

2014

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.

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Professor Brendan Crabb AC

**Director and CEO,
Burnet Institute**

Chair, AMREP Council

I am delighted to present the AMREP Research Report for 2014, which reflects the significant research contribution AMREP partners make to the health of our region.

The past year has seen closer collaborative research activities across the precinct, and in a major boost, the bringing to fruition of the Monash Partners Advanced Health Research and Translation Centre (AHRTC). The announcement of Monash Partners as being officially recognised by the NHMRC as one of only four AHRTCs in Australia is an acknowledgement of the high calibre of our translational research, clinical practice and the education provided by all members of the partnership. It is also a reflection of the significant impact we can make through a collaborative approach to improving health outcomes for all Australians and more broadly. I look forward to seeing the benefits of this new partnership being effectively translated into tangible health benefits.

All AMREP partners continue to operate in an increasingly tight financial environment at both State and Federal Government level. Our need to identify additional sources of funding has never been so great, with increased reliance on philanthropy to initiate new programs of research and to fund the purchase of equipment. We await the progress of legislation through Parliament, which paves the way for the long-awaited Medical Research Future Fund (MRFF). Once passed, the MRFF will provide a significant boost to the level of grant funding, critical to the on-going sustainability of research across the country. AMREP partners together with the MRFF Action Group and other peak bodies continue to lobby our parliamentarians to help passage of the Bill.

Research at AMREP continues to deliver significant translational outcomes for the benefit of all. Over the past year, we have seen progress in the development of vaccines for malaria and hepatitis C, advances in new rapid diagnostic technologies, new approaches to clinical practice and patient care, and greater collaborations aimed at improving the health of indigenous Australians just to name a few. Our research has far reaching impact and we should be justifiably proud of the difference we make in people's lives.

I would like to take this opportunity to thank Director of Baker IDI, Professor Garry Jennings AO, for his very significant contributions to AMREP over his 14-year term as Director. During his directorship, Professor Jennings cemented Baker IDI's reputation as an international leader in cardiovascular and diabetes research, translation, education, advocacy and health promotion and helped build a strong AMREP partnership.

We welcome incoming Director of Baker IDI, Professor Thomas Marwick, who has been appointed effective from January 2016. A clinician researcher of international standing, Professor Marwick brings a clear understanding of the Australian research and clinical environment, an excellent record of leading research and attracting significant investment, substantive experience in institutional leadership and a deep commitment to translational research with direct relevance for health outcomes.

With great sadness I acknowledge the passing of former Burnet Institute Chair Alastair Lucas AO who, over 12 years, played a major role in the development of Burnet Institute both as an independent medical research institute and non-government organisation, and as a major contributor to AMREP. He was instrumental in taking Burnet from a relatively small research institute to the organisation and AMREP partner it is today. Alastair was a passionate and tireless campaigner for medical research, founding Chair of the MRFF Action Group and board member of Research Australia.

Contents

AMREP Highlights 2014/2015	2
Research Outputs	4
Human Ethics and Research Governance	6
Animal Ethics	7
Baker IDI Heart and Diabetes Institute	8
Nucleus Network	14
Burnet Institute	16
Monash School of Public Health and Preventive Medicine	22
Epidemiology and Preventive Medicine	23
Centre for Obesity Research and Education	24
Rheumatology (Musculoskeletal Epidemiology)	25
Monash Central Clinical School	26
Australian Centre for Blood Diseases	27
Division of Clinical Sciences	29
Immunology	33
Infectious Diseases	35
Psychiatry	37
Sexual Health	39
Alfred Health	40
Allergy, Immunology and Respiratory Medicine	41
Allied Health	43
Anatomical Pathology	47
Burns	48
Cardiothoracic Surgery	49
Cardiovascular Medicine	50
Clinical Pharmacology	52
Diagnostic and Interventional Radiology	53
Emergency and Trauma	54
Endocrinology and Diabetes	55
Gastroenterology	56
General Surgery	57
Intensive Care and Hyperbaric Medicine	58
Medical Oncology	59
Melanoma Service	60
Neurosurgery	61
Nuclear Medicine	62
Nursing Services	63
Orthopaedic Surgery	64
Pathology Services	65
Pharmacy	66
Radiation Oncology	67
Rehabilitation, Aged and Community Care	68
Renal Medicine	70
Major Grants	72
Doctoral Degrees Completed and Passed	84
High Impact Publications	86
AMREP Committee Membership	91

AMREP Highlights 2014/2015

NHMRC Recognition of Monash Partners Academic Health Science Centre

The Alfred Health and Monash Health and Partners Advanced Health Research Translation Centre, also known as Monash Partners Academic Health Science Centre, was one of four Australian health centres recognised by the National Health and Medical Research Council (NHMRC) as being amongst the world's best for using medical research to improve patient care.

The Minister for Health, the Hon. Sussan Ley MP, announced all four as the first ever NHMRC Advanced Health Research and Translation Centres, following assessment by an international panel of experts. The NHMRC received 12 submissions following its call for applications in 2014. The innovative program has been well received by leaders in the health system.

The four successful centres are:

- Alfred Health and Monash Health and Partners Advanced Health Research and Translation Centre
- Melbourne Health Care Partners Advanced Health Research and Translation Centre
- South Australian Advanced Health Research and Translation Centre
- Sydney Health Partners Advanced Health Research and Translation Centre.

NHMRC Funding Success

AMREP researchers were awarded \$55 million in new NHMRC grants in the 2014 funding round including:

- A Program Grant (\$5.6 million) led by Professor Henry Krum, Monash School of Public Health and Preventive Medicine (SPHPM), for a program of 'Novel approaches to the prevention and treatment of chronic heart disease and its co-morbid complications';
- A Centre of Research Excellence (CRE) (\$2.5 million) led by Professor Mark Cooper, Baker IDI, for the 'JDRF/NHMRC Diabetes Complications Centre of Research Excellence';
- Thirty-four Project Grants totalling \$31.6 million;
- Eleven Research Fellowships;
- Two Practitioner Fellowships;
- Four Career Development Fellowships;
- Ten Early Career Fellowships;
- Six Postgraduate Scholarships.

Further details are on page 82 of this report.

AMREP Scientists Inducted into Australian Academy of Health and Medical Sciences

Fourteen of AMREP's senior scientists were among 116 Australians inducted into the new Australian Academy of Health and Medical Sciences in 2014 in recognition of their leadership in health and medical research:

- Professor Rinaldo Bellomo (Monash University)
- Professor Brendan Crabb AC (Burnet Institute)
- Professor Jamie Cooper (The Alfred / Monash University)
- Professor Mark Cooper (Baker IDI)
- Professor Suzanne Crowe AM (Burnet Institute)
- Professor David Kaye (Baker IDI)
- Professor Bronwyn Kingwell (Baker IDI)
- Professor Stephen Jane (Monash University)

- Professor Garry Jennings AO (Baker IDI)
- Professor Paul Myles (The Alfred / Monash University)
- Professor Robyn O'Hehir (The Alfred / Monash University)
- Professor Jeffrey Rosenfeld AM OBE (Monash University)
- Associate Professor Jonathan Shaw (Baker IDI)
- Professor John Zalcberg OAM (Monash University)

Professor Suzanne Crowe AM, who is an Associate Director of Clinical Research at the Burnet Institute, an NHMRC Principal Research Fellow, Principal Specialist in Infectious Diseases at The Alfred hospital and Professor of Medicine and Infectious Diseases at Monash University, was inducted into the Australian Academy of Medical Sciences in 2014.



The academy was established to promote health and medical research and provide independent advice to government, industry and the community on issues relating to evidence-based medical practice and research in Australia.

Centre for Eye Research at AMREP

Thirty five research staff from the Centre for Eye Research Australia (CERA) will relocate to premises on the sixth floor of Baker IDI by July 2015. CERA is the pre-eminent eye research institute in Australia and is a designated World Health Organisation Collaborating Centre for the Prevention of Blindness. CERA focuses on the major blinding eye diseases, age-related macular degeneration, glaucoma and diabetic retinopathy.

Monash-Led Hazelwood Coal Mine Fire Health Study

Monash researchers were awarded a \$26 million Victorian Department of Health tender to lead a long-term study examining the health impacts of the 2014 Hazelwood coal mine fire. The long-term 20 year study, which commenced in 2015, is being led by Monash SPHPM's Professor Michael Abramson, in collaboration with researchers from Monash University's School of Rural Health, Federation University, University of Tasmania, CSIRO and the University of Adelaide.

The study aims to investigate the long-term impact of exposure to emissions from the Hazelwood coal mine fire by providing information on potential health effects including respiratory and cardiovascular conditions, cancer, causes of death, child development and psychological outcomes, as well as broader community health outcomes.



Investigators of the Hazelwood Health Study (L to R): Professor Pamela Wood (Federation University), Associate Professor Darryl Maybery (Monash School of Rural Health (SRH)), Dr Martine Dennekamp (Monash School of Public Health and Preventive Medicine (SPHPM)), Professor Michael Abramson (Monash SPHPM), Professor Judi Walker (Monash SRH), Dr Matthew Carroll (Monash SRH) and Dr Phillip Thompson (Monash, Interim Project Manager). In Absentia: Professor Malcolm Sim (Monash SPHPM).

AMREP Highlights 2014/2015

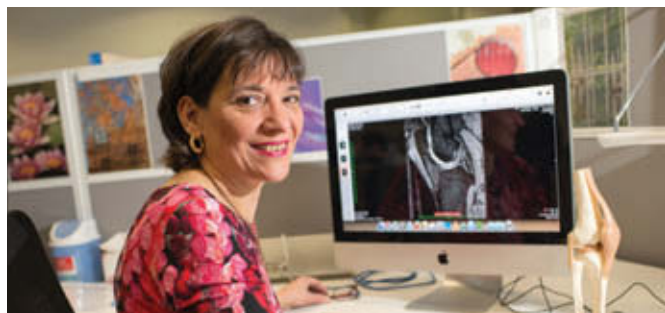
Australia Day Honours

Professor Brendan Crabb, Director of the Burnet Institute, was appointed Companion of the Order of Australia (AC) in the 2015 Australia Day Honours for eminent service to medical science as a prominent researcher of infectious diseases, particularly malaria, and their impact on population health in developing nations, as an advocate, mentor and administrator, and through fostering medical research nationally and internationally.

Professor Stephen Bernard, from The Alfred Intensive Care Unit and Monash SPHPM, was awarded the Ambulance Service Medal for his pivotal role in driving a quality, evidence-based approach to patient care in a career spanning more than 20 years as a Medical Adviser with Ambulance Victoria.

Other Awards and Honours

- Professor John McNeil AM (Head of Monash SPHPM) was honoured for his career contribution to Monash University by being appointed as a Sir John Monash Distinguished Professor.
- Professor Sharon Lewin (Alfred Infectious Diseases Department) was named 2014 Melburnian of the Year and won the 2014 Hadassah Australia Tikken Olam Award for a prominent Australian who has made a contribution to society and health globally.
- Professor Flavia Cicuttini (Monash SPHPM) was awarded the Australian Rheumatology Association President's Prize for collaborative research with Professor Graeme Jones from the University of Tasmania. This triennial prize recognises collaborative research endeavours within Australia and is awarded based upon the research group's body of published work in a specific area of research.



Professor Flavia Cicuttini, who heads Musculoskeletal Epidemiology for the Monash Department of Epidemiology and Preventive Medicine as well as the Rheumatology Department at Alfred Health, was awarded the Australian Rheumatology Association (ARA) President's Prize at the 56th ARA Annual Scientific Meeting.

- Professor Jayashri Kulkarni (Monash Alfred Psychiatry Research Centre) was honoured by the City of Melbourne with the 2014 Melbourne Award for Contribution to Community by an Individual.
- Dr Jacqueline Boyle, from Monash SPHPM, and Professor Christina Mitchell, Dean of the Faculty of Medicine, Nursing and Health Sciences and AMREP Council member, were inducted into the Victorian Honour Roll of Women. The Roll acknowledges and pays tribute to women from across Victoria who have succeeded through vision, leadership, commitment and hard work.
- Alfred Health was named the gold winner of the Excellence in Quality Healthcare Award in the 2014 Victorian Public Health Care Awards in recognition of the Intensive Care Unit's

work in developing the rapid deployment of extra-corporeal membrane oxygenation treatment (ECMO) for patients in cardiac arrest. The ECMO program has resulted in a 40% survival rate among a group of patients who previously had close to 100% mortality.



L:R: Director of Alfred ICU Professor Carlos Scheinkestel, Alfred Health Board Chair Helen Shardy and ICU Intensivists Dr Vince Pellegrino and Professor Stephen Bernard accept the 2014 Public Health Care Gold Award from The Hon David Davis MP (far right), Minister for Health, in recognition of Alfred Health's new program for the rapid deployment of extracorporeal membrane oxygenation for the treatment of cardiac patients in cardiac arrest.

New Appointments

Professor Harshal Nandurkar has taken up the position of Director of the Australian Centre for Blood Diseases (ACBD) following the retirement of Professor Hatem Salem.

Professor Anton Peleg has been appointed as Head of The Alfred Department of Infectious Diseases.

Professor Thomas Marwick has been appointed as the Director of Baker IDI Heart and Diabetes Institute and will take up the position in January 2016. Professor Marwick is currently director of the Menzies Research Institute, University of Tasmania. He will succeed Professor Garry Jennings AO who has led Baker IDI Heart and Diabetes Institute for the past fourteen years.

Professor Sharon Lewin, formerly Director of The Alfred Department of Infectious Diseases and Co-Head of the Burnet Institute's Centre for Biomedical Research, left AMREP in September 2014 to take up the position of inaugural Director of the Doherty Institute for Infection and Immunity at the University of Melbourne.

Professor Fabienne Mackay, Head of the Monash Department of Immunology, has been appointed as inaugural Head of the new School of Biomedical Sciences in the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne. Fabienne will take up her new position in August 2015.

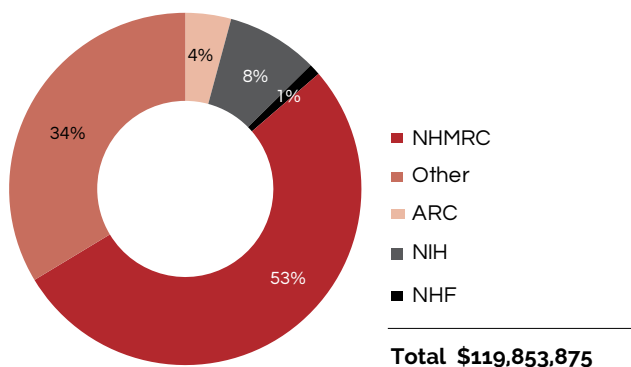
Research Poster Display and Research Day

The 2014 Alfred Week Research Poster Display showcased 183 research posters from across AMREP. Generous prizes were awarded for the posters judged to be the best in their category.

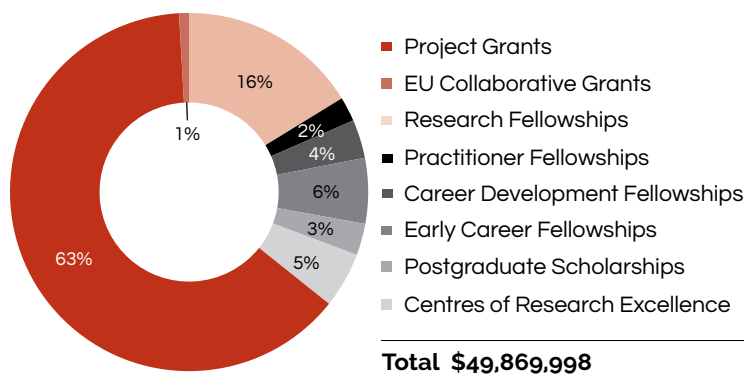
Research Day, held during Alfred Week, featured a keynote address by Professor Garry Jennings AO titled 'Hearts, Minds and Research at AMREP'. Following his address, Professor Jennings presented the AMREP Research Prize. The AMREP Research Prize is awarded annually for the highest impact original clinical and basic science research articles published by AMREP researchers in the previous calendar year.

Research Outputs

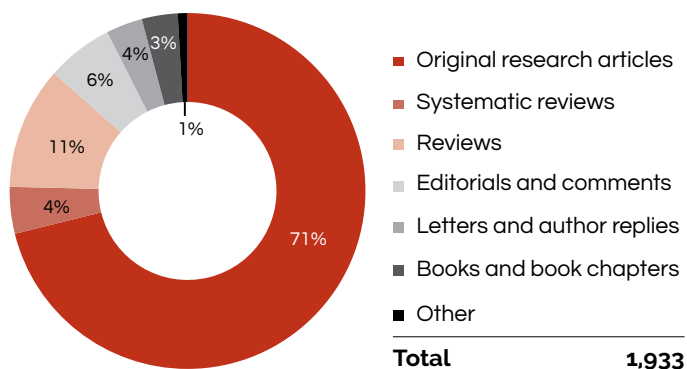
External funding received 2014



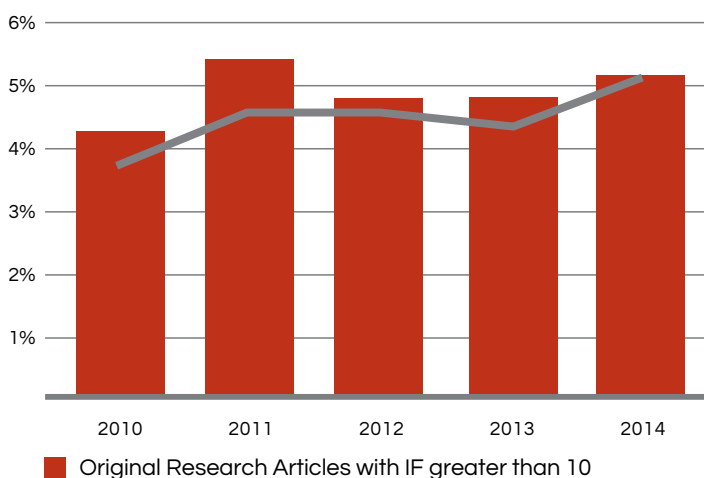
New NHMRC funding commencing in 2015



Publications 2014



High impact factor original research articles



For a list of high-impact factor (IF) publications by AMREP staff in 2014, see page 86 of this report.

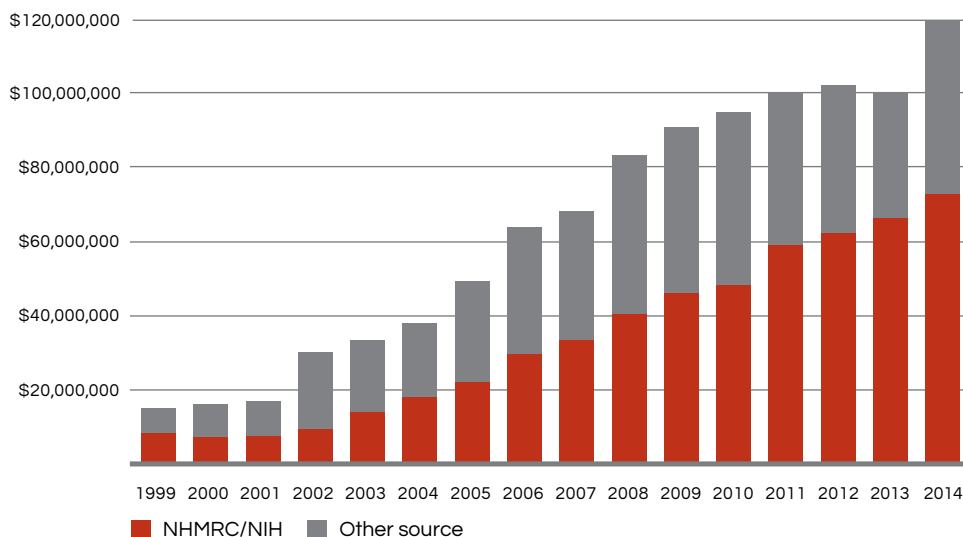
Higher degree completions 2014

67 Doctoral completions
152 Masters completions

In 2014, there were 438 current PhD students and 27 other doctoral students at AMREP.

