V, Rees SD, Takeuchi F, Young R, Aung T, Basit A, Chidambaram M, Das D, Grundberg E, Hedman AK, Hydrie ZI, Islam M, Khor CC, Kowlessur S, Kristensen MM, Liju S, Lim WY, Matthews DR, Liu J, Morris AP, Nica AC, Pinidiyapathirage JM, Prokopenko I, Rasheed A, Samuel M, Shah N, Shera AS, Small KS, Suo C, Wickremasinghe AR, Wong TY, Yang M, Zhang F; DIAGRAM; MuTHER, Abecasis GR, Barnett AH, Caulfield M, Deloukas P, Frayling TM, Froguel P, Kato N, Katulanda P, Kelly MA, Liang J, Mohan V, Sanghera DK, Scott J, Seielstad M, Zimmet PZ, Elliott P, Teo YY, McCarthy MI, Danesh J, Tai ES, Chambers JC. Genome-wide association study in individuals of South Asian ancestry identifies six new type 2 diabetes susceptibility loci. *Nat Genet* 2011;43(10):984-9. [IF: 36.377]

Danaei G, Finucane MM, Lu Y, Singh GM, Cowan MJ, Paciorek CJ, Lin JK, Farzadfar F, Khang YH, Stevens GA, Rao M, Ali MK, Riley LM, Robinson CA, Magliano D; Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group (Blood Glucose). National, regional, and global trends in fasting plasma glucose and diabetes prevalence since 1980: systematic analysis of health examination surveys and epidemiological studies with 370 country-years and 2.7 million participants. *Lancet* 2011;378(9785):31-40. [IF: 33.633]

Emerging Risk Factors Collaboration, Wormser D, Kaptoge S, Di Angelantonio E, Wood AM, Pennells L, Thompson A, Sarwar N, Kizer JR, Lawlor DA, Nordestgaard BG, Ridker P, Salomaa V, Stevens J, Woodward M, Sattar N, Collins R, Thompson SG, Whitlock G, Danesh J. Separate and combined associations of body-mass index and abdominal adiposity with cardiovascular disease: collaborative analysis of 58 prospective studies. *Lancet* 2011;377(9771):1085-95. [IF: 33.633]

Farzadfar F, Finucane MM, Danaei G, Pelizzari PM, Cowan MJ, Paciorek CJ, Singh GM, Lin JK, Stevens GA, Riley LM, Magliano D; Global Burden of Metabolic Risk Factors of Chronic Diseases Collaborating Group (Cholesterol). National, regional, and global trends in serum total cholesterol since 1980: systematic analysis of health examination surveys and epidemiological studies with 321 country-years and 3.0 million participants. *Lancet* 2011;377(9765):578-86. [IF: 33.633]

Ferreira MA, Matheson MC, Duffy DL, Marks GB, Hui J, Le Souëf P, Danoy P, Baltic S, Nyholt DR, Jenkins M, Hayden C, Willemsen G, Ang W, Kuokkanen M, Beilby J, Cheah F, de Geus EJ, Ramasamy A, Vedantam S, Salomaa V, Madden PA, Heath AC, Hopper JL, Visscher PM, Musk B, Leeder SR, Jarvelin MR, Pennell C, Boomsma DI, Hirschhorn JN, Walters H, Martin NG, James A, Jones G, Abramson MJ, Robertson CF, Dharmage SC, Brown MA, Montgomery GW, Thompson PJ; Australian Asthma Genetics Consortium. Identification of IL6R and chromosome 11q13.5 as risk

loci for asthma. *Lancet* 2011;378(9795):1006-14. [IF: 33.633]

Than M, Cullen L, Reid CM, Lim SH, Aldous S, Ardagh MW, Peacock WF, Parsonage WA, Ho HF, Ko HF, Kasliwal RR, Bansal M, Soerianata S, Hu D, Ding R, Hua Q, Seok-Min K, Sritara P, Sae-Lee R, Chiu TF, Tsai KC, Chu FY, Chen WK, Chang WH, Flaws DF, George PM, Richards AM. A 2-h diagnostic protocol to assess patients with chest pain symptoms in the Asia-Pacific region (ASPECT): a prospective observational validation study. *Lancet* 2011;377(9771):1077-84. [IF: 33.633]