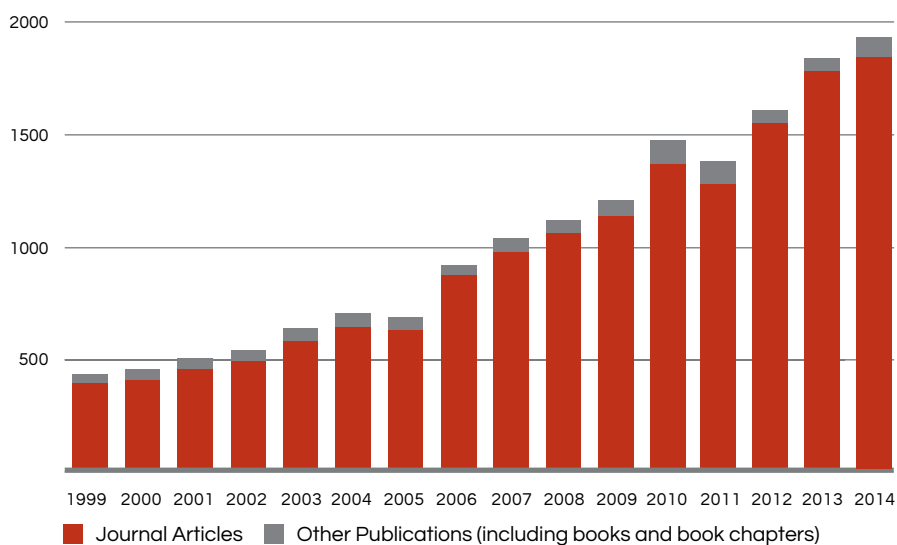
For a list of Doctoral degrees completed and passed in 2014, see page 84 of this report.

External research funding received



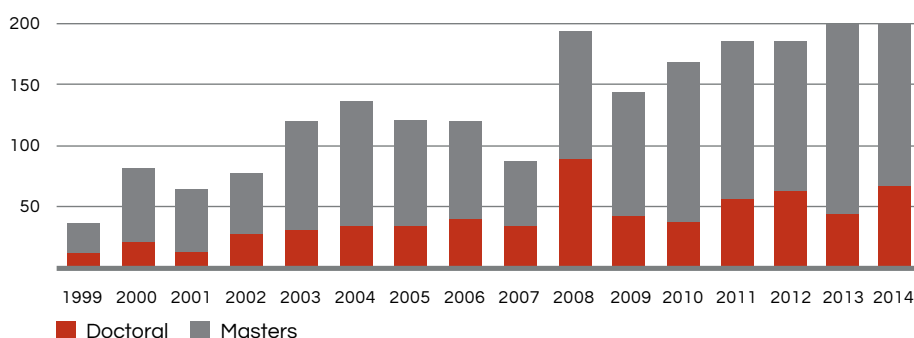
External research funding refers to competitive peer reviewed grants from schemes offered by funding bodies such as NHMRC, National Heart Foundation and NIH or government grants (e.g. Department of Human Services), industry and university grants. Funds received from commercially sponsored clinical trials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

Publications



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

Completed and passed higher degrees



Masters include course work and research degrees.

Human Ethics and Research Governance

Professor John McNeil AM
Chair, Alfred Hospital Ethics Committee

www.alfredresearch.org

Alfred Hospital Ethics Committee

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

Applications

In 2014, the Alfred HREC received 284 research projects for review, comprising 129 health and social sciences applications, and 155 drugs and interventions applications. A further 278 'low risk' applications were received that did not require review by the full HREC.

Multicentre Research

The streamlined processes for reviewing Australian multi-centre projects have been in operation for over four years, and most projects reviewed are commercially sponsored clinical trials. Much human research, including university research, is still submitted to each individual HREC for approval, although plans are afoot to include those in the streamlined programs. In 2014, 22 applications were submitted to the Ethics Committee for review under the streamlined process. A further 26 projects were authorised for commencement at Alfred Health after review by another HREC.

Ethics Research Database

Launched in April 2014, the online ethics application management system, ERA (Ethics Research Administration), allows the Ethics Committee to conduct reviews online with virtually paperless meetings. Researchers find the new platform simple to use, with the ability to directly submit applications and conduct subsequent communication via ERA. A second phase is being developed to manage post-approval documents, including project amendments, reporting of adverse events and submission of progress reports.

Research Governance at AMREP

Each AMREP partner is expected to have a research governance framework to ensure proper conduct of human research under its auspices. *The Australian Code for the Responsible Conduct of Research* outlines requirements for institutions and researchers.

In addition, introduction of streamlined processes have highlighted the importance of paying attention to the appropriateness of research department processes for proper research conduct, since research at a particular site might have been approved by an external HREC. Usually local HRECs have knowledge of their own institutions and take that knowledge into account in their decision-making.

Audits conducted at Alfred Health monitor research progress and facilitate an educative process allowing researchers to communicate face-to-face with the Research Governance Officer.

The General Ethical Issues Sub-committee

The General Ethical Issues Sub-committee (GEI S-C), which meets bi-monthly, considers general ethical matters of relevance to the main Ethics Committee, Alfred Health, AMREP partners, the research community and the general public. Members are selected from the main Alfred Hospital Ethics Committee, experts from within Alfred Health and AMREP, and external members with specific expertise (e.g. legal, regulatory, ethical and community expertise). The Sub-committee provides a discussion forum, develops guidance documents to assist with ethical decision making and ethical research practice, and contributes to public consultations conducted by the NHMRC and others.

Discussion Topics in 2014

Public Consultations

- NHMRC targeted consultation: Return of Results from 'Omics'-based Research and Clinical Practice (Dec 2013)
- NHMRC Public Consultation: Principles for the translation of 'omics'-based tests from discovery to health care (June 2014)
- NHMRC Public Consultation: Draft Statement on Consumer Involvement in Health and Medical Research (August 2014)
- NHMRC Consultation: Human Research Application Form (Consultation 1 – Structure and Content of the Form) (July 2014)

Review of Ethics Committee Guidelines and Processes

- Interaction between Ethics Committee and Clinical Innovations Committee
- Implications on ethics application and review process of the revision of the National Statement's guidance on human biospecimens in laboratory-based research
- Impact and implications of changes (effective 12 March 2014) to the *Privacy Act (1988)* on ethics application and review process

Discussion and Guidance on Research Ethics

- Use of social media platforms for research participant recruitment
- Issues relating to the governance of clinical quality registries
- Proposal for a simplified participant information and consent form

Ethical Opinion for Institution

- Comments on Alfred Health patient privacy brochure 'What happens to information about me?'

Animal Ethics

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

amrepaec.bakeridi.edu.au

AMREP Animal Ethics Committee

Two Animal Ethics Committees (AECs) are in operation at AMREP, with each committee meeting monthly. The AECs assess proposals for the use and breeding of animals for scientific purposes from Baker IDI Heart and Diabetes Institute, Monash University Central Clinical School, the Burnet Institute, The Alfred hospital and AMREP Animal Services. The AECs determine whether a proposal to use animals is justified on ethical grounds, and whether the welfare of the animals will be adequately protected. Modifications and other project-specific documentation relating to an approved project are reviewed by the AEC that reviewed the original application.

AEC Applications in 2014

The AMREP AECs reviewed a total of 101 new experimental proposals in 2014. A summary of applications in all categories is shown in the table below.

SUMMARY OF APPLICATIONS REVIEWED BY THE AMREP AEC IN 2014				
	Baker IDI Heart and Diabetes Institute	Monash Central Clinical School	Burnet Institute	Alfred Health
New experimental applications	68 (50)	29 (39)	2 (3)	2 (3)
Modifications to experimental applications	92 (95)	71 (63)	5 (10)	4 (0)
Tissue applications	8 (9)	2 (3)	0 (0)	0 (0)
Colony applications	20 (15)	75 (87)	1 (0)	0 (0)

In brackets: number of applications reviewed in 2013.

AMREP Animal Ethics Training

In 2014 four, two-hour training sessions were delivered to animal users at AMREP with presentations on topics including legislation, role of the AEC, AEC application forms, post-approval monitoring, annual reporting, record keeping, adverse events and animal care and monitoring.

In February 2015, an online training module was launched. Completion of the module is compulsory for all new staff as well as existing staff who did not attend any training sessions in 2014. Investigators who do not complete the training are unable to gain access to the animal facility or submit new applications to the AEC for review. The online training format has provided an efficient mechanism to deliver training more readily to a larger number of people.

In 2014 the AEC training sessions were attended by 240 researchers. Since its launch in February 2015 the online training module has been completed by a further 150 researchers.

AMREP Animal Ethics Governance and Policy Committee

The AMREP Animal Ethics Governance and Policy (GAP) Committee facilitates consistent operation across the two AMREP AECs in accordance with the *Australian Code for the Care and Use of Animals for Scientific Purposes 8th edition (2013)* (the Code) and the relevant Victorian Legislation.

The main responsibilities of the GAP committee are to:

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

Revised AEC Application Form

Following the initial launch of the new *EthicsAppOrder* AEC application platform in November 2013, some refinements were made to further improve and streamline the Word application form. The new version was released in February 2015 and has played an important part in improving the efficiency of the review process for both the AECs and the researchers.

Post-approval Monitoring of Project Compliance

In 2014 the Animal Ethics Officer conducted post-approval monitoring of six randomly selected animal ethics approved projects on behalf of the AECs. Project records were audited to check that animals issued to these projects had undergone procedures and monitoring in accordance with the AEC approvals. Reports were prepared for both the AECs and the investigators. Overall, the review process has proved to be an effective method of ensuring the AMREP institutions are meeting the requirements of the Code. The program will continue in 2015.

Baker IDI Heart and Diabetes Institute Research Programs and Domains

Director: Professor Garry Jennings AO

Five research Programs underpin Baker IDI's major scientific goals, each addressing a key question of interest.

Behavioural and Generational Change - Heads Prof. Neville Owen and Prof. Assam El-Osta

Lead Laboratory: Behavioural Epidemiology – N Owen

Metabolism and Inflammation - Head: Prof. Mark Febbraio

Lead Laboratory: Cellular and Molecular Metabolism – M Febbraio

Diabetic Complications - Head: Prof. Karin Jandeleit-Dahm

Lead Laboratory: Diabetes and Kidney Disease – K Jandeleit-Dahm

Atherothrombosis and Vascular - Head: Prof. Karlheinz Peter

Lead Laboratory: Atherothrombosis and Vascular – K Peter

Hypertension and Cardiac Disease - Head: Prof. David Kaye

Lead Laboratory: Heart Failure Research – D Kaye

Baker IDI's research Domains are built around the full range of life-stage disease themes encompassed by the Institute's science. Aboriginal Health is a key research focus. Each Domain comprises a group of laboratories.

Prevention

Head: Prof. Bronwyn Kingwell

Metabolic and Vascular Physiology – B Kingwell
Genomics and Systems Biology – K Bozaoglu
Metabolomics – P Meikle
Muscle Research and Therapeutics – P Gregorevic
Physical Activity – D Dunstan
Translational Metabolic Health - S Summers

Vascular Disease

Head: Prof. Jaye Chin-Dusting

Vascular Pharmacology – J Chin-Dusting
Computational Biology – R Lazarus
Lipoproteins and Atherosclerosis – D Sviridov
Vascular Biology and Atherosclerosis – A Bobik
Vascular Biotechnology – C Hagemeyer

Diabetes

Head: Prof. Mark Cooper

Molecular Group – M Cooper
Beta Cell Biology Group – R Shi
Biochemistry of Diabetic Complications – M Thomas
Diabetes and Atherosclerosis – T Allen
Human Epigenetics – A El-Osta
Epigenomic Medicine – T Karagiannis
Nutrition, Glycation and Metabolism – M Coughlan

Heart Disease and Neuroscience

Head: Prof. Geoff Head

Neuropharmacology – G Head
Cardiac Hypertrophy – J McMullen
Experimental Cardiology – X-J Du
Heart Failure Pharmacology – R Ritchie
Human Neurotransmitters – G Lambert
Molecular Cardiology – E Woodcock
Clinical Electrophysiology – P Kistler
Hypertension and Kidney Disease – M Schlaich

Cardiometabolic Risk

Head: Assoc. Prof. Jonathan Shaw

Clinical Diabetes – J Shaw
Clinical Obesity – J Dixon
Diabetes and Population Health – D Magliano
Obesity and Population Health – A Peeters

Aboriginal Health

Head: Prof. Sandra Eades

Indigenous Population Health Research – S Eades

Clinical Research Centre

Head: Prof. Graeme Maguire

Diabetes Clinics – N Cohen
Diabetes Education Group – M Mack
Clinical Imaging – A Taylor
Healthy Hearts Group – L Jenkins
Cardiovascular and Other Non-Diabetes Clinics – A Ellims
Sports Cardiology - A La Gerche
Healthy Lifestyle Research Centre

Baker IDI Heart and Diabetes Institute

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



Baker IDI Heart and Diabetes Institute is a world-renowned medical research facility, with a history spanning more than 89 years. 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 prevalent and complex diseases responsible for the most deaths and the highest costs in the world in terms of treatments and hospitalisation. The Institute aims to address the full spectrum of issues within its mission, from cell biology through to public health initiatives, and from early life to end stage chronic disease.

Our main laboratory facilities at AMREP are complemented by a research facility dedicated to Aboriginal health in Alice Springs and leading researchers based around the country.

New Science Strategy

In 2014, the Institute introduced an innovative science strategy that aims to accelerate areas of research excellence, encourage greater collaboration by breaking down silo structures and focus our work on translational outcomes. This approach was developed after an international Scientific Advisory Board visited the Institute in 2013 and recommended a model of collaborative Centres of Excellence rather than laboratories working in isolation. The institute's new approach combines a firm organisational structure to accommodate funding and line management (*Domains*) with a fluidity to pursue broad-based, multidisciplinary research (*Programs*). The Programs focus on peaks of excellence and ultimately, aim to deliver more breakthroughs across more areas of the institute's program.

Domains

The Baker IDI scientific Domains are based around seven themes as outlined below:

Prevention

Head: Professor Bronwyn Kingwell

Prevention is key to stemming the current burden of obesity, diabetes and cardiovascular disease. The Prevention domain seeks to slow ageing and prevent progression of these conditions by research informing primary prevention through physical activity, more accurate risk assessment, and early intervention strategies to limit/reverse disease progression. Approaches combine basic molecular studies, systems

biology, clinical physiology as well as epidemiological research across lipid and adipose biology, glucose metabolism and muscle function, and vascular function and cardiac metabolism.

Cardiometabolic Risk

Head: Associate Professor Jonathan Shaw

The Cardiometabolic Risk domain studies diabetes and obesity at the clinical and population levels to build evidence to support specific policy or practice approaches. The two main types of study are: large population-based studies in Australia and overseas, which provide insights into the causes and consequences of diabetes and obesity; and smaller studies which explore new therapies and optimisation of established therapies.

Aboriginal Health

Head: Professor Sandra Eades

Baker IDI's Aboriginal Health domain is a national program of research with the mission to improve the health of Aboriginal and Torres Strait Islander peoples, with a particular focus on the residents of Central Australia. With its main office located in Alice Springs and hubs in Melbourne and Sydney, the Aboriginal Health domain leads a number of research projects in close collaboration with community stakeholders across remote, regional and urban settings. Areas of research include clinical, population health, health services and global Indigenous health.



Head of Aboriginal Health, Professor Sandra Eades (L) with Senior Research Fellow Catherine Chamberlain (R).

Clinical Research

Head: Professor Graeme Maguire

The Clinical Research domain provides a focal point for all the institute's interests in human research and clinical service provision, including governance and planning of clinical trials, clinical service delivery through the Baker IDI clinics, and an increasing interest in diagnostic imaging including MRI, echocardiography and ultrasound.

Diabetes

Head: Professor Mark Cooper

The Diabetes domain encompasses basic, translational and clinical research in the field of diabetes with a particular interest in diabetic complications. The focus is on developing and refining novel pharmacological approaches to reduce the burden of diabetes and its complications.

Vascular Disease

Head: Professor Jaye Chin-Dusting

The Vascular Disease domain encompasses teams focused on understanding vascular disease pathologies from pre-symptomatic through to overt disease. The disease focus is dyslipidemia, hypertension, atherosclerosis and coronary artery disease, including the role of the immune cells (monocytes, B- and T-cells). It investigates questions of prevention, diagnosis, therapy and drug delivery.

Heart Disease and Neuroscience

Head: Professor Geoff Head

Heart disease encompasses a range of disorders including heart failure, coronary artery disease, myocardial infarction and arrhythmias. This domain combines a range of state-of-the-art cellular, tissue, animal and clinical studies to unravel the underlying mechanisms leading to heart disease, as well as investigating treatments and therapies. Laboratories focus on signalling pathways, mechanisms of cardiac remodelling in disease, new treatments for heart failure and genetic approaches. Importantly, this domain aims to unravel the psychological and nervous system mechanisms contributing to cardiovascular disease and hypertension.



Associate Professor Rebecca Ritchie, Head of the Heart Failure Pharmacology Group, within the Heart Disease and Neuroscience Domain.

Programs

The five programs are built around strengths identified in the International Scientific Advisory Board review, and focus on a series of specific questions that are the basis for Baker IDI's current work. The intention is that this focus will evolve over time with the institute's capacity and in response to results.

Behavioural and Generational Change

Heads: Professors Neville Owen and Assam El-Osta

What physical activity, diet and other behavioural patterns are optimal at different life stages for preventing diabetes and cardiovascular disease, and how can behavioural and generational change best be addressed?

Metabolism and Inflammation

Head: Professor Mark Febbraio

What is the role of inflammation in the initiation and progression of heart disease, diabetes, chronic kidney disease and heart failure?

Diabetic Complications

Head: Professor Karin Jandeleit-Dahm

How can we prevent the progression of diabetes to complications affecting arteries, the heart, the kidneys and the eyes?

Atherothrombosis and Vascular Disease

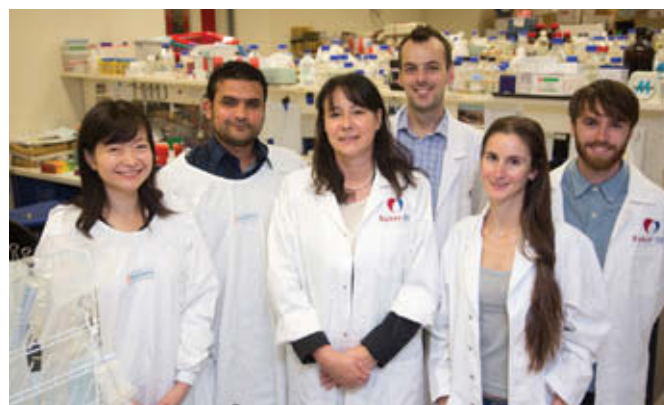
Head: Professor Karlheinz Peter

How can vulnerable plaque be identified and treated?

Hypertension and Heart Disease

Head: Professor David Kaye

How can we reverse chronic heart disease, and prevent and repair structural damage to the heart from hypertension, heart disease and associated rhythm disturbances?



Head of the Diabetic Complications Program, Professor Karin Jandeleit-Dahm (3rd left), with her research group.

Research Highlights

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. The Institute's work ranges from cellular and molecular biology in the laboratory, to clinical treatment services for patients through to lifestyle and behavioural research in the community. Highlights over the past year include a focus on disease and disease prevention in the following life stages:

Early Life

- Baker IDI Aboriginal Health is participating in the Pregnancy and Neonatal Diabetes Outcomes in Remote Australia (PANDORA) study. This study aims to improve outcomes for pregnant women with pre-existing diabetes and to reduce the risk of pregnant women and their infants in the Northern Territory from developing type 2 diabetes. In 2014, the project, which is led by Menzies School of Health Research, received more than \$2.29 million over five years in NHMRC funding.

- 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 techniques.

Childhood and Adolescence

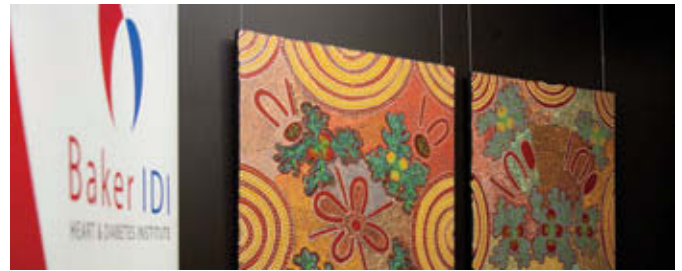
- Baker IDI researchers are collaborating on a study to determine if children identified with minor heart abnormalities are at greater risk of rheumatic heart disease or contracting acute rheumatic fever.
- Discovery that activation of Heat Shock Protein 72 with a small molecule activator improves glucose homeostasis in patients with type 2 diabetes.

Adults with Risk Factors

- Baker IDI worked with a publisher to produce a book explaining what blood pressure is and the implications of high blood pressure. *The Baker IDI Blood Pressure, Diet and Lifestyle Plan* provides information for the community about practical changes people can make to their lifestyle; it explores the medical aspects of blood pressure care and provides healthy recipes to maintain and improve health.
- A study led by Dr Evelyn Wong from the Obesity and Population Health unit found that being obese for longer during mid-life increases the risk of disability in later life. The study, published in *Obesity* in December 2014, was the first to demonstrate that duration of obesity increases the risk of disability over and above the BMI attained.
- An international team of investigators, headed by Dr Andrew Murphy, discovered that fat from obese mice and humans released a molecule called IL-1 β that travelled to the bone marrow stem cells to instruct them to increase the production of inflammatory cells. Using a drug under clinical evaluation to block IL-1 β , they were able to prevent the obesity-associated inflammation. They also found that weight loss in mice and humans resulted in a decrease in inflammatory cell production. This work, published in *Cell Metabolism* in May 2014, was cited in the top 10 discoveries in metabolism during the past 10 years by the journal.



Dr Andrew Murphy, Heart Foundation Future Leader Fellow, published a study in the journal *Cell Metabolism* in 2014, which was cited by the journal as one of the top ten discoveries in metabolism of the last ten years.



- Baker IDI hosted an educational symposium in Alice Springs in October 2014 for health professionals working in the area of the impact of chronic disease in Indigenous communities, particularly in remote settings. This symposium focused on cardiovascular disease, diabetes and related complications, and included workshops on Diabetes Education and Diabetes in Pregnancy aimed at building practical skills.
- Baker IDI researchers found that displaying calorie counts on menu boards at fast food outlets has little influence on the behaviour of poorer people. Danja Sarink reviewed 10 previous studies on the impact of menu labelling schemes on disadvantaged populations. She presented her findings at the European Congress on Obesity in Bulgaria in 2014.

Sub-clinical Organ Damage

- Professor Mark Cooper and colleagues will lead a new research centre to find better treatments and methods to prevent type 1 diabetes. The \$2.5m in funding for the NHMRC-JDRF Diabetes Complications Centre of Research Excellence was announced by the NHMRC in October 2014. The Centre aims to translate new experimental findings into strategies for the prevention, treatment and management of type 1 diabetes and its complications, as well as training clinical investigators in the field.
- Provided an important framework for HDAC inhibitor function in vascular biology and a comprehensive description of genome-wide deacetylation by pharmacological HDAC inhibition. This study was published in *Genome Research* in August 2014.

Clinical Complications

- Examined the data of nearly half a million patients in primary care from 2005 to 2013, which showed that most patients being treated for diabetes in general practice are not adequately controlled. However, there are positive trends showing some improvements in the last few years. The study results were released at the Australian Diabetes Society in Melbourne in August 2014.
- Found that renal denervation resulted in sustained lowering of blood pressure at three years in a selected population of subjects with severe, treatment-resistant hypertension without serious safety concerns. This study was published in the *European Heart Journal* in June 2014.
- Discovered that a small molecule, BGP-15, already in multi-centre human clinical trials for type 2 diabetes may be beneficial in treating heart failure and atrial fibrillation. The molecule was shown to significantly improve cardiac function and reduce arrhythmic episodes in pre-clinical trials. The study, by Professor Mark Febbraio and Associate Professor Julie McMullen, was published in *Nature Communications* in December 2014.
- Developed a potential new target called CDA1 for the treatment of renal fibrosis in people with diabetic and non-diabetic kidney disease. This work published in *Journal of American Society of Nephrology* has now led to a major program to identify inhibitors of this target as a strategy to reduce kidney scarring.

- A 13-year study of mortality trends of more than one million people with type 1 and type 2 diabetes has shown declining mortality rates. However, death rates in those with diabetes are still much higher than the general population, particularly for people with type 1 diabetes. Surprisingly, cancer is now emerging as one of the leading causes of death in those with diabetes. The research was published in *Diabetes Care* in June 2014.
- In research published in *Cell Metabolism*, PhD Candidate Michael Kraakman, Professor Mark Febbraio and team showed how a new drug effectively blocks inflammation without adverse metabolic side effects including high cholesterol, high blood lipids and weight gain. The drug is now in phase 2 clinical trials for people with rheumatoid arthritis.



Head of the Cardiometabolic Risk Domain and Clinical Diabetes Research Unit, Associate Professor Jonathan Shaw (L) and PhD student, Winda Liviya Ng (R).

- Found that type 1 and type 2 diabetes are associated with an excess risk of incidence and mortality for overall and a number of site-specific cancers, which is only partially explained by bias. In *Diabetes Care*, PhD candidate Jessica Harding and authors suggest that screening for cancers in diabetic patients is important.
- Identified that diffuse myocardial fibrosis, assessed by post-contrast myocardial T1 time, correlates with invasively-demonstrated LV stiffness in cardiac transplant recipients. In patients with increased diffuse myocardial fibrosis, abnormal passive ventricular stiffness is therefore likely to be a major contributor to diastolic dysfunction. This study was published in *Journal of the American College of Cardiology* in March 2014.



Acute Complications

- Demonstrated how inflammation is induced and localised in the body, and critically, provided new insight on how to detect and treat inflammation. Three studies led by Professor Karlheinz Peter, featured in articles published in *Circulation* in 2014, demonstrated how inflammation contributed to the damage in the heart in patients who suffered a heart attack. They also explained how obesity contributed to generalised inflammation, and thus increased cardiovascular risk in patients. The publications are the result of collaborations between Baker IDI scientists, researchers at the University of Freiburg in Germany and Harvard Medical School in the United States.
- Developed a new clot-busting drug that overcomes the risk of bleeding, a complication that prevents thousands of stroke and heart attack patients each year from receiving the potentially life-saving treatment. This study, by Dr Xiaowei Wang in collaboration with Professors Karlheinz Peter and Christoph Hagemeyer, was published in *Circulation Research* in February 2014.

Future Directions

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

Metabolomics

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 is allowing researchers to devise more effective prevention and treatments.

DNA and Blood Profiling

The establishment of this facility several years ago represents a major advance in personalised medicine. By more effectively understanding the role of epigenetics in human health and disease and the mechanisms by which epigenetic changes regulate gene expression, for example, our researchers aim to improve the diagnosis, treatment and care of patients in a more holistic manner.

Bioinformatics

An internal, web accessible analysis workbench called 'Galaxy' runs on dedicated hardware at Baker IDI, allowing scientists to use popular third party tools to study large data sets without needing to manage complex code. Galaxy supports transparent translational genomic and genetic research, and supports sharing of analyses and results among Baker IDI researchers.

The Healthy Lifestyle Research Centre

Australia's first Healthy Lifestyle Research Centre is enabling Baker IDI scientists to examine how genetic and environmental factors combine to influence body weight. This unique facility is helping to improve understanding of the effects of physical activity and nutrition for the prevention, management and treatment of obesity and its complications.

Specialist Diabetes Clinic

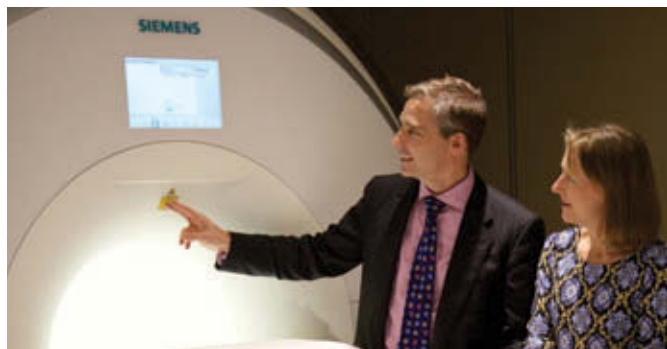
The Baker IDI Specialist Diabetes Clinic provides diabetes services in Melbourne's inner southeast and west, to communities in and around Alice Springs, and via a telehealth service in collaboration with the Royal Flying Doctors Service in Mildura. The combination of clinical services and research provides significant opportunities to link groundbreaking research with patient care.

Baker IDI's Aboriginal Health Program

Baker IDI's Aboriginal health program aims to address the profound disadvantage experienced by Aboriginal Australians and Torres Strait Islanders, and to build a long-term strategic platform for health and medical research in these communities. The Aboriginal Health program is continuing to expand and now supports four PhD students and seven postdoctoral researchers, including Aboriginal and Māori researchers.

Clinical Research Centre

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



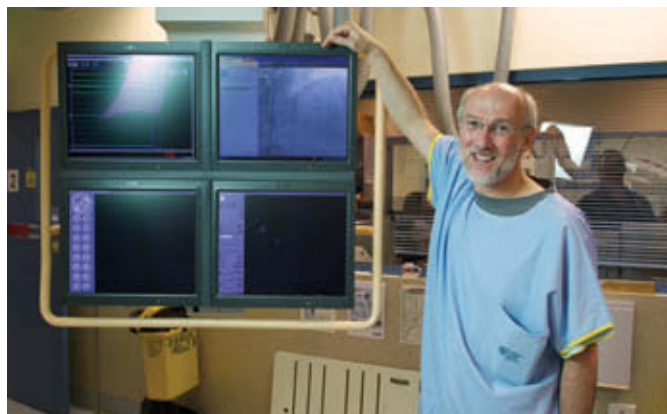
Associate Professor Andrew Taylor, Head of Clinical Imaging, studies cardiac fibrosis with the use of magnetic resonance imaging (MRI). Associate Professor Taylor (L) with Janet Russell (R) in the Institute's state-of-the-art MRI facility.

International Collaborations

Baker IDI has a long and proud history of international collaboration and this approach continues to underpin the institute's research agenda. A comprehensive overview of our programs is available in our latest annual reports at www.bakeridi.edu.au/Reports/.

Selected Awards

- Professor Garry Jennings AO, Baker IDI Director, was the recipient of the Björn Folkow Award in Athens in June 2014. This is the highest recognition from the European Society of Hypertension for original research in physiology that has contributed to understanding of the pathogenesis of hypertension.



Professor Karlheinz Peter, Head of the Atherothrombosis and Vascular Program, was awarded the 2014 RT Hall Prize by the Cardiac Society of Australia and New Zealand.

- Professor Karlheinz Peter, who heads the Atherothrombosis and Vascular Program, was awarded the 2014 RT Hall Prize by the Cardiac Society of Australia and New Zealand (CSANZ) during the World Congress of Cardiology in May 2014. This is the most esteemed research award by the CSANZ.
- Professor Geoff Head, leader of Baker IDI's Heart Disease Domain, received the inaugural International Society of Hypertension Paul Korner Award in Athens in June 2014.
- Professor Bronwyn Kingwell, who leads the Prevention Domain, was awarded the NHMRC Elizabeth Blackburn Fellowship - Clinical award in June 2014.
- Associate Professor Anna Peeters, head of the Obesity and Population Health Unit, received a 2014 Churchill Fellowship, which will enable her to travel to the United Kingdom, The Netherlands, and the United States to identify obesity prevention policies most likely to improve social inequalities in obesity.
- Professor Paul Zimmet AO, Director Emeritus, was the recipient of Diabetes Australia - Victoria's Outstanding Contribution Award in Diabetes.
- Noel Tresider, Occupational Health and Safety Chemical specialist, received a Lifetime Achievement Award from the International Occupational Hygiene Association.
- Elyse Di Marco, PhD candidate, was awarded the Australian Atherosclerosis Young Investigator Award.
- Dr Stephen Gray, Postdoctoral Fellow, was the recipient of the Australian Vascular Biology Society's Young Investigator Award.
- Professor Paul Nestel, a member of Baker IDI's Senior Faculty, was honoured at the 50th Anniversary Congress of the European Atherosclerosis Society in Madrid for substantial contributions to science and the Society's interests.
- Dr Xiaowei Wang was the recipient of the International Society for Heart Research's 2014 Postdoctoral Publication Prize and the National Association of Research 2014 Fellow Award.
- David White was the winner of the International Society for Heart Research Student Publication Prize.
- Professors Paul Zimmet, Mark Cooper and John Dixon were named in the top 10 global list of diabetes and bariatric experts by 'expertscape', while Professor Zimmet and Associate Professor Jonathan Shaw were two of seven Australians of 400 globally listed by Thomson Reuters as 'one of the world's most influential scientific minds (clinical medicine) in 2014'.



Head of the Prevention Domain and Metabolic and Vascular Physiology Laboratory, Professor Bronwyn Kingwell (L) and Postdoctoral Scientist, Dr Andrew Carey (R). Professor Kingwell and her team are studying how to harness the energy burning properties of brown fat in people to treat obesity.

Postgraduate Students

89 PhD Students

Publications

399 Journal Articles
11 Book Chapters



www.nucleusnetwork.com.au

Nucleus Network

Chief Executive Officer: Bev Thomas BPharm, PhD, MBA, GAICD

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

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

Phase 1 clinical trials, 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 those who need them most. The information collected from clinical trials monitors and protects the participants' health and also provides crucial information about the therapy under trial.



Volunteer trial participants in the Nucleus Network facility.



A volunteer trial participant is monitored in the Nucleus Network facility.

Highlights in 2014

- Over \$2 million of services, donations, education subsidies and contract work paid to AMREP members.
- Approximately \$12 million in direct export revenue generated for the Australian biopharmaceutical industry in addition to flow-on benefits for the industry and other economic sectors.
- Clients include international pharmaceutical and biotech companies from Australia, USA, France, New Zealand, China, India and the United Kingdom.
- More than 40 clinical trials conducted.
- Expansion of AMREP facility from 41 to 50 beds, including a 4-bed infusion suite for patient studies.
- Support of investigator-led studies in spinal cord injury patients and heart failure patients.
- Five direct student placements plus support provided to external researchers (including PhDs).



A volunteer trial participant has his blood pressure monitored by a Clinical Trial Research Nurse in the Nucleus Network facility.



Associate Professor Xiao-Jun Du (R), Head of Baker IDI's Experimental Cardiology Group, with PhD student My-Nhan Nguyen.



Associate Professor Heidi Drummer was appointed Deputy Head of Burnet's Centre for Biomedical Research in 2014.

Burnet Institute Centres and Working Groups

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

Centre for Biomedical Research

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

Anderson Laboratory
Diagnostics Development

Beeson Laboratory
Malaria Immunity & Vaccines

Caminschi Laboratory
Dendritic Cell Biology & Immunotherapy

Churchill Laboratory
HIV Neuropathogenesis

Crosby Laboratory
Hepatitis B Antivirals

Crowe Laboratory
International Clinical Research

Drummer/Poumbourios Laboratory
Viral Entry & Vaccines

iCRL
International Clinical Research Laboratory (HIV monitoring)

Gilson/Crabb Laboratory
Malaria Research

Gorry Laboratory
HIV Molecular Pathogenesis

Gugasyan Laboratory
Lymphocyte Biology

Hogarth Laboratory
Inflammation, Cancer & Infection

Jaworowski Laboratory
Infection, Inflammation & Innate Immunity

Lahoud Laboratory
Dendritic Cell Receptors

***Lewin Laboratory**
HIV & Hepatitis B

Ffrench Laboratory
Viral Immunology

Richards Laboratory
Malaria & Tropical Diseases

Fowkes Laboratory
Malaria & Infectious Diseases Epidemiology

O'Keeffe Laboratory
Dendritic Cell Research

Pietersz Laboratory
Bio-organic & Medicinal Chemistry

Ramslund Laboratory
Structural Immunology

Tachedjian Laboratory
Retroviral Biology & Antivirals

Tannock Laboratory
Influenza

Wright Group
HIV Prevention & Management of Infection

Gowans/Loveland Laboratory
Hepatitis C

Centre for Population Health

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

Malaria and Infectious Diseases Epidemiology: F Fowkes

Alcohol & Other Drugs: P Dietze & P Higgs

Justice Health: M Stoové

Viral Hepatitis: M Hellard

HIV: M Stoové

Sexual Health & Young People's Health: M Hellard & M Lim

Modelling & Biostatistics: E McBryde

Infectious Disease Surveillance: C El-Hayek

Centre for International Health

Head: Prof. Robert Power

International Operations: M Tennant

Infectious Disease & Harm Reduction: C Hughes

Women's & Children's Health: S Luchters

Education & Capacity Development: E Kennedy

* Professor Sharon Lewin headed the Centre for Biomedical Research until her departure from the Burnet Institute in September 2014. The Lewin Laboratory was active at the Burnet until September 2014.



Burnet Institute
Medical Research. Practical Action.

www.burnet.edu.au

Burnet Institute

Professor Brendan Crabb AC, BSc(Hons), PhD

Financially and programmatically it has been a strong year for the Burnet Institute. Our annual turnover exceeds \$42 million and our competitive funding from the NHMRC totalled \$7,829,044 in 2014, an increase of 10% on 2013. The number of peer-reviewed publications increased to 216, a new record for the Institute.

Innovation and translation are key elements of the Burnet Institute's research and public health activities, underpinning our strategies for achieving better health for poor and vulnerable communities.

Burnet is leading the sector in rapid diagnostic test development in Australia with tests for hepatitis E in production, a CD4 test for HIV diagnosis well into clinical trials, and a number of new tests in the pipeline including for syphilis and tuberculosis (TB). The Institute has established Nanjing BioPoint Diagnostic Technology in China and, with a Chinese venture capital partner, is well under way to developing additional diagnostic technologies, initially for liver disease and other significant diseases. Established on a sound financial footing through a Hong Kong-based holding company, BioPoint is now operating from new laboratories in Nanjing. It is our intention that BioPoint will become a leader in new technologies, which can be applied to regional health priorities.

Papua New Guinea (PNG) continues to be a significant focus of our work. With support from the Federal Government, Burnet Institute is supporting the RID-TB project in Western Province, where transmission of drug-resistant TB is on the rise. RID-TB involves implementing a patient-centred model of care and the strengthening of governance, infection control, and supply of quality medicines, laboratory services and information systems. Our Healthy Mothers, Healthy Babies research program aims to address the high mortality rate of mothers and their newborns during and after childbirth. Our home-based malaria management program is researching the feasibility and best approaches for bringing new rapid diagnostic tests and modern anti-malarial medicines to families in rural villages, through training community-based staff, and boosting the capacity of first-line health facilities.

We have been operating in Myanmar since 2003. Working with local community groups and with government, we continue to be a leader in developing creative local solutions to complex development issues such as HIV, women's and children's health, TB, enhancing education and health services to reduce harms associated with drug use, and strengthening the monastic school education program.



The Burnet Institute's mission is to achieve better health for poor and vulnerable communities in Australia and internationally through research, education and public health.

Healthy Mothers, Healthy Babies

The philanthropically-funded \$10 million Healthy Mothers, Healthy Babies program is a cross-institute initiative that involves strong collaborations with partners at the district, provincial and national level in PNG. More than 1,500 women die in childbirth in PNG every year, of which 98% would be preventable with better and faster access to health care. More than 5,000 newborns perish in their first month of life and 7,000 children do not reach their fifth birthday. Our innovative program seeks to identify the major causes of these deaths and develop and implement cost-effective strategies that will provide lifesaving health care.

The program addresses three major needs: developing and testing better ways to provide interventions of proven effectiveness to communities that currently lack access; defining the major disease burdens that contribute to maternal and infant mortality, such as anaemia, malaria, TB, sexually transmitted infections (STIs), malnutrition, and maternal complications of childbirth; and developing new and more effective interventions to improve maternal and child health.

Activities are now under way in Kokopo, East New Britain with the appointment of new research staff, the development of laboratory facilities, and the recruitment of 700 pregnant mothers into the program. Five separate but complementary studies will generate evidence that has immediate use in East New Britain to improve services, and that can inform future health policy in PNG and similar settings.



Blood and other samples from pregnant mothers and newborns are analysed in the new Healthy Mothers, Healthy Babies laboratory in Kokopo, East New Britain, Papua New Guinea.