Darido C, Georgy SR, Wilanowski T, Dworkin S, Auden A, Zhao Q, Rank G, Srivastava S, Finlay MJ, Papenfuss AT, Pandolfi PP, Pearson RB, Jane SM. Targeting of the tumor suppressor GRHL3 by a miR-21-dependent proto-oncogenic network results in PTEN loss and tumorigenesis. *Cancer Cell* 2011;20(5):635-48. [IF: 26.925]

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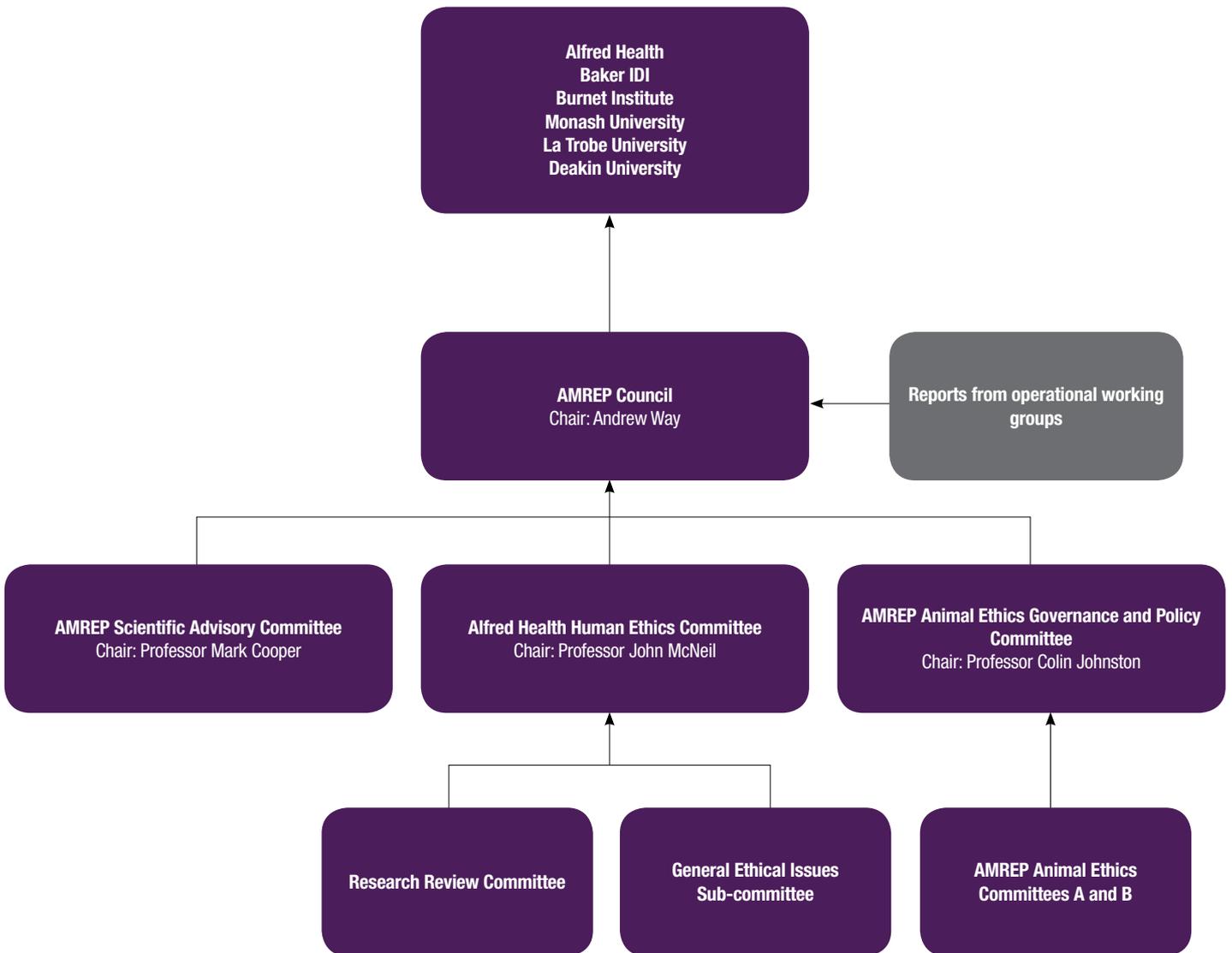
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