Centre for Biomedical Research

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

Collaborative Research Programs

The innovative collaborative research programs (CRPs) feature across four major themes of the Centre's work:

- HIV and hepatitis;
- Malaria and tropical diseases;
- Vaccines, diagnostics and therapeutics;
- Immune function in health, ageing and disease.

The CRPs aim to maximise the Centre's research achievements and their translation into health improvements through enhancing interactions and sharing of knowledge and expertise between research groups. They also promote collaborations and partnerships across Burnet, strengthening the academic environment and research support for staff and students. Researchers in the Centre are also developing significant research projects in partnership with other Burnet Centres on infectious diseases including malaria, HIV, hepatitis C, and TB, and across the Institute's health themes of maternal and child health, diagnostics, vaccines, and sexual and reproductive health.

New Vaccine Development Strategy

Dendritic cells (DCs) are both the 'sentinels' and the 'generals' of the immune system, specialising in detecting invaders and actively orchestrating the impending immune response. Delivery of vaccines directly to DCs is a potentially powerful approach to generating immune responses that may protect against infections or fight cancer cells. This can be achieved using antibodies to a protein on the surface of DCs, known as Clec9A. However, different delivery mechanisms vary greatly in their capacity to induce immunity. We have identified attributes essential for vaccine efficacy and more importantly, we have also shown that our delivery system works in primates to induce potent immunity. Our findings support this vaccination approach in humans and offer important insights into vaccine design (Li J *et al.*, *Eur J Immunol* 2015).



Associate Professor Gilda Tachedjian (foreground), Head of the Retroviral Biology and Antivirals Group within Burnet's Centre for Biomedical Research.

Towards HIV Cure Strategies

CD4+ T-cells, a specific type of immune cell, are an important target for HIV infection, particularly central memory and the newly described stem memory T-cells (TSCMs), which have been demonstrated to be long-lived HIV reservoirs. We investigated which CD4+ T-cells were infected by HIV over a three year period in a unique cohort, and whether this changed during progression of HIV disease, or through changes in the expression of co-receptors (CCR5 or CXCR4), proteins used for HIV entry into cells. It was found that the newly described TSCM CD4+ T-cells were infected by HIV types (CCR5- and CXCR4-), highlighting the potential for TSCMs to serve as a long-lived viral reservoir. Targeting these T-cells will be important in future HIV cure strategies (Cashin K *et al.*, *Retrovirology* 2014).

HIV Infection and Immune Cell Energy

Immune cells take up low levels of glucose through a protein known as Glucose transporter 1 (Glut1). The glucose is broken down by a series of steps to produce pockets of energy to maintain the general wellbeing of the cells. In two related papers (Palmer CS *et al.*, *J Immunol* 2014; Palmer CS *et al.*, *AIDS* 2014), Dr Clovis Palmer and colleagues showed for the first time that HIV affects the way immune cells use energy. This causes deterioration of the immune system in persons with HIV infection, even if they are on anti-retroviral treatment and have undetectable viral loads.

Blocking Malaria's Protein Machinery

Malaria is caused by parasites that infect and destroy our red blood cells. To replicate rapidly and avoid the immune system, the parasites extensively renovate, or modify, red blood cells. The renovations are performed by parasite proteins exported into the blood cell, but how the proteins get there has been a mystery. To solve this, we turned off parasite genes that make a protein complex called PTEX and this stopped proteins from entering, which proves PTEX is a protein exporter. The parasites lacking PTEX died suggesting that PTEX might be a new drug target for treating malaria (Elsworth B *et al.*, *Nature* 2014). This work received significant media coverage in Australia and internationally.

Insights into Malaria Immunity

Two related studies led to significant new insights into immunity to malaria to advance the development of effective vaccines against malaria. A Beeson group study (Osier FH *et al.*, *BMC Med* 2014) showed that antibodies produced by the immune system can coat malaria parasites in the blood, effectively tagging them for destruction by white blood cells (monocytes and macrophages). This type of immune response was strongly linked to protection from malaria in Kenyan children. The other study (Cutts JC *et al.*, *BMC Med* 2014) identified potential antigens that could be valuable in the development of vaccines or a diagnostic test for malaria caused by *Plasmodium vivax*, an important but neglected disease that is prevalent through much of Asia and the Pacific.



Professor James Beeson (front, centre), Head of Burnet's Centre for Biomedical Research with researchers from the Malaria Immunity and Vaccines Laboratory.

Centre for Population Health

The Centre for Population Health aims to improve the health of the community by conducting high-quality innovative research that addresses the major public health problems associated with infectious diseases, drugs and related behaviours. HIV, hepatitis C, STIs, malaria, TB, and drug and alcohol use are serious health concerns in Australia, in Asia and the Pacific. Reducing the impact of these infectious diseases, particularly in highly vulnerable populations and disease endemic areas, is an enormous challenge. The Centre addresses these major health problems by implementing novel, multidisciplinary scientific programs that use cutting-edge epidemiology, high-quality laboratory science, excellent clinical and social research and strong public health principles.

Tracking Resistance to Artemisinin

TRAC (Tracking Resistance to Artemisinin Collaboration) is an NHMRC-funded multinational study investigating the interaction between immunity to malaria and the assessment of emerging anti-malarial (artemisinin) resistance. TRAC seeks to test the hypothesis that early signs of low-grade resistance can go unnoticed in populations with high levels of antibodies, or conversely, an incorrect impression of reduced drug efficacy could occur in populations with declining malaria transmission and immunity. The study has recruited approximately 2,000 patients from 16 study sites across South-East Asia and Africa with varying degrees of artemisinin resistance. Preliminary analysis shows that there is variation in the immune response to malaria, both within and across populations, and that these variations have the potential to mask the emergence of artemisinin resistance.

Understanding Trends in Methamphetamine Markets

Dr Nick Scott analysed forensic data on Victoria Police drug seizures and data on drug purchasing from a cohort of people who inject drugs to produce new insights into methamphetamine use in Victoria. Results highlighted that, while the mean price paid by consumers of methamphetamine increased slightly over 2009-2013, the purity of the drug increased dramatically (more than threefold), meaning that the purity-adjusted price decreased substantially. This means that it is likely that purchasers use much bigger doses of methamphetamine than they would have previously, and this change could underpin the increases in methamphetamine-related problems seen in Victoria recently.

Improving the Emergency Response to GHB Overdoses

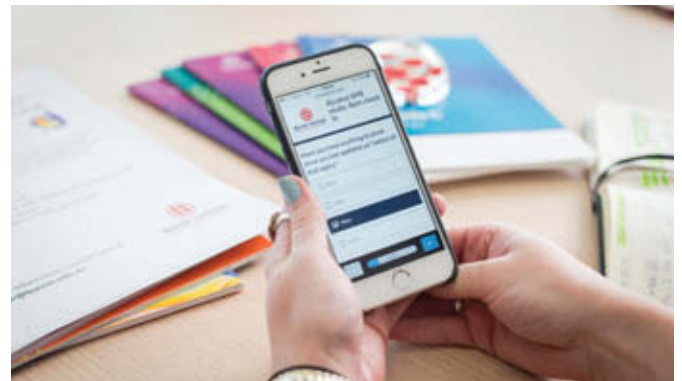
A landmark study published in the journal *Academic Emergency Medicine* showed how endo-tracheal intubation was associated with longer stays in hospital emergency departments (EDs) and a greater likelihood of hospital admission, with no improvement in outcome, for people who have experienced γ -hydroxybutyrate (GHB) overdose (Dietze P *et al.*, *Acad Emerg Med* 2014). This unique study compared outcomes for patients at an ED where intubation was conducted routinely for managing GHB overdoses, with another ED where patients had their overdose symptoms managed conservatively, that is, largely through observation and supportive care. The findings suggest that conservative management decreases the chances of admission to hospital, reducing costs and allowing patients to resume normal functioning more quickly.

The COUNT Study

COUNT is an NHMRC funded national community-based undiagnosed infection and HIV testing study. Led by Burnet's Associate Professor Mark Stoové and coordinated by Research Officer Jason Asselin, the study involves a partnership with the University of New South Wales' Centre for Social Research, the Kirby Institute and the National Serology Reference Laboratory. The study seeks to measure the prevalence of HIV and undiagnosed HIV infection, and examine the correlates and context of undiagnosed HIV infection among gay men in Australia. Burnet's role is to lead recruitment into the study, which has completed recruitment in Canberra, Melbourne and Sydney, enrolling more than 2,000 participants. Recruitment will continue in Perth, Brisbane and Adelaide.

Sexting

'Sexting' is the sharing of sexual images via mobile phones or social media. The Centre's innovative work in this area has shown that sexting is common among young Australians (40% reported sexting) and that it is considered a normal part of a modern relationship. The Social Connectivity, Online Perceptions and Experiences (SCOPE) project will attempt to educate young people using memes in an interactive campaign about sexting and other misuses of new technologies. Memes are an idea, behaviour or style that spreads from person to person within a culture. Specifically, the project will educate young people about the permanence of images and posts online, legal and social consequences of sexting, pornography setting unrealistic expectations for relationships, and dealing with cyber bullying.



The Burnet Institute uses innovative research methods to understand the key health issues affecting young people arising from risky behaviours.

Preventing Hepatitis C Transmission

The development of new highly efficacious treatments for hepatitis C has given rise to the concept of treatment as prevention, meaning hepatitis C can be eliminated through a combination of treatment, opioid substitution therapy, and needle and syringe programs. The Centre has undertaken innovative research to understand the role of the people who inject drugs (PWID), injecting networks in hepatitis C transmission and whether using the injecting network to allocate treatment can facilitate hepatitis C elimination. The Centre's modelling showed that using a 'bring your friends' strategy, in which the PWID and their injecting partners were treated at the same time, led to a greater reduction in hepatitis C prevalence than treating PWID randomly. The likely reason for this was the reduction in hepatitis C re-infection. In 2015, the Centre will undertake a clinical trial – The Hepatitis C Treatment and Prevention (TAP) Study – to ascertain if the modelling results can be replicated in the community.

Centre for International Health

The Centre for International Health responds to health problems in developing countries through the provision of technical advice and support, organisational capacity building, applied research, policy analysis and development, and training and education programs. The Centre focuses on the most marginalised populations in the Asia-Pacific region, combining sound evidence-informed research with innovative interventions in policy and practice, seated in a framework of participation, collaboration and responsiveness. Our expertise spans the prevention and care of infectious diseases, women's and children's health, sexual and reproductive health, drug use, primary health care and strengthening national health systems.

Women's and Children's Health

The Women's and Children's Health team has implemented projects focusing on sexual and reproductive health with an emphasis on preventing unintended pregnancy, reducing the burden of sexually transmitted infections (particularly HIV and syphilis), and care around the time of childbirth.

A thematic priority in 2014 was to promote male involvement in improving maternal and neonatal health outcomes. A World Health Organization (WHO)-commissioned global systematic review assessed the effect of male involvement interventions on maternal and child health care-seeking outcomes, and directly contributed to the development of new WHO health promotion guidelines.

In addition, a collaborative study with research partners in Zimbabwe, Tanzania and Bangladesh evaluated activities designed to increase male engagement in maternal and child health, to advance an understanding of factors leading to strategies to improve the impact of male engagement.

Infectious Disease and Harm Reduction

Our programs focus on HIV and other blood-borne viruses, malaria and multidrug-resistant TB. In PNG, more than 300 community volunteers were supported to test febrile (feverish) cases within their community for malaria in rural settings in East New Britain, testing up to 1,000 people a month. In Western Province we worked with stakeholders to establish a robust and comprehensive response to the TB epidemic, in a challenging context where many cases are resistant to the standard range of treatment options.

For the first time in Myanmar, Burnet started operating direct service delivery of harm reduction interventions for people who use drugs across five locations. More than 2,500 PWID received services focusing on HIV and other blood-borne virus prevention, through the provision of clean injecting equipment and safer sex commodities, testing and support, and referral for methadone opiate substitution therapy.

Education and Capacity Development

Complementing our regular teaching and training activities, Burnet hosted 14 senior health professionals, government officials and researchers from Kenya, Zimbabwe and South Africa in Melbourne as part of the Australian Awards Fellowship Program. The three-week program, featuring workshops aimed at sharing and building expertise in operational research, integrating maternal and child health and HIV, and leadership skills, also included attendance at the 20th International AIDS Conference – AIDS 2014.

Australian National Co-operation Program

Burnet's Australian National Co-operation Program operating in Myanmar, Papua New Guinea, Lao PDR and Zimbabwe resulted in improved capacity of health providers to deliver quality maternal newborn and child health (MNCH) services to clients. Community outreach activities and intervention tools focused on identifying barriers to service uptake, and problem solving using existing community resources to increase demand and uptake for health services. Health workers were trained in basic maternal and newborn emergency obstetric care resulting in women from more remote areas delivering in a health facility with qualified health staff. In Zimbabwe, the project refurbished maternity waiting homes, supported by community involvement. In PNG, the health promotion/education sessions with expectant mothers at health clinic antenatal checks resulted in more women opting for facility-based births. Encouragingly, the Burnet MNCH projects also resulted in more male partners attending antenatal clinics with their partners and attending the birth of their child.

Myanmar

In a further year of expansion, Burnet extended its thematic and research activities, including two projects in the new thematic areas of malaria and TB. In partnership with local NGO, Karuna Myanmar Social Services, we are delivering a three year community-based malaria prevention, early diagnosis and quality treatment project for the most hard to reach populations across the states of Kayah, Kayin and in Bago Division. The project is funded by 3MDG – the Three Millennium Development Goal Fund.

In the peri-urban areas of Yangon, the Australian Department of Foreign Affairs and Trade (DFAT) is funding the provision of a holistic model of community-based multidrug-resistant TB treatment adherence and care, to support township level health systems. With support from the Global Fund and 3MDG, delivering harm reduction services for PWID and use drugs started across five drop-in centre sites in Yangon, Mandalay and Sagaing Divisions. A major activity of our research focus was the United Nations Development Program (UNDP)-commissioned National HIV Socio- Economic Household Survey.

Papua New Guinea

A long-term focus country for Burnet, our programs and presence continue to expand. Among the successful research initiatives implemented this year were the first surveillance studies into direct transmission of drug-resistant HIV in PNG; the scale-up of the Healthy Mothers, Healthy Babies program examining key variables influencing the unacceptably high levels of maternal morbidity and mortality in PNG; and approval for studies trialling point-of-care tests for sexually transmitted infections, early infant diagnosis of HIV, and CD4 T-cell counts to inform ongoing HIV treatment.



Mothers and babies take part in the Burnet's Healthy Mother's, Healthy Babies program in Papua New Guinea.

Burnet research highlighting the need to address multidrug-resistant TB in Western Province helped influence national PNG policy, leading to the expansion of the response. A program for community-based management of malaria in East New Britain Province, which Burnet is overseeing, is targeting more than 123,000 people across three districts. More than 21,500 people have been tested and 10,254 treated since July 2013. We continue to work with national institutions such as the Institute for Medical Research, the School of Medicine and Health Sciences, and the National Department of Health, to promote long-term improvements in national systems for public health education, service delivery, and health research.

China: Tibet Autonomous Zone

The Tibet Health Capacity Building Program provides support to improve management and clinical capacity within the Tibet Autonomous Region's health system. In May 2014, an external technical review of the program commissioned by the program's funder, DFAT, concluded that the program is "the right program, at the right time, in the right place, with the right people". The review commended the program's stakeholder engagement and alignment with national and regional policies, noting that whilst the program was only in its second year of implementation, already some evidence of sustainable impact was apparent. Key areas of work included support to county hospitals working to achieve official service classification, strengthening skills of trainers working in the health sector, and commencing clinical skills training for township clinic workers.

Lao PDR

Maternal and child health and young people were the key focus of our work in Lao PDR this year, culminating in the completion of the Youth Situation Analysis with the Lao Youth Union and the United Nations Population Fund, UNFPA. Our maternal and child health program in Vilabouli continues with support from mining company MMG Ltd and DFAT. Also working with UNFPA, the Jean Hailes Centre and the National Centre for Advancement of Women in Laos, a qualitative survey on Lao women's experience of domestic violence was completed. As part of a team led by RMIT University, we investigated the employment and social impacts on women in Vilabouli of mining operations in the local area and at a national level as well as participating in a review and evaluation of the national HIV strategy.

Africa

Our engagement in Kenya, South Africa and Zimbabwe (supported by the Drakensburg Trust, the Peter Falvey Foundation, and SBA Foundation) was expanded, resulting in more women from remote areas being able to give birth in a health facility with more qualified staff. Burnet continues to work in partnership with local agencies to provide infrastructure support to rural health clinics and maternity waiting homes, and competency based basic emergency obstetric and newborn care training for health staff. One project has developed an Action Birth Card (ABC), an innovative goal-setting tool for use by pregnant women to identify barriers to service uptake, to problem solve using existing community resources, and to record and reflect on their performance. Evaluation showed that women demonstrated significantly higher service uptake during their recent pregnancy using the ABC planning card compared to a previous pregnancy without the card.



The Burnet Institute aims to save lives by developing evidence-based solutions to prevent maternal and newborn deaths.

Postgraduate Students

60 PhD Students

Publications

212 Journal Articles
4 Book Chapters



The Burnet Institute's Healthy Mothers, Healthy Babies program aims to save the lives of mothers and their babies in Papua New Guinea (PNG). PNG's maternal mortality rate is 80 times Australia's.



Monash School of Public Health and Preventive Medicine

School of Public Health and Preventive Medicine

Head: Professor John McNeil AM



Epidemiology and Preventive Medicine

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

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

Sepsis Treatment

New research in 2014 from the DEPM has found that patients with sepsis in Australia and New Zealand (ANZ) receive better treatment than in any other country. ARISE was a large-scale six-year study led by the ANZ Intensive Care Research Centre (ANZIC-RC) at the School of Public Health and Preventive Medicine (SPHPM). Patients (n = 1600) with early stage sepsis, who were admitted to emergency care across more than 40 hospitals, were randomly allocated to receive usual care or Early Goal Directed Therapy (EGDT).

Usual care in ANZ comprises a combination of rapid specialist-led care, powerful and immediate antibiotics and rapid resuscitation in either emergency departments or ICUs. EGDT includes usual care plus insertion of a catheter into the jugular vein to monitor oxygen levels in the blood returning from the body to the heart, as well as following a set protocol of treatment with drugs and blood transfusion to increase oxygenation.

Previous studies found mortality rates for sepsis were as high as 46%, but were lowered to 30% if EGDT was also delivered. Subsequently the therapy has been recommended globally and is endorsed by the Surviving Sepsis Campaign. In contrast, this new study found that in ANZ hospital mortality rates for both groups were close to 15% – the lowest ever reported for this life threatening condition. The study, published in *The New England Journal of Medicine*, sheds doubt on the reported effectiveness of EGDT because researchers found it did not make any noticeable difference to survival rates.

One of the reasons for the high survival rates is thought to be ANZ's healthcare system, which has one of the longest and most scrutinised joint training programs in the world for doctors and nurses working in emergency and intensive care. It was noted that ANZ ICUs routinely have one highly trained specialist nurse for each patient to maximise level of care and minimise cross infection.

The study was funded by the NHMRC and The Alfred Foundation.



ASPREE is Australia's largest clinical trial that will determine whether healthy older people will benefit from taking daily low dose aspirin. Tasmanian trial participants gathered in Launceston for a study update.

Women's Health: Menopause Diagnosis Kit

A free and simple toolkit for GPs could revolutionise menopause diagnosis and treatment. Created at DEPM, the world's first menopause toolkit is designed for GPs to use with women from the age of 40. Researchers say the toolkit has the potential to help manage menopausal conditions for women globally. The Women's Health research team at the DEPM, led by Professor Susan Davis, combined existing research on menopause, diagnostic algorithms and extensive clinical experience to develop the diagnostic tool. The tool works by assessing a patient's medical history and risk factors to arrive at the best treatment solution.

The toolkit fills the void of clear guidelines on menopause diagnosis and management, equipping doctors with the fundamentals to care for all women. The free resource includes a flow chart of standardised questions for doctors to ask women. The kit also flags safety concerns, provides a list of all hormone therapies approved by regulators in different countries and lists non-hormonal evidence-based therapies.

The International Menopause Society is promoting the use of the toolkit throughout the world, stating that it is the first to present structured practical advice. The Practitioner Toolkit is available to download for free from Climacteric and the algorithm is available at www.med.monash.edu.au/sphpm/womenshealth/info-4-health-practitioners/toolkit-management-of-the-menopause.html.

Hazelwood Coal Mine Fire Health Study

On February 9, 2014 the Hazelwood mine in Victoria's Latrobe Valley caught fire resulting in the nearby town of Morwell being covered in clouds of smoke and ash for a period of six weeks. In response to residents' concerns that exposure to the smoke may cause long-term health problems, the Victorian Department of Health (DoH) commissioned by tender a comprehensive health study.

In November 2014, the DEPM was awarded a \$26.5 million Victorian DoH tender to conduct a study into the long-term health effects of the Hazelwood open cut brown coal mine. The study, led by Professor Michael Abramson, will focus attention on susceptible sub-groups, such as pregnant women, infants, children, the elderly, and those with pre-existing lung and heart disease. Study outcomes will contribute to health advice for the future and understanding of long-term impact of short-term events.

The study will involve collaborations with researchers from Monash University's School of Rural Health, Federation University Australia, Menzies Institute for Medical Research (University of Tasmania), CSIRO and The University of Adelaide. The project will include the development of an advisory committee with representation from local community members, as well as relationships with local health professionals to ensure the study outcomes are communicated locally and taken up into policy and practice.

ASPREE Highlights

ASPREE is Australia's largest clinical trial that will determine whether healthy older people will benefit from taking daily low-dose aspirin. The study aims to find if the daily aspirin will lead to healthier, longer lives by prevention or delay of the onset of serious illness and debility. The ASPREE clinical trial reached a number of significant milestones in 2014 with highlights including recruitment milestones; regional and rural participation; community outreach successes; and sub-study developments.

Recruitment Milestone: The ASPREE study attained the recruitment target of 19,000 participants across Australia and the United States in November 2014: 16,700 participants are Australian. The international team now look forward to working with participants during the observation and consolidation phase until the end of 2017.

Regional and Rural Participation: ASPREE regional hubs exceeded recruitment milestones with participant numbers at > 6400 in Melbourne and greater Melbourne, > 5200 in regional Victoria, > 2100 in Tasmania, > 1000 in Canberra, > 500 in Wollongong and nearly 1250 participants in Adelaide. Almost 44% of Australian ASPREE participants represent regional and rural areas. ASPREE Clinical Trial Centres in Ballarat, Bendigo, Geelong, Traralgon, Warrnambool, Wodonga, Burnie, Launceston and Wollongong helped drive regional community engagement in the trial.

Community Outreach: More than 2150 GP co-investigators and 955 general medical practices are actively involved in the trial. This highly successful interaction between researchers and primary carers is invaluable for the study's success. Since recruitment began in 2010, ASPREE has distributed 600,000 invitations to participate (150,000 in 2014), most on behalf of GP co-investigators. The ASPREE team subsequently phone screened close to 83,000 people for eligibility to join the trial (25,000 in 2014).

Achievements

- Professor Rinaldo Bellomo, Co-Director of the ANZIC-RC, was named one of the world's most influential scientific minds by Thomson Reuters based on analysis of data from Web of Science and InCites platforms over the past 11 years.
- In 2014, Associate Professor Allen Cheng received an NHMRC Research Excellence Award for the highest ranked NHMRC Career Development Fellowship (CDF) at Clinical Level 2. The aim of Associate Professor Cheng's CDF, which commenced in 2014, is to prevent and treat significant infections in the community and in hospitals, focusing on influenza, hospital-acquired infections and use of antibiotics, and clinical infectious diseases. In addition to his Associate Professorship of Infectious Diseases Epidemiology in DEPM, he is an infectious diseases physician and Deputy Head of the Infection Prevention and Healthcare Epidemiology Unit at The Alfred.
- Professor John Zalcberg (Head of The Cancer Research Program, SPPHM) was awarded the 2014 Tom Reeve Award for Outstanding Contributions to Cancer Care by the Clinical Oncology Society of Australia.

Postgraduate Students

157 PhD Students
9 Doctor of Public Health Students
517 Masters Students

Publications

669 Journal Articles
7 Book Chapters

www.core.monash.edu

Centre for Obesity Research and Education

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

The Centre for Obesity Research and Education (CORE) applies a multidisciplinary approach to the study of obesity, which integrates a clinical obesity management program with strengths in clinical research, clinical epidemiology, public health, basic sciences and professional and community education. Through this integration, CORE is able to measure the health consequences of obesity and has the unique capacity to evaluate the health benefits of predictable weight loss.

The major area of research interest is the health benefits of weight loss and we also explore the basic mechanisms underlying satiety. In 2014 our work focused on the role of weight loss in diabetes management, with two major studies (led by Senior Research Fellow and Endocrinologist Dr John Wentworth) published in high level journals.

The first study, performed in collaboration with Baker IDI, was a randomised, controlled trial in type 2 diabetes patients with a body mass index (BMI) of between 25 and 30 (i.e. overweight rather than obese) who either received multidisciplinary diabetes care alone or who received multidisciplinary care as well as undergoing bariatric surgery (laparoscopic adjustable gastric banding). Patients were followed for two years and

it was found that the surgically treated group experienced significantly greater weight loss and required significantly fewer diabetic medications. This study was the first of its kind in this BMI group (Wentworth *et al.*, *Lancet Diabetes Endocrinol* 2014).

The second study was a comparative cohort study following up the outcomes of obese, pre-diabetic patients who underwent laparoscopic adjustable gastric banding compared with a pre-diabetic group from AusDiab, a population-based study. The study, led by Dr John Wentworth along with BMedSci student Tamishta Hensman, demonstrated that patients who lost substantial weight following bariatric surgery had a significantly lower risk of progressing to diabetes over a period of time greater than four years (Wentworth *et al.*, *Diabetologia* 2014).

These studies provide further evidence that weight loss following bariatric surgery provides substantial benefits to obese or overweight diabetic patients, and should be considered in their treatment paradigm.

Postgraduate Students

1 Master of Surgery Student

Publications

6 Journal Articles

Rheumatology (Musculoskeletal Epidemiology)

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



Students analyse an MRI of a patient's back.

The Rheumatology Unit's research focus is on novel approaches to the treatment and prevention of musculoskeletal diseases. Our aim is to understand the role of common lifestyle factors including diet, obesity and physical activity in knee, back, foot and hip osteoarthritis (OA). We have a number of NHMRC-funded clinical trials in progress, in which we are investigating new approaches to the treatment of pain and disease modification in knee OA. The goal of the clinical trials is to improve outcomes for patients with musculoskeletal disease.

Early Life and Osteoarthritis

There is increasing evidence that the risk factors for knee and hip OA differ, with the shape of the bones and the joint having a very significant role in hip OA compared to knee OA. Both congenital and developmental diseases of the hip, such as mild hip dysplasia, may influence the development of hip OA in adulthood. The formation of the acetabulum is incomplete at birth in preterm babies, which can often result in these infants developing a postural deformation of the legs persisting into early childhood.

Previous research has linked low birth weight and preterm birth to hypertension, cardiovascular disease, insulin resistance and reduced bone mass in adulthood. We investigated whether low birth weight and preterm birth were associated with an increased risk of joint replacement surgery as an adult. We found that low birth weight and preterm birth were associated with a two-fold increased risk of hip but not knee replacement surgery. We plan to investigate the potential mechanisms through the use of birth cohorts, as it is possible that simple interventions targeting individuals in early life could be important in the prevention of hip OA.

Back Pain

Our studies have shown that both psychosocial factors and structural changes to the back, as measured by MRI (magnetic resonance imaging), are risk factors for back pain and disability. Obesity appears to be linked to these structural changes and we continue to explore the effect of obesity and weight loss on structural changes in the back and on back pain and disability.

Treatment of Knee Osteoarthritis

Significant progress has been made in our NHMRC-funded studies examining new approaches to the treatment of knee OA. The first one is examining whether the use of a cholesterol lowering agent, simvastatin, has a disease modifying effect in symptomatic knee OA. The second one is examining whether zoledronic acid, a bisphosphonate commonly used in the treatment of OA, may have a disease modifying effect in knee OA. These two very different approaches to treating knee OA reflect the changing view of this clearly

heterogeneous disease. These studies address some of the different mechanisms that result in knee OA, a failing joint. The emerging evidence suggests that there will be more than one treatment for knee OA, reflecting the different pathological processes that are occurring.

Grants

New NHMRC Project Grants 2015-2017

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

NHMRC People Support Grants Commencing in 2014

- Career Development Fellowships were awarded to Associate Professor Anita Wluka (Level 2) and Dr Yuanyuan Wang (Level 1).
- An Early Career Fellowship was awarded to Dr Andrew Teichtahl co-supervised by Professor Cicuttini and Associate Professor Jonathan Shaw (Baker IDI Heart and Diabetes Institute).
- A Postgraduate Scholarship was awarded to Dr Sharmayne Brady.

Other Scholarships

- Sam Smith was awarded the Dr Natalie Almond Scholarship for BMedSci studies.



Postgraduate Students

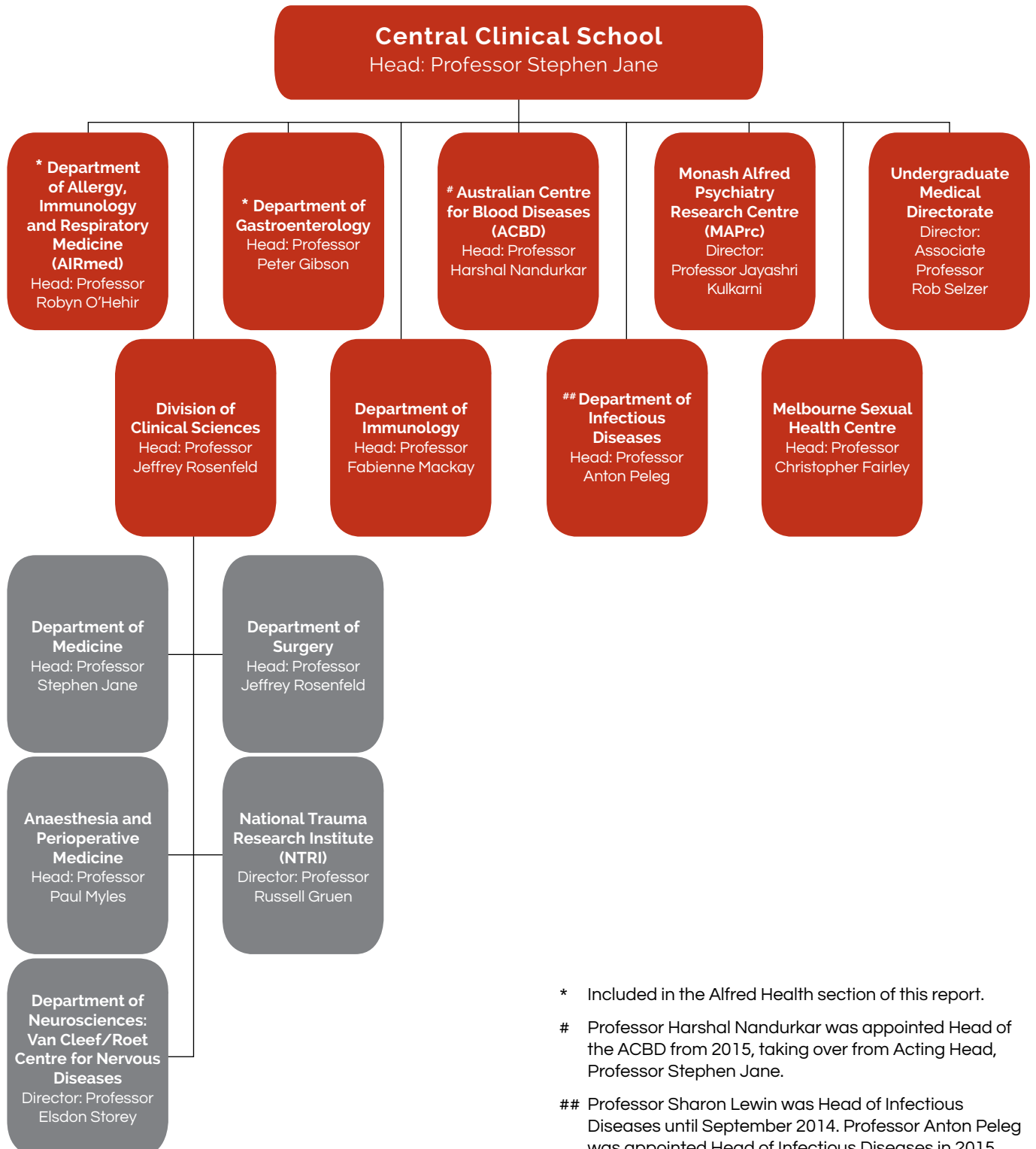
6 PhD Students

Publications

24 Journal Articles
5 Book Chapters



Monash Central Clinical School



* Included in the Alfred Health section of this report.
 # Professor Harshal Nandurkar was appointed Head of the ACBD from 2015, taking over from Acting Head, Professor Stephen Jane.
 ## Professor Sharon Lewin was Head of Infectious Diseases until September 2014. Professor Anton Peleg was appointed Head of Infectious Diseases in 2015.

Australian Centre for Blood Diseases

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

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

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

Professor Harshal Nandurkar was appointed as Director of the ACBD from 2015, taking over from Acting Head, Professor Stephen Jane.

Non-Malignant Haematology Thrombosis Research Unit

Head: Professor Shaun Jackson

The unit investigates therapies that are able to prevent disease-causing bleeding without the side-effect of increased blood clots. Our group previously identified a new class of anti-clotting drugs that target the enzyme PI3-kinase (PI3K), which were safe and effective in human trials. We are now investigating if PI3K inhibitors may be beneficial for stroke. More recently, in a multidisciplinary collaboration between our researchers (Justin Hamilton and Jessica Mountford) and researchers from the Walter and Eliza Hall Institute in Melbourne and the Blood Transfusion Centre in France, we identified a new mechanism regulating blood clotting involving another PI3K family member called Class II PI3K (Mountford JK *et al.*, *Nat Commun* 2015).

Platelet and Megakaryocyte Cell Biology

Head: Dr Justin Hamilton

Arterial thrombosis (AT) is the most common cause of death and disability in Australia. Activated platelets are the cells that form arterial thrombi and anti-platelet drugs are the mainstay of current pharmacotherapy for the prevention of AT. Consequently, there is a need for novel strategies to inhibit platelet function for the prevention of heart attack and stroke. Our research has examined the cell biology of blood platelets to find novel approaches for pharmaceutical platelet inhibition. Recent work uncovered a new approach to inhibiting platelet function during blood clot formation that may be applicable to heart attack and stroke prevention therapy (Mountford JK *et al.*, *Nat Commun* 2015).



Dr Justin Hamilton (R) receives the 2014 Australasian Society of Thrombosis and Haemostasis (ASTH) scientific medal from ASTH President Dr Jenny Curnow (L) for his presentation on class II PI3-kinases in platelets.



Systems Haematology Unit

Head: Associate Professor Robert Andrews

Our group investigates platelet receptor levels in health and disease and how changes result in altered platelet function. Our work, which we have published extensively in 2014, addresses an unmet need by developing tools, assays and approaches to assess patients with an increased risk of bleeding have resulted in part from the development of these approaches. In 2014 we analysed samples from 17 patients with unexplained bleeding referred by Alfred Hospital haematologists and 73 samples from healthy donors.

Cancer and Immune Cell Signalling

Head: Professor Steve Gerondakis

A complex signal transduction network orchestrates the development and function of hemopoietic cells. The NF- κ B and MAP kinase component of this network controls fundamental biological processes in hemopoietic cells that include differentiation, cell division, cell survival and immune function. Deregulation of these biochemical pathways is a common feature of hemopoietic system diseases, including blood cell cancers such as multiple myeloma (MM), lymphoma and myeloid leukaemia. We study how the NF- κ B and MAP kinase pathways control the differentiation, division and survival of normal and malignant hemopoietic cells.

Fibrinolysis and Gene Regulation Unit

Head: Professor Robert Medcalf

The blood brain barrier (BBB) becomes compromised in traumatic brain injury (TBI) and ischemic stroke patients, particularly after thrombolysis. We identified an essential signalling event within key cells of the BBB that controls permeability following brain injury and demonstrated that blocking this signalling attenuates BBB opening. We are evaluating this in mouse models of ischemic stroke and in TBI.

Malignant Haematology and Stem Cell Transplantation

Myeloma Research Group

Head: Professor Andrew Spencer

Our group explores novel therapeutic approaches for MM in preclinical and clinical studies. We are evaluating the activity and mechanism of action of epigenetic modifying agents and preclinical development of both a novel anti-MM monoclonal antibody, κ Mab, and the orally bioavailable β -catenin inhibitor BC2059. We secured funding from the Victorian Cancer

Agency (VCA), International Myeloma Foundation and pharmaceutical industry partners and activated the Myeloma and Related Diseases Registry aligned national biobanking initiative, the Myeloma 1000 Project.

Mammalian Functional Genetics Unit

Head: Associate Professor Jody Haigh

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

Leukaemia Research Group

Heads: Dr Mark Guthridge and Dr Andrew Wei

The Wei lab develops targeted therapies against acute myeloid leukaemia (AML). The Alfred opened several phase 1 to 3 clinical trials targeting BCL2, IDH1, PIM, LSD1 and FLT3. The Sequenom platform for rapid AML mutation profiling was introduced into The Alfred hospital. Development of digital PCR to more sensitively monitor driver mutations continues. In our research laboratories, Sewa Rijal published findings on the role of inositol polyphosphate 4-phosphatase II (INPP4B) in chemoresistance and poor outcome in AML (Rijal S *et al.*, *Blood* 2015). Donia Moujalled focuses on the role of MCL1 and PhD student Tse-Chieh Teh focuses on the role of BCL2 in AML.

Stem Cell Research Unit

Heads: Associate Professor David Curtis and Dr Stephen Ting

Self-renewal allows normal hematopoietic stem cells (HSC) to constantly replenish the blood system, while leukaemia stem cells (LSC) use self-renewal to propagate the disease, and utilise quiescence to evade eradication. We found that the genes, Ap2a2 and Gpsm2 enhance HSC self-renewal and now study whether their respective dysregulation affects leukaemia. We constructed an Ap2a2-conditional knock-out mouse model, which shows embryonic lethality when constitutively deleted. Hematopoietic specific deletion of Ap2a2 during development and adulthood is being assessed.

Red Cell Group

Heads: Professor Stephen Jane and Associate Professor David Curtis

We have developed a novel drug for blocking the activity of an enzyme important for the control of hemoglobin production and growth of blood cancers such as polycythemia and myelofibrosis. This work has attracted funding from the NHMRC and the UK's Wellcome Trust to assist with moving the drug into clinical trials for patients with thalassemia, sickle cell disease and myelofibrosis.



Head of the ACBD's Systems Haematology Group, Associate Professor Robert Andrews (front right) and Senior Research Fellow, Dr Elizabeth Gardiner (front left) meet with Professor Kailin Xu (front middle), Head of the Key Laboratory of Bone Marrow Stem Cells, Xuzhou Medical College, Jiangsu, China.

Eastern Clinical Research Unit Translational Research Division

Head: Dr Anthony Dear

In collaboration with Professor Andrew Spencer, we identified novel molecular markers that are potentially predictive of early epigenetic treatment response in patients with myeloid malignancies (Liu HB *et al.*, *Int J Onc* 2014). This work is now the subject of a prospective clinical trial. In collaboration with Novo Nordisk and Monash Pharmacology, we discovered anti-fibrotic effects in the myocardium using a novel glyceemic treatment utilised in the management of type II diabetes. A collaboration with Monash Pharmacology and Professor Jonathan Golledge (James Cook University, Townsville) led to the identification of a novel treatment and mode of delivery in the management of restenosis in peripheral arterial disease (Rahmatzadeh M *et al.*, *Cardiovasc Drugs Ther* 2014).

Achievements

Associate Professor David Curtis secured two NHMRC Project Grants to commence in 2015: a four-year grant of \$742,530 as CIA to work on eradicating leukaemic stem cells; and a five-year grant of \$1,394,125 as CIC with Associate Professor Susan Nilsson (CIA) of Australian Regenerative Medicine Institute, Monash University to study bone marrow endothelial cells.

In 2014 Dr Justin Hamilton's work on Class II PI3-Ks in platelets won him the 2014 Australasian Society of Thrombosis and Haemostasis Scientific Medal for best oral presentation at the meeting as well as the John Lloyd Travel Grant to attend the meeting.

PhD student Shauna French won the most creative presentation at the 2014 AMREP Postgraduate Symposium.

Associate Professor Andrews was elected President of the Australian Vascular Biology Society.

Project funding received by Professor Andrew Spencer for 2014 included:

- A study to identify circulating biomarkers in the peripheral blood of MM patients funded by the International Myeloma Foundation, USA (\$US 270,000: 2014-2017).
- A pre-clinical evaluation of carfilzomib in combination with MEK inhibition for MM funded by Onyx Pharmaceuticals (now part of Amgen) as part of the Proteasome Research and Integrative Science for MM Novel Therapies Program (\$US116,000 : 2014-2015).
- Identifying cancer biomarkers for predicting response to histone deacetylase inhibitor plus or minus proteasome inhibitor therapy in myeloma funded by the Snowdome Foundation (\$US116,000 : 2014-2105).
- A Translational Research Project - Victorian Epigenetics Group (VEG): 'A collaboration for personalised epigenetic cancer therapy through pre-clinical evaluation, novel biomarker development and early phase clinical trials of new drugs' funded by the VCA (2014-2017). Professor Andrew Spencer is a co-investigator of the VEG, which is led by Professor Miles Prince of Peter MacCallum Cancer Centre. Professor Spencer has received \$419,500 of the grant which has total funding of \$1 million annually.

Postgraduate Students

22 PhD Students
1 Master of Biomedical Science Student
3 MD Students

Publications

69 Journal Articles

Division of Clinical Sciences

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

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



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

The Division of Clinical Sciences includes:

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

Research projects investigate disease processes, applications and treatments and span a wide range of medical subject areas from anaesthetic protocols to vision prosthetics. Research methodology ranges from investigating fundamental physiological processes involved in the aetiology of disease, to creating clinical registries. We enable fresh approaches to solving problems and improving current treatment options for patients by drawing on novel technological advances and collaborations with other disciplines.

All the research ultimately contributes to improved diagnosis of complex illnesses, better treatment for acute problems and improving the quality of life for people with chronic conditions. In addition, our work contributes to the body of knowledge for researchers and clinicians worldwide.

The division provides quality education to MBBS undergraduates and research opportunities to university graduates and medical practitioners from a variety of disciplines. In 2014 our achievements included over 200 peer-reviewed publications, \$7.8 million in grant income and five PhD completions. Each of the centres and departments within the Division of Clinical Sciences has a number of research projects. In this report, we highlight major initiatives for each area.



Anaesthesia and Perioperative Medicine

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

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

The Department of Anaesthesia and Perioperative Medicine at The Alfred hospital is amongst the largest in Australia, consisting of 29 full-time and over 50 visiting specialist anaesthetists, as well as 40 registrars in training. In 2014 its research unit coordinated five multicentre international trials, and participated in several other trials including randomised clinical trials (RCTs), audits and surveys. Its expected income is approximately \$14M over the duration of the trials.

Disability-Free Survival After Surgery

Doctors may soon be able to predict which patients are likely to experience poorer outcomes after surgery by drawing on data from a world-first study into post-operative disability. Anaesthetists at The Alfred have applied an internationally recognised disability measure – previously reserved for arthritis, stroke and other patient groups – to track the wellbeing of patients up to one year after undergoing surgery. The tool is a questionnaire developed by the World Health Organisation (WHO), which has not previously been applied to the measure of outcomes after surgery.

Perioperative research has traditionally focused on surrogate outcomes such as length of hospital stay, or clinician focused outcomes such as myocardial infarction, stroke, and other major medical complications. These outcomes occur with varying severity and are of variable significance to patients. More recently, patient-centred outcome measures have been used to assess perioperative outcomes that are important to the patient. Survival and freedom from new or worsened disability after surgery are important outcomes. Until now, no measure of disability has been validated in a surgical population.

The team evaluated the psychometric properties of the WHO Disability Assessment Schedule 2.0 (WHODAS) in a diverse cohort of 510 patients up to 12 months after surgery. They found that WHODAS was clinically acceptable, valid, reliable and responsive in this surgical population. In addition, when combined with survival, WHODAS can be used to measure disability-free survival, providing an outcome measure for future perioperative research and clinical audit that is meaningful to clinicians and patients alike.

Alfred anaesthetist and lead author on the study, Dr Mark Shulman, said the results confirm the tool is able to accurately and reliably measure the impact of surgery in a way that is meaningful to both doctors and patients. Physical, cognitive and social function of post-surgical patients were measured at key intervals with factors such as chronic pain, return to work and resumption of usual social activities tracked, along with whether patients might still be in rehabilitation or, in some cases, had passed away.



Dr Mark Shulman, an Alfred hospital anaesthetist, is lead author on a study that has validated a tool to measure disability-free survival after surgery.

Professor Paul Myles agreed that both this study and follow-on studies will eventually help to predict which patients may not benefit from certain surgeries, or will need closer monitoring during and after their time in the operating theatre. Identifying which patients are at risk of disability will aid the decision whether to avoid surgery or, at least, modify the surgical approach. Most importantly, we will be better placed to help our patients make more informed decisions about surgery by comparing the benefits with the expected risks for that individual.

Postgraduate Students

1 PhD Student

Publications

28 Journal Articles

Department of Medicine

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

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

The Department of Medicine has a broad ranging program of research including, developmental biology, endocrinology, neuroscience, oncology, pathology and dermatology. During 2014, Perdita Cheshire, Aislin Meehan, Kathryn Hackman and Jeremy Wrobel completed and passed their PhDs.

Skin Formation

The skin is the body's largest organ. It forms *in utero* and is maintained throughout adult life. However, the womb is a more stable and regulated place than the more complex terrestrial environment, and skin function in an embryo and an adult is very different. The different molecular mechanisms contributing to the development, regulation and maintenance of the skin structure *in utero* and postnatally can be attributed to highly conserved genes, largely unchanged from fruit fly to human. These three genes (in mammals) are members of a family of transcription factors known as the 'Grainy head-like' (Grhl) transcription factors that play a role in organ (including skin) development and barrier repair after tissue damage. Grhl1 and 3 are both highly expressed in skin.

Michael Cangkrama is a doctoral student supervised by head of the Epidermal Development Laboratory, Professor Stephen Jane. Michael's research has focused on the Grhl transcription factor genes in skin barrier function. Epidermal skin cells have a 30 day turnover, twice as slow as the mucus membrane of the skin internal to the mouth, nasal passages and oesophagus. The Epidermal Development Laboratory identified the unique and cooperative roles of Grhl1 and Grhl3 that were both involved in the maintenance of the epidermal skin barrier through the regulation of their specific target genes, the transglutaminases. They characterised the molecular pathways driving the maintenance of the adult skin barrier using novel approaches, including systems biology, genetic screens, bioinformatics and phylogenetic approaches *in silico* to predict target genes and signalling networks that are conserved in mice and humans.



Michael Cangkrama, PhD student, researches the role of Grhl transcription factor genes in skin barrier function.

Understanding the mechanism of gene regulation by Grhl factors and their target genes will not only help tease out the evolutionarily conserved mechanisms of skin cell formation and maintenance, but it will throw light on the processes involved in human skin diseases such as atopic dermatitis and psoriasis.

In 2014 Michael Cangkrama won a Young Scientist Skin Research Travel Fellowship to present his work at an international conference where he gave both oral and poster presentations entitled 'Coordinate function of the Grainyhead-like transcription factors is critical for maintenance of skin barrier function postnatally'. His work has been published in four high impact factor journals comprising one review article and three research articles. Michael anticipates submitting his thesis in early 2015 and has a postdoctoral position lined up in Switzerland.

Postgraduate Students

51 PhD Students
3 MD Students

Publications

92 Journal Articles

National Trauma Research Institute

Head: Professor Russell Gruen MBBS, PhD, FRACS

www.ntri.org.au

Since its inception in 2003, the National Trauma Research Institute (NTRI) has established programs of clinical research, quality improvement, trauma knowledge translation and international systems development. Bringing together key stakeholders from around Australia and internationally, NTRI develops and delivers national multicentre projects and contributes to national and international trauma care practice and policy. This has resulted in reduced deaths and improved outcomes for those who have sustained severe injury.

Traumatic Brain Injury

Traumatic brain injuries (TBIs) create an enormous burden world-wide on individuals, families, communities and the economy. Over the past three years a virtual research centre located within NTRI – the Centre of Excellence in TBI – has sponsored a number of research fellows in this field.

Dr Sarah Hellewell carried out the project 'Validating the use of novel and established biomarkers of brain injury in an erythropoietin clinical trial'. Aware that biomarkers are intrinsic proteins of the nervous system that diffuse into the blood stream as a consequence of damage to the brain, Dr Hellewell's research focused on developing biomarkers as a diagnostic measure for the severity of initial brain damage, as a tool for detecting secondary insults and as early predictors of long-term neurological outcome.

Particularly interesting to insurers of compensable injury world-wide, identification of diagnostic biomarkers of brain injury has the potential to direct treatment and therefore limit progressive brain damage, improve outcomes to patients and reduce overall care costs. Dr Hellewell's fellowship experience provided a strong foundation that allowed her to take up a post-doctoral fellowship in Canada.



Dr Sarah Hellewell, Research Fellow at the Centre of Excellence in Traumatic Brain Injury, has worked on validating biomarkers of brain injury.

NTRI Evidence Service

Since 2009, NTRI has worked with many organisations to produce rigorous, independent evidence reviews on complex health problems to ensure that the policy and practices of those organisations are informed by clinical and scientific evidence. Led by Ornella Clavisi, Evidence Service Manager, together with researchers Loyal Pattuwage and Melissa Chee, the NTRI Evidence Service uses established methods to develop new systematic reviews and clinical practice guidelines, and update existing systematic reviews.

Over the past year, the Evidence Service team have updated a suite of three complex evidence reviews on implantable pain therapies for chronic pain that involve a range of neurostimulation and intrathecal devices. These reviews found that there was insufficient evidence to prove that these interventions were effective, and that in some cases there was evidence of side effects and complications. As a consequence, funding of implantable pain therapies was restricted by the organisation, resulting in significant cost savings and efficient resource allocation, as well as improving patient care by restricting access to ineffective and potentially harmful treatments.

Postgraduate Students

8 PhD Students

1 Master of Surgery Student

Publications

46 Journal Articles

Department of Surgery

Head: Professor Professor Jeffrey V Rosenfeld AM OBE

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

The Monash Department of Surgery (DoS) research program incorporates endocrine surgery and thyroid cancer, colon cancer, burns, brain and spine trauma, cardiothoracic surgery, bionic vision, gastroesophageal disorders and prostate cancer. In 2014 Dr Silvana Marasco (Surgical Rib Fixation) and Dr Philip Lewis (Monitoring of Cerebral Autoregulation) completed their PhDs.

Paediatric Traumatic Brain Injury

The PhD studies of Dr Philip Lewis involved examining the regulation of blood flow in the brain. Often after traumatic brain injury (TBI), this regulation mechanism is disrupted. As a result, during episodes of low blood pressure the brain cannot prevent a drop in flow. Conversely, during high blood pressure episodes the brain swells as the non-reactive blood vessels stretch. Dr Lewis' thesis examined how this mechanism works, and the development of techniques for measuring its deterioration.

Dr Lewis has also been collaborating with the Royal Children's Hospital in Melbourne and Cambridge University in the UK to study children with TBI. The team investigated the pressure reactivity (PR) of cerebral blood vessels in these patients using a technique developed at Cambridge. Disturbance of PR is common after TBI in adults and is predictive of poor outcome, but has not been well studied in children. They found that loss of pressure reactivity was significantly associated with worse outcome, and that continuous monitoring of PR could enable an individualised approach to blood pressure targeting. The study was accepted as an abstract at the 7th World Congress on Pediatric Clinical Care (Lewis *et al.*, *Pediatr Crit Care Med* 2014;15(4)Suppl p78).

Tissue Engineering to Treat Burn Wounds

The Alfred Skin Tissue Culture Laboratory pursues a translational research program directed towards the investigation and development of tissue engineered products for wound healing. A phase 1 clinical trial evaluating the use of cultured keratinocytes as an adjunctive therapy for patients with severe burns commenced recruitment in 2014. To date, five patients have been recruited. The trial is expected to be completed by October 2016. The technique allows keratinocyte cell isolation from a small biopsy from the patient, which are expanded to form sheets of graftable epidermis on a fibrin carrier. The cultured epidermal autograft sheets are evaluated for comparative healing efficacy in wound beds in association with different dermal components (vascularised allograft dermis, residual reticular native dermis, and widely meshed autograft).

In addition to producing cultured keratinocytes for clinical use, the laboratory conducts research directed to the development of a tissue engineered three-dimensional skin construct. A mouse model to test novel dermal substitutes in animals has been established. A project to conduct a comparative study on a novel synthetic dermal substitute versus a bovine derived commercially available collagen dermal matrix has been completed. This work informs a multicentre clinical trial to commence in 2015 evaluating biodegradable temporising matrices for wound healing.

The laboratory continues to host and train Honours and BMedSc(Hons) students in the area of skin biology in relation to burns treatment.



The Alfred Skin Tissue Culture Laboratory has a research program into tissue engineering to treat burns wounds. (L-R) Dion Martinus (Quality Officer), Dr Heather Cleland (Director, Burns Unit) and Dr Shiva Akbarzadeh (Senior Research Fellow).

Postgraduate Students

5 PhD Students
4 Masters Students

Publications

56 Journal Articles

Van Cleef / Roet Centre for Nervous Diseases

Head: Professor Elsdon Storey MBBS, DPhil, FRACP

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

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

The unit's cerebellar ataxia research continued along several lines. NHMRC supported work on symptomatic treatment of incoordination in spinocerebellar ataxia type 1 mice was continued. We have another Honours student to help with this in 2015. Part-time PhD student, Evelyn Lindsay, continued development of a portable electronic battery of upper limb coordination tasks, in conjunction with Deakin University specialists.

PhD candidates Judy Allen-Graham and Perdita Cheshire successfully completed their PhD theses. Judy finished her project in 2013 on potential redundancy between the Alzheimer's disease (AD) protein APP and its homologue APLP2, and was awarded her doctorate in 2014. This basic research has potential implications for gene therapy for AD. Perdita Cheshire completed in 2014 and was investigating the mechanisms of levodopa-induced dyskinesias in Parkinson's disease (PD).

Large Clinical Trials

Professor Storey's involvement as a trial investigator continued in the large international NIH-funded ASPREE trial of aspirin in the normal elderly, and its NHMRC funded ENVision (MRI and retinal vascular imaging) and SNORE-ASA (sleep apnoea) sub-studies. Professor Storey is also a Chief Investigator on the STAR-EE trial of statins in the healthy elderly, which began in 2014. These studies are being carried out in the Monash Department of Epidemiology and Preventive Medicine.

Movement Disorders

The Movement Disorder Team has continued its research interests in biomarkers, clinical and pathological aspects of neurodegenerative parkinsonism including PD, progressive supranuclear palsy (PSP) and other movement disorders.

In 2014 we have continued with our prospective study of patients with PSP, PD and multiple system atrophy (MSA) using transcranial magnetic stimulation (TMS) as a measure of neurodegeneration (Dr Kelly Bertram, Dr Sarah Hewer). This study has been designed in collaboration with the Movement Disorder team at University of Rome. There is evidence that neuronal dysfunction in PSP can be measured utilising TMS. Given different parkinsonian syndromes are associated with different patterns of brain region involvement, diagnostic accuracy may be improved by the use of TMS.

The aims of this study are to measure responses to TMS paradigms in patients with PSP and compare these responses to patients with other forms of parkinsonism, namely MSA and PD, and with healthy controls. This will determine if TMS can distinguish between these diagnostic entities. Secondly, we aim to determine if these responses correlate with clinical features of disease and change over time with disease progression. This will allow us to determine the potential utility of TMS in future treatment trials.

We have contributed to a number of other studies that have been presented at International Meetings in poster format. Together with investigators from the largest clinical trial in PSP, we have identified the minimal clinically significant change in disease measures of PSP severity, which will assist in future clinical trials of PSP. Analysis of data from a smartphone based assessment tool in PD has been collected, showing a useful measurement tool for remote patient based assessment. This work forms an important part of assessing symptom severity on waking from sleep, which we hope will give insights into the ways in which dopamine is handled in different patients with a dopamine deficit causing PD.



Dr Kelly Bertram demonstrates use of transcranial magnetic stimulation, which is being evaluated as a way to distinguish between the various Parkinsonian disorders.

Postgraduate Students

2 PhD Students

Publications

16 Journal Articles

Immunology

Head: Professor Fabienne Mackay BBiomedEng, PhD

The Monash University Department of Immunology is internationally renowned for its combined expertise in research, teaching and service delivery in immunology and immunopathology. There are extensive research programs in basic and translational immunology, including highly successful collaborations with The Alfred hospital and other AMREP partners. The department has established effective links between basic science / target discovery from the main Monash University campus at Clayton as well as AMREP and translation / clinical trials on The Alfred side.

Our research activities target diseases including allergy, asthma, autoimmunity, inflammation, diabetes, lupus, organ fibrosis, cancer and malaria. We also focus 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 and other research grants from international sources such as Worldwide Cancer Research, and have a strong publication output, patent portfolio and biotech activity.

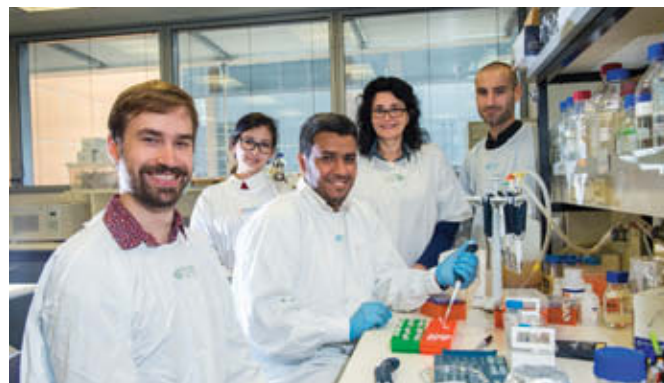
Promotion of immunology to students and encouragement of progression to Honours and postgraduate research studies is a major focus of our department's activity. Our regular departmental scientific retreat, designed to encourage scientific integration and collaboration within the department, includes a very successful mentoring program for young researchers. The program is aimed at providing important scientific strategies to prepare their transition from postdoctoral researchers to independent laboratory heads. Our PhD students participated as demonstrators at the annual International Day of Immunology activities for high school students, hosted at Melbourne's Gene Technology Access Centre. This year we congratulate Jainxiong Chan, Devy Deliyanti, Chindu Govindaraj, Rohimah Mohamud and Zeyad Nasa for successful completions of their PhD theses.

New appointments in 2014 were Dr Dan Andrews, who heads a new research group on Natural Killer cells and Dr Beatriz De Garcillan, who joined the BAFF laboratory as a Research Fellow.

Research Highlights

Immune Cells Restoration to Fight CLL

Chronic lymphocytic leukaemia (CLL) is the most common leukaemia in the developed world and has no cure. Professor Fabienne Mackay and her PhD student Damien Saulep-Easton have published findings on previously unknown aspects of CLL (Saulep-Easton D *et al.*, *Leukemia* 2014). They demonstrated that innate immune cells called plasmacytoid dendritic cells (pDCs), which are important for fighting infections and stimulating other immune cells



Professor Jennifer Wilkinson-Berka (2nd from right), Head of the Diabetic Retinopathy Laboratory, with her research group.

in the destruction of tumour and infected cells, are actually eliminated in people with aggressive CLL. pDCs form only a tiny fraction of the body's entire arsenal of immune cells. CLL patients with a milder form of CLL appeared to have more of these rare cells, suggesting some protective effect. Their research found that these rare but critical cells can be restored at the experiment level, resulting in re-activated immune functions including the destruction of cancer cells.

These results provide supporting evidence that a similar approach of restoring the body's own cells to fight infection might have therapeutic benefits in patients with CLL. In healthy people, the immune system usually helps detect and destroy cancer cells or infected cells as soon as they arise. Therefore, when cancer cells disable the immune system, people become more vulnerable to severe infections and are no longer capable of controlling the emergence of cancer cells. These discoveries could be an important turning point for the development of new therapeutic strategies that reactivate the immune system, and enhance the long-term survival of CLL patients particularly vulnerable to fatal complications with infections.

Diabetic Retinopathy

Professor Jennifer Wilkinson-Berka was awarded an NHMRC Project Grant in 2014 to support her research on diabetic retinopathy. Her project, entitled 'Inhibition of specific NOX isoforms as a new treatment for hypertensive and diabetic retinopathy', received four years of funding (2015-2018: \$823,373).

Ischaemic retinopathies such as diabetic retinopathy and retinopathy of prematurity are the main causes of vision loss and blindness in people of working age and children, respectively. These diseases feature extensive and progressive damage to the retinal microvasculature, which can result in haemorrhage, vasoproliferation and in some instances retinal detachment. Despite the increasing prevalence of both diseases throughout the world, there are still no preventive and mechanism-based medical treatments. The focus of Professor Wilkinson-Berka's Diabetic Retinopathy Laboratory is the evaluation of how inflammatory cells and oxidative stress elements contribute to diabetic retinopathy and retinopathy of prematurity. Our studies are performed in pre-clinical models of these diseases and we utilise novel therapeutic strategies with the intention of translating our findings to human clinical studies.

Lung Diseases

Associate Professor Margaret Hibbs was awarded an NHMRC Project Grant in 2014 for her research on the role of pathogenic macrophages in lung diseases. Funding is for a three-year project (2015-2017: \$639,794) entitled 'Targeting macrophage sub-types as a strategy for chronic inflammatory lung disease'.

Chronic obstructive pulmonary disease (COPD/emphysema) and lung adenocarcinoma are major global health problems. There is strong evidence that the two diseases share common susceptibility determinants and it is known that macrophages play an important role in the pathogenesis of both conditions. Macrophages, however, are also essential for tissue homeostasis, host defence, disease resolution, tissue repair and immune defence against cancer. The goal of Associate Professor Hibb's lab is to understand how to treat, or prevent, inflammatory lung diseases by selectively targeting pathogenic macrophage subpopulations without paralysing macrophage-dependent innate immune defences and tissue homeostasis.

Natural Killer Cells and Cancer Doctoral Thesis Excellence

Dr Christopher Chan received a Vice-Chancellor's Commendation for Doctoral Thesis Excellence for his PhD thesis in 2014. Christopher was a PhD student in the Department of Immunology, who completed his thesis in 2013. He did his research at the Peter MacCallum Cancer Centre under the supervision of adjunct staff members Professor Mark Smyth and Dr Dan Andrews. The title of Christopher's thesis was 'Mechanisms of NK cell-mediated regulation of inflammation and cancer'.

Natural Killer (NK) cells are an attractive target for cancer therapy as they are able to directly recognise cancer cells and kill them. In addition, NK cells are able to influence the function of other immune cells and thus orchestrate and direct a broader anti-tumour immune response.

The contact-dependent functions of NK cells are controlled through activating and inhibitory receptors that bind to cognate ligands on NK cell targets or other immune cells. Although some of these receptors have been well characterised functionally, other families of receptors known to be expressed on NK cells have not. Furthermore, how tumours may be able to alter their expression of ligands to escape NK cell-mediated recognition had not been reported.

Christopher's thesis concentrated on investigating the function of a group of receptors on NK cells that bind to nectin and nectin-like proteins. There are four members in this family: CD226, CD96, TIGIT, and CRTAM. The regulation of NK cell function by this family is highly complex due to their expression pattern, and the fact that they share common cognate ligands. More specifically, the function of CD96 was unknown. Christopher was able to show for the first time that CD96 can negatively regulate cytokine responses by NK cells, and that this receptor does so by directly competing with CD226 for binding to their cognate ligand on target cells.

Finally, Christopher's thesis also showed that in the context of acute myeloid leukaemia (AML), NK cells can directly recognise leukaemic cells. Consequently, as a mechanism of immune resistance, AML cells that actively down-regulate ligands for NK cell activating receptors have a survival advantage that may contribute to disease relapse. Thus, novel therapies that can enhance NK cell recognition of AML may have clinical benefit.

Postgraduate Students

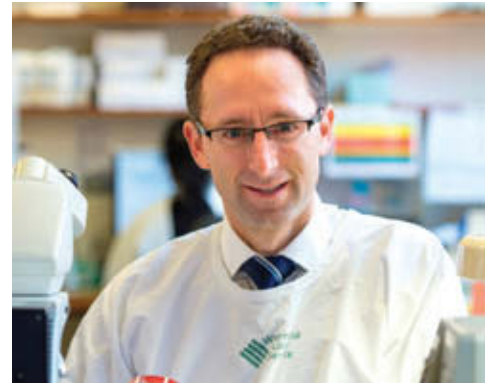
32 PhD Students

Publications

47 Journal Articles
1 Book Chapter



Professor Fabienne Mackay (centre), Head of the Department of Immunology, with her research group.



Professor Anton Peleg was appointed Head of Infectious Diseases in 2015.

www.med.monash.edu.au/cecs/infectious-diseases/

Infectious Diseases

Head: Professor Anton Peleg MBBS, PhD, MPH

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

In September 2014 Professor Sharon Lewin left AMREP to take up the position of inaugural Director of the Peter Doherty Institute for Infection and Immunity at the University of Melbourne. Professor Anton Peleg was appointed Head of Infectious Diseases in 2015.

HIV

Research into HIV cure has extended into several clinical trials led by Professor Lewin in collaboration with Dr Julian Elliott, head of our Clinical Research Unit. One study demonstrated that the histone deacetylase inhibitor (HDACi) and anti-cancer drug vorinostat can 'wake up' HIV from dormant cells (Elliott JH *et al.*, *PLoS Pathog* 2014). A sub-study established participant expectations for HIV cure research (McMahon JH *et al.*, *AIDS* 2015). A collaborative study with the University of California San Francisco, funded by the NIH and American Foundation for AIDS Research, investigated the ability of disulfiram, a drug used to treat alcohol addiction, to activate HIV. Professor Lewin collaborated on a clinical trial of the HDACi, panobinostat, funded by the Danish Medical Council (Rasmussen TA *et al.*, *Lancet HIV* 2014). Professor Lewin's and Dr Paul Cameron's research, supported by NIH, into understanding how latency is established and can be reversed using novel *in vitro* models, continues to inform new strategies to eliminate HIV latency and our understanding of HIV pathogenesis.

Professor Lewin and post doctoral fellow Megan Crane continued work on immune abnormalities in HIV / hepatitis B virus (HBV) co-infected patients that enhance liver disease (Crane M *et al.*, *J Infect Dis* 2014; Giarda P *et al.*, *Antivir Ther* 2014). Together with colleagues at the University of Malaya, Reena Rajasuriar and Adeeba Kamarulzaman, they identified genetic risk factors for diseases related to persistent immune activation for patients on antiretroviral therapy (ART) (Rajasuriar R *et al.*, *J Transl Med* 2015; Rajasuriar R *et al.*, *Curr Opinion HIV AIDS* 2015).

The notion of HIV treatment as a prevention strategy has gained international focus. This prompted Dr James McMahon to establish a clinical network of the seven largest providers of HIV care in Victoria treating over 80% of people living with HIV. This work established estimates of patient retention in HIV care as well as tracing and re-engaging patients lost to care and established reasons for disengagement.

In 2014, Associate Professor Edwina Wright was appointed co-chair of the HIV Working Group, Department of Health and Human Services. Associate Professor Wright demonstrated the importance of early ART (Le T *et al.*, *N Engl J Med* 2014) and in 2013-14 successfully led a submission to the Australian Pharmaceutical Benefits Advisory Committee to allow prescription of ART at any stage of the disease, independent of CD4 count. Associate Professor Wright is leading two international studies looking at the benefits of immediate versus deferred ART on neurocognitive health and on the size of the HIV reservoir in HIV-positive people. She is also leading a study to determine the neurocognitive benefits of treating hypertension in HIV positive people.

General Infectious Diseases

The General Infectious Disease team and the Cardiothoracic Unit reviewed the occurrence of bacteremia in patients receiving ventricular assist device implants between 1990 and 2009 (Rosenfeldt F *et al.*, *Heart Lung Circ* 2014). A report on necrotising fasciitis due to *Neisseria gonorrhoeae* (Kanhutu K *et al.*, *Sex Health* 2014) has extended the spectrum of causative organisms of this clinical syndrome. Collaborative studies with the Austin hospital, University of Melbourne and Monash Centre for Medicine Use and Safety have informed our knowledge and practices of the management of vancomycin resistant enterococcus (Cheah ALY *et al.*, *BMC Infect Dis* 2014). The unit's interest in travel medicine has led to an excellent review of Rickettsial infections in Southeast Asia (Aung AK *et al.*, *Am J Trop Med Hyg* 2014).

Clinical Microbiology

A multi-site study on the clinical pharmacokinetics and toxicodynamics of linezolid (Boak LM *et al.*, *Antimicrob Agents Chemother* 2014) has impacted on the optimal use of this new antibiotic. A study on the use of HBV DNA for monitoring of chronic infection has informed local use of this test (Trevillyan J *et al.*, *Pathology* 2014). Amanda Dennison, our Principal Scientist in Microbiology, published a critical review (Dennison A, *Aust J Med Science* 2014) on the difficult area of the laboratory testing for *Clostridium difficile*. The unit contributes significant laboratory and clinical data to the Australian Group on Antibiotic Resistance resulting in regular publications that supply critical data on trends and resistance in Australia.



Drug Resistance, Antimicrobial Prescribing

Professor Anton Peleg, in collaboration with Associate Professor Allen Cheng and Monash Department of Pharmacy's Dr David Kong, supervised PhD student Ching Jou Lim in extensive work on assessing antimicrobial use and resistance in Caulfield Hospital nursing homes. The work resulted in several publications (Lim CJ *et al.*, *J Antimicrob Chemother* 2014; Lim CJ *et al.*, *Med J Aust* 2014, Lim CJ *et al.*, *BMC Infect Dis* 2014 x 2), received media interest and led to an NHMRC call for action. Professor Peleg's laboratory continued work on understanding mechanisms of disease of hospital-acquired pathogens and the identification of potential therapeutic targets (Cerqueira GM *et al.*, *J Infect Dis* 2014).

Infections in the Immunosuppressed Host

The Immunocompromised Host Service studies prevention, diagnosis and treatment of invasive fungal disease. Professor Peleg and Nenad Macesic, in collaboration with Dr Orla Morrissey, Associate Professor Cheng and the Haematology Unit, studied the changing microbial epidemiology over a nine-year period in the stem cell transplant population, which helped inform the risks of anti-bacterial prophylaxis and development of resistance (Macesic N *et al.*, *Transpl Infect Dis* 2014).

Viral Hepatitis Service

The Hepatitis C virus (HCV) Treatment and Prevention (TAP) study is a world first study examining the feasibility of treating with direct acting antiviral drugs using a nurse led model of care in a community based environment for a cohort of HCV-positive people who inject drugs. It is being undertaken in collaboration with the Burnet Institute and St Vincent's Hospital.

The multicentre Australian trial in acute HCV II (ATAHC II) study was an investigator-initiated trial (in collaboration with the Kirby Institute), which investigated the treatment of recently acquired HCV, with the length of treatment (eight to 24 weeks) being governed by the rate of response to pegylated interferon and ribavirin.

The ATAHC Recall Study explored long-term re-infection, liver health and quality of life following acute HCV infection. The Resolve C Study followed the natural history of a cohort infected with HCV from a single source, healthcare associated outbreak. The Alfred was also involved in international, multi-centre studies treating HCV in people co-infected with HIV (PHOTON-2 Study).

Clinical Research Unit (CRU)

The CRU has enrolled and maintained participants in multiple clinical trials. These have included international multi-site phase 3/4 trials in HIV medicine as well as studies on *Clostridium difficile*, severe influenza and hepatitis C. The CRU is also involved in observational studies in HIV medicine and other infectious diseases such as multi-drug resistant *Klebsiella pneumoniae* and influenza.

Victorian Spleen Service

Spleen Australia resides within the Department of Infectious Diseases (formerly the Victorian Spleen Registry and Service). Currently there are over 4,400 patients registered. Collaborations have now been established with Departments of Health in Tasmania and Queensland and we estimate that 85% of Victorians who have a splenectomy are being registered.

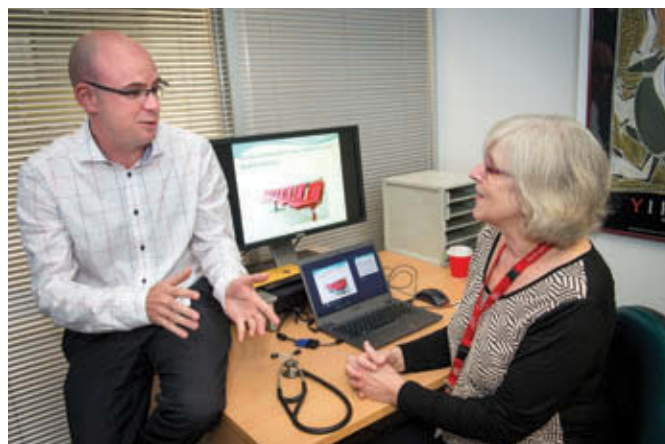
Achievements

Awards

- Infectious Diseases won a Health Roundtable 2014 Innovation Award for 'Improving the care of patients with superbugs'.
- Associate Professor Allen Cheng received the 2014 NHMRC Research Excellence Award for the highest ranked NHMRC Career Development Fellowship at Clinical Level 2.
- Medical Student Eric Aizenstros was awarded a Best Poster Prize at the 2014 Australasian Society of Infectious Diseases Annual Scientific Meeting in Adelaide for his meta-analysis study with Associate Professor Cheng on influenza vaccination in immunosuppressed patients.
- In 2014, Professor Sharon Lewin won the Gertrude Elion Distinguished Lecturer Award and delivered the 20th Annual B. Frank Polke HIV Research Lecture at Johns Hopkins University.
- Professor Lewin was named 2014 Melburnian of the Year and won the 2014 Hadassah Australia Tikkun Olam Award for a prominent Australian who has made a contribution to society and health globally.

Selected Grants

- Associate Professor Cheng was awarded two five-year NHMRC Project Grants, as CIC and CIF, respectively, to commence in 2015: (i) a \$4.6 million trial to study post-operative infection, led by Professor Tomas Corcoran of Monash University; and (ii) a \$1.1 million RCT on combination antibiotic treatment, led by Dr Joshua Davis of the Menzies School of Health Research, NT.
- Professor Cheng leads the Department of Health supported Influenza Complications Alert Network awarded \$470,132 in 2014.
- Professor Lewin received a 12-month (2014-2015) Oregon Health and Science University (OHSU) grant of \$US100,000 for the project 'Eliminating the latent SIV reservoir in rhesus macaques using Alemtuzumab, with colleague Afafe funa Okoye at OHSU.
- Professor Peleg was awarded two three-year NHMRC Projects Grants as CIA and CIB, respectively, to commence in 2014: (i) investigating polymicrobial biofilms (\$587,562); and (ii) investigating antibiotic-induced persistent bacterial infection (\$611,226), led by University of Melbourne colleague Associate Professor Benjamin Howden.
- Dr James McMahon received a \$20,000 Gilead Australia Fellowship Grant for his research into patients lost to follow-up from HIV care in Victoria.



Professor Jennifer Hoy (R), Director of HIV Medicine at The Alfred and Dr James McMahon (L), Infectious Disease Physician and HIV researcher, discuss care of HIV patients.

Postgraduate Students

17 PhD Students

Publications

80 Journal Articles

Psychiatry

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



Professor Jayashri Kulkarni (front row, 2nd right) with members of the MAPrc team.

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

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

Women's Mental Health

Antipsychotic Medication in Pregnancy

Principal Investigator: Professor Jayashri Kulkarni

The National Register of Antipsychotic Medication in Pregnancy (NRAMP) is a world-first, prospective research study employing descriptive techniques, which provides naturalistic observation of mothers in Australia who take antipsychotic medication during pregnancy. The global lack of medication-based guidelines and patient-centred treatment plans highlights the need to support this specific mother-infant dyad in all stages of life, particularly in the first five years. Our focus turns to the children of women in NRAMP, who have been exposed to antipsychotic medication *in utero*.

Anecdotal evidence, backed by clinical report, informs us that although the majority of infants at 12 months of age are progressing well across all developmental domains, there is a smaller group that exhibits gross motor delay. This appears to continue over time, to children at 5 years of age, where it emerges as a significant difference when compared with an age-matched control group of children without *in utero* antipsychotic medication exposure. Such implications accentuate the need for further research on fetal, infant and child development, while the evolution of a translational, integrated, evidence-based medication framework continues.

Psychiatric Neurotechnology

Novel Methods to Treat Depression

Principal Investigator: Dr Rebecca Segrave, Research Fellow

Many patients with major depressive disorder (MDD) fail to respond to antidepressant medications and psychological therapies and so there is a need to develop novel effective therapies. Depression is associated with under activity of the dorsolateral prefrontal cortex (DLPFC), an important brain region for development of targeted neurobiological treatments. Transcranial direct current stimulation (tDCS) is a mild form of non-invasive brain stimulation, which has shown promise as an antidepressant therapy when administered at rest to the DLPFC. However, the magnitude of antidepressant outcomes have been mild to moderate and we are working to develop novel tDCS treatment protocols that may enhance therapeutic outcomes.

Research conducted at MAPrc, and internationally, has shown that tDCS can enhance cognitive processing, especially when an individual is cognitively active during its delivery. Cognitive control training (CCT) is a new antidepressant therapy that uses specialised cognitive tasks to activate the DLPFC in order to increase neural activity in this area and reduce depression severity. Thus, tDCS and CCT are two interventions that aim to modulate activity in the DLPFC to treat MDD, one via direct stimulation and the other via behavioural methods. We recently conducted a world-first pilot clinical trial that tested the antidepressant efficacy of combined tDCS plus CCT. Our data suggest that the two treatments together may be more effective at treating depression than delivery of either one alone. Support from 'beyondblue' is allowing us to follow this up in a larger study.

Cognitive Psychiatry

Eye movement and Anorexia

Principal Investigator: Professor Susan Rossell, Professorial Research Fellow

Anorexia nervosa (AN) is a complex disorder involving psychological, sociocultural, genetic and neurobiological factors that potentially contribute to susceptibility. The limited utility of current therapeutic options necessitates a clear understanding of the neurobiological basis of AN, which may inform current treatments and afford insight into the development of new therapeutic applications. In recent work

from Professor Rossell's team with AN patients, we identified an as yet unreported oculomotor deficit that may be critical to understanding the pathophysiology of AN. The AN patients made an increased rate of 'saccadic intrusions' called square wave jerks (SWJ) that are 'twitching' eye movements, in which the eye quickly moves away and returns to fixation. The rate at which AN patients (n = 23) made SWJs was negatively correlated with state anxiety. Together, the rate of SWJs and anxiety correctly classified healthy controls (n = 22) with 96% accuracy and AN participants with an accuracy of 87%. The findings suggest that AN may be related to a dysfunction in specific oculomotor brain areas and/or the GABA (γ -aminobutyric acid) neurotransmitter system. Further research examining GABA in AN is recommended.

Phillipou A, **Rossell SL**, Castle DJ, Gurvich C, Abel L. Square wave jerks and anxiety as distinctive biomarkers for anorexia nervosa. *Invest Ophthalmol and Vis Sci* 2014;55(12):8366-70.

Psychopharmacology

Ondansetron Study

Principal Investigator: Professor Jayashri Kulkarni

Schizophrenia is a low-prevalent but severe mental illness, which will directly affect approximately 1% of the population in their life. The long-term prognosis of schizophrenia is highly variable and for many individuals it will become a lifelong illness. While current antipsychotic medication may help to attenuate or in some cases cease the symptoms entirely, there is a long-term risk of relapse seen as either a re-emergence or increased intensity of symptoms and, for many patients, medication will be required for life. A major concern for both clinicians and their patients is that current antipsychotic medication is associated with significant side-effects. As the burden of schizophrenia to both the affected individual and society can be devastating, we need to find superior treatment options without the problematic side-effects to better manage the symptoms of psychosis, improve quality of life, and enable full recovery from this debilitating illness.

MAPrc is conducting a 12-week double-blind randomised controlled treatment trial using ondansetron as an adjunctive therapy, which is funded by the Stanley Foundation. Ondansetron is a serotonin 5HT₃ receptor antagonist that has shown promising results in the treatment of schizophrenia symptoms in a number of small scale studies. In particular, ondansetron has shown benefits in reducing the persistent cognitive and other symptoms experienced by many patients with schizophrenia. MAPrc has randomised 70 participants in the trial and interim analysis of data has shown promising results.

Services

Burns Injuries and Psychosocial Adjustment

Principal Researcher: Birgit Pfitzer, Alfred Community Liaison Psychiatry

The February 2009 Black Saturday Victorian bushfires are among Australia's worst natural disasters, with approximately 173 deaths. Seventeen people with significant burn injury were also successfully treated at The Alfred hospital's statewide Victorian Adults Burns Service. Three years after Black Saturday, we completed qualitative and quantitative

measures relating to 13 burns patients and seven of their family members to explore the longer-term psychological impact of being a bushfire burns patient or family member of a patient. At three years post-injury, 33% of bushfire burns patients reported 'high' to 'very high' levels of psychological distress, 25% reported symptoms consistent with post-traumatic stress disorder and physical health status was also impaired. A number of family members also reported significant psychological distress, indicating that both burns patients and family members face a risk of chronic psychological impairment. Patient and family member interview feedback highlighted differences in coping strategies, supports, and meaning attributed to being a bushfire burns survivor or involved in survivor care. Provision of care for bushfire burns patients and their families must therefore consider how to address longer-term psychological and physical health consequences.

Pfitzer B, Katona LJ, Lee SJ, O'Donnell M, Cleland H, Wasiak J, Ellen S. Three Years After Black Saturday: Long-Term Psychosocial Adjustment of Burns Patients As a Result of a Major Bushfire. *J Burn Care Res* 2014;Dec 10:Epub.

Achievements

- Professor Jayashri Kulkarni was honoured by the City of Melbourne with the 2014 Melbourne Award for 'Contribution to Community by an Individual'.
- Professor Paul Fitzgerald secured an NHMRC Practitioner Fellowship (2015-2019) and an NHMRC Project Grant of \$967,355 (2015-2019) for his research into advancing brain stimulation treatments for depression.
- Professor Susan Rossell received a Barbara Dicker Foundation Grant for her research into auditory verbal hallucinations in mental health disorders.
- Dr Kate Hoy was awarded an NHMRC Career Development Fellowship (2015-2018) for her research into restoring cognitive function using brain stimulation and was elected to Co-Deputy Chair the Australian Academy of Sciences Early- and Mid-Career Researchers Forum.
- Dr Rebecca Segrave was awarded a Monash University Faculty of Medicine Nursing and Health Sciences Strategic Grant for Early Career Researchers (ECRs) for her work 'Understanding individual differences in response to non-invasive brain stimulation: The influence of gender and sex hormones' and was selected to represent Australian ECRs at the 64th Lindau Nobel Laureates Meeting in Physiology or Medicine held in Germany in 2014.
- Dr Bernadette Fitzgibbon won the 2014 Victorian Young Tall Poppy Award and the 2014 Bethlehem Griffiths Research Foundation Young Researcher of the Year Award for her work on pain perception.
- Dr Tamsyn Van Rheenen secured an NHMRC Early Career Fellowship (2015-2018) as well as receiving the 2014 Australian Psychological Society Award for an Excellent Thesis in Psychology and the Swinburne University of Technology's School of Health Sciences Best Thesis Award for her PhD.

Postgraduate Students

23 PhD Students
11 Doctor of Psychology Students

Publications

64 Journal Articles
1 Book Chapter

Sexual Health

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



Research staff and new students at Melbourne Sexual Health Centre.

The Melbourne Sexual Health Centre (MSHC) is a specialised unit for the diagnosis and treatment of sexually transmissible infections (STIs) including HIV, and is a principal centre for training sexual health professionals in Victoria. The Centre conducts epidemiological, public health and clinical research, primarily aimed at improving the services offered at MSHC. The Research Division of Melbourne Sexual Health joined Monash Central Clinical School in November 2013.

Express Testing Service

An express testing service (ETS) for clients at lower risk for STIs provides easy access to clinical services for STI screening. We assessed the benefits of an ETS considering all clients attending the walk-in triage service at MSHC before the introduction of ETS in 2009 and after ETS (2011 and 2012). Over this time, the total number of clients seen in the clinic rose and the time taken for each consultation and the total time spent in the clinic was significantly decreased for those clients using the ETS compared to the others (from 25 min to 6 min for consultation time and from 59 min to 29 min for total clinic time). The data suggest that fast-track services such as ETS are effective in increasing access for higher-risk individuals while streamlining screening of asymptomatic low-risk clients.

Human Papilloma Virus

Human Papilloma Virus (HPV) is common among men who have sex with men (MSM) and is the principal cause of anal cancer. We examined the incidence of anogenital HPV infection among teenage MSM. The proportion of men with anal HPV of any type was 10% in men reporting no prior receptive anal sex and 47% in men reporting four or more receptive anal sex partners. The proportion of men with penile HPV was 4% in men reporting no prior insertive anal sex and 15% in men reporting four or more insertive anal sex partners. Overall, 39% of men had at least one HPV type: 23% had a vaccine-preventable type (6, 11, 16 or 18). The yearly incidence of HPV 16 or 18 (main cancer causing types) was 25% per year. Early and high per partner transmission of HPV occurred between men soon after their first sexual experiences. The public health significance of these findings are that vaccination against HPV must occur before commencement of sexual activity and vaccination coverage needs to be high.

Bacterial Vaginosis

A study of women-who-have-sex-with-women (WSW) with bacterial vaginosis (BV) was carried out to look at behaviours that may impact on the vaginal microorganisms of women and their female partners. Women between the ages of 18 and 55 years were recruited nationally. Participants completed questionnaires and self-collected vaginal swabs weekly on three occasions for BV assessment. A total of 458 participants were recruited of which 192 were co-enrolled with their female partner (96 couples). BV was detected in 125 women (27%) and was found more often in those who smoked, those who had four or more lifetime female partners and those whose partners had BV symptoms. A total of 375 (88%) participants had stable normal vaginal flora with co-enrolled couples less likely to have BV (31% versus 23%). Long term sexually-active WSW partnerships were more likely to have normal vaginal microorganisms.

Achievements

- Dr Tim Read was awarded a four-year NHMRC Early Career Fellowship to commence in 2015 for his postdoctoral research project entitled 'A randomised trial of allowing MSM to have HIV and syphilis tests between clinic consultations'.
- Dr Jason Ong was awarded an NHMRC Postgraduate Scholarship for 2014-2015 for his research project entitled 'Annual anal examinations to detect early cancer in HIV positive MSM'.
- Dr Eric Chow was awarded a four-year NHMRC Early Career Fellowship to commence in 2015 for his postdoctoral research project entitled 'Prevalence of genital HPV infection in males following introduction of universal male HPV vaccination'. Dr Chow also received the 2014 Burnet Prize for Infectious Diseases for his poster presentation at Alfred Health Week entitled 'Ongoing decline in genital warts among young heterosexuals seven years after the Australian HPV vaccination program'.

Postgraduate Students

9 PhD Students

Publications

46 Journal Articles

Alfred Health Departments Conducting Research

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



*Medical and Surgical Departments	Medical Services	Nursing
Allergy, Immunology and Respiratory Medicine Head: Prof. Robyn O’Hehir	Anatomical Pathology Head: Prof. Catriona McLean	Nursing Services Executive Director: Janet Weir-Phyland Research Director: Prof. Tracey Bucknall
Burns (Victorian Adult Burns Service) Head: Dr Heather Cleland	Clinical Pharmacology Head: Professor Henry Krum	Allied Health
Cardiothoracic Surgery Head: Prof. David McGiffin	Diagnostic and Interventional Radiology Head: Prof. Ken Thomson	
Cardiovascular Medicine Head: Prof. Anthony Dart	Nuclear Medicine Head: Prof. Victor Kalff	Head: Lyndell Keating
Emergency and Trauma Centre Head: Dr De Villiers Smit	Pathology Services Head: Assoc. Prof. Hans Schneider	Nutrition and Dietetics Head: Assoc. Prof. Ibolya Nyulasi
Endocrinology and Diabetes Head: Prof. Duncan Topliss	Pharmacy Head: Prof. Michael Dooley	Occupational Therapy Head: Jane Feurtrill
Gastroenterology Head: Prof. Peter Gibson		Social Work Head: Bridget Wall
General Surgery Head: Prof. Jonathan Serpell		Physiotherapy: Head: James Sayer
Intensive Care Head: Prof. Carlos Scheinkestel		Psychology Head: Lynda Katona
Medical Oncology Head: Prof. Max Schwarz		Speech Pathology Head: Janine Mahoney
Melanoma (Victorian Melanoma Service) Head: Assoc. Prof. John Kelly		
Neurosurgery Head: Prof. Jeffrey Rosenfeld		
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		

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

Allergy, Immunology and Respiratory Medicine

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



Head of The Alfred Cystic Fibrosis (CF) Service Professor John Wilson (R) and Clinical Fellow Dr Deirdre Edgeworth discuss preliminary data from a clinical trial in CF patients.

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

AIRmed integrates clinical services with extensive human and experimental research programs, linking senior clinician scientists, bench scientists, allied health professionals, primary care physicians and the community. Clinically driven hypotheses direct the laboratory-based human research and subsequent translation into changes in current best practice for improved health outcomes. The clinical and academic base of AIRmed is located at The Alfred hospital, with experimental and clinical research laboratories located within the hospital and 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 and other research grant funding. High international and national profiles of senior personnel are reflected in numerous peer review publications and speaking invitations. AIRmed is committed to delivering outstanding best practice clinical care, outcome driven professional education and community outreach as well as translational research of international acclaim.

Asthma Breakthrough

Professor Bruce Thompson (Head of The Alfred Physiology Service) and Professor Robyn O'Hehir have compelling preliminary data from pilot studies that show that the small airways are the predominant site of disease activity for asthma patients. The conventional treatment of inhaled steroids only reaches the medium to large central airways. A new study, funded by an NHMRC Centre of Research Excellence, will test the effectiveness of a small particle treatment designed to travel further into the lungs. The study, to be jointly performed with the Royal North Shore Hospital, will recruit 120 patients, aged 18-55 years, with severe asthma. This type of asthma occurs in almost half of the asthma population. Recruitment will begin in 2016, with results to be analysed in 2019. The Alfred team is hopeful that this will be a cost effective way to substantially reduce morbidity and healthcare costs associated with complications of severe and unstable asthma.

Cystic Fibrosis

People with cystic fibrosis (CF) inherit a defective gene called CFTR (CF transmembrane conductance regulator). Ivacaftor is a CFTR gene-potentiating agent licensed for use in patients with Class III gating CF mutations. The beneficial effects on lung function, exacerbation rate, rate of hospitalisation and quality of life indices have been well established. To date, however, the effects on exercise capacity and other indices of extra-pulmonary health are unknown. With this in mind the CF Service at The Alfred undertook a double-blind, placebo-controlled trial in 20 adult patients with CF. At the end of the study period all participants commenced open-label medication and had a further assessment at 24 weeks post-commencement.

Participants underwent six assessments involving cardio-pulmonary exercise testing, spirometry, bloods, sputum samples, quality of life assessments and sweat tests. The primary end-point for the study was VO_2 max. Secondary end-points included FEV₁ percent predicted, sweat chloride levels, inflammatory markers, quality of life indices and changes in the sputum microbiome (analysis on genetically distinct molecular species). Sputum samples were examined using cDNA microbiome analysis techniques. Findings are due to be presented in 2015.

Achievements and Awards

- Professor Robyn O'Hehir was elected a Foundation Fellow of the newly established Australian Academy of Health and Medical Sciences.
- Adjunct Clinical Associate Professor Brenda Button was awarded a 2014 Churchill Fellowship to gain expertise in life supportive treatment for patients bridged to lung transplant on external mechanical oxygenation.
- Dr Kirk Kee received an Abstract Scholarship to attend the 2014 American Thoracic Society (ATS) International Conference in San Diego, on behalf of the Assembly on Sleep and Respiratory Neurobiology.
- Professor Bruce Thompson was elected to the Board of the Thoracic Society of Australia and New Zealand at the Annual General Meeting held in March 2014 and has since been appointed Secretary of the Society.
- Dr Miranda Paraskeva received an International Society for Heart and Lung Transplantation 2014 Transplant Registry Early Career Award for her research project entitled 'Outcomes of adolescent recipients following lung transplantation'.

- Kerry Parker was awarded a Traveling Fellowship supported by The Alfred WTMS (Whole Time Medical Specialists) Fund to present at the ATS meeting and to visit world renowned hospitals specialising in both acute and chronic non-invasive ventilation.

Selected Major Grants

- Professor Robyn O’Hehir (CIA) and AIRmed co-investigators Emeritus Professor Jennifer Rolland and Dr Sara Prickett secured a \$2 million grant from the Medical Research Commercialisation Fund (2014-16) to carry out a phase 1 and phase 2a clinical trial for peanut synthetic peptide immunoregulatory T-cell epitope therapy.



L-R: Members of the Allergy Laboratory: Dr Sara Prickett, Professor Robyn O’Hehir (Head of AIRMed) and Emeritus Professor Jennifer Rolland are conducting a clinical trial of a vaccine for peanut allergy.

- Professor Robyn O’Hehir is a co-investigator (CID) on a three-year (2015-2017) NHMRC Project Grant of \$673,472 entitled ‘Structure and function of human Fc receptors’ with Burnet Institute collaborators Professor Mark Hogarth (CIA) and Dr Bruce Wines (CIC).
- Associate Professor Tom Kotsimbos is a co-investigator (CIC) on a three-year (2015-2018) NHMRC Project Grant of \$965,569 entitled ‘The role of cross-reactive T-cells in severe lung disease following viral respiratory infections’ with Monash University collaborators Professor Anthony Purcell (CIA) and Dr Nicole Mifsud (CIB).
- Professor Bruce Thompson is a co-investigator (CIF) on a five-year \$2.5 million NHMRC Centre of Research Excellence in Severe Asthma awarded to a team led by Professor Peter Gibson at the University of Newcastle (2014-2019).

- Professor Michael Abramson (CIB) and Associate Professor Anne Holland (CIE) are co-investigators on a three-year (2014-2017) NHMRC Partnership Project Grant of \$441,491 entitled ‘An interdisciplinary model of care for early detection of lung damage, smoking cessation support, and a home-based exercise/self-management program’ led by Dr Johnson George (CIA) with other co-investigators from Monash University, University of Newcastle and University of New South Wales.



Professor Bruce Thompson, Head of The Alfred Physiology Service.

- Professor Bruce Thompson (CIC) is a co-investigator on a three-year (2015-2017) ARC Discovery Grant of \$344,400 entitled ‘Hybrid imaging / modeling: unlocking our understanding of the lung’ with Monash University collaborators Professor Andreas Fouras (CIA) and Associate Professor Gregory Sheard (CIB).
- Professor John Wilson (CIA) and Associate Professor Tom Kotsimbos (CIB) are co-investigators on a \$99,800 collaborative grant with their Monash University colleagues from the National e-Health Transition Authority (NeHTA) entitled ‘Evaluation of the benefit of the PCEHR – Personally Controlled Electronic Health Record’ (2014-2015).

Postgraduate Students

7 PhD Students

Publications

100 Journal Articles
3 Book Chapters
2 Books

Allied Health

Head: Lyndell Keating

Nutrition

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

The Nutrition Department provides acute and chronic disease management services. Research areas include the etiology and impact of nutritional disorders in disease and targeted nutrition interventions with active projects in intensive care, respiratory medicine, haematology and pregnancy.

Nutrition in the ICU

Measurement of energy expenditure with indirect calorimetry to calculate nutrition requirements for Intensive Care Unit (ICU) patients has become routine practice since Dr Audrey Tierney's observational study in 2013. Dr Tierney's work has informed the development of a study, which will recruit 80 obese ICU patients to compare standard nutrition care to nutrition therapy using indirect calorimetry.

The Alfred Nutrition Department is the lead Australian site on a multicentre, randomised, controlled trial (RCT) investigating the role of supplemental parenteral nutrition in critically ill adults. A sub-study at The Alfred follows nutrition intake after ICU and measures energy utilisation with indirect calorimetry.

In a prospective case controlled pilot study, Dr Tierney and Oana Tatucu are using a novel method to measure intestinal permeability changes in critically ill adults that will assist in determining gastro-duodenal, small intestine, large intestine and whole gut permeability.

Pregnancy and Nutrition

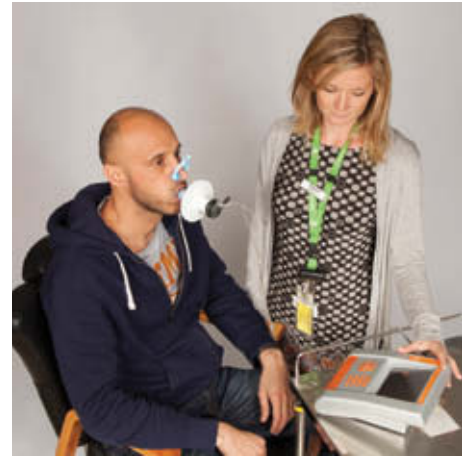
Dr Tierney is the lead investigator examining the impact of dietary interventions on pregnancy outcomes, together with Rachelle Opie and Madeleine Neff. Following on from a pilot study completed in 2013, a larger controlled trial is investigating if early nutritional intervention and ongoing antenatal dietetic support in obese pregnant women will achieve weight gain targets and reduce antenatal and postnatal complications in mother and child.

Nutrition in Respiratory Conditions

The nutritional arm of a gene-therapy study in cystic fibrosis (CF) patients with G551D gene mutations (led by Dr Tierney) investigated the effects of the gene potentiator drug (Kalydeco™) on body composition. Overall, three months on the medication resulted in increased body weight, body mass index and fat mass.

With a view to refining approaches to nutrition assessment and management in Chronic Obstructive Pulmonary Disease (COPD), Natalie Shalit, Dr Susannah King and Dr Tierney

Oncology dietitian Sarah Fagan measures a patient's energy expenditure with the FITMATE to facilitate individualised nutrition management.



examined factors that influence dietary intake in adults with COPD and found that a range of physical, practical and social support factors influenced food choices and nutritional habits.

Nutrition and Stem Cell Transplantation

Dr King leads investigations in stem cell transplant (SCT) recipients with a view to developing a model of care for nutrition management during and following SCT. One study finding marked persistent weight loss in allogeneic and autologous SCT recipients and poor recovery of weight by one year post-SCT. A second pilot study is measuring energy expenditure using indirect calorimetry in SCT recipients in addition to body composition monitoring.

Dr Tierney leads work on nutritional health issues in longer term SCT survivors. The 'Positive Change for Life' study, a healthy lifestyle intervention program to reduce metabolic syndrome and associated risk factors in long term survivors of SCT, showed that 53 survivors achieved significant reduction of mean weight and waist circumference with clinically meaningful reductions in blood pressure.

Achievements

- Emma Ridley and Rachelle Opie were awarded NHMRC Postgraduate Scholarships commencing in 2014 for PhD studies at Monash and La Trobe Universities, respectively.
- Dr Audrey Tierney received the Research Focus Area Understanding Disease Game Changing Partnership Grant (\$78,000) in 2014 from La Trobe University to undertake an RCT investigating the Mediterranean diet in Non Alcoholic Fatty Liver Disease (MEDINA) in three Melbourne metropolitan hospitals.
- Natalie Shalit's study investigating influences on dietary intake of COPD patients won the best poster award at the 2014 Australian Disease Management Association Conference and the Lucy Battistel poster prize for Allied Health at Alfred Health Week, 2014.
- Beth Viner-Smith won the Henrietta Law Memorial Prize for Allied Health at Alfred Health Week, 2014, for her poster on nutrition in SCT survivors.
- Dr Susannah King received the David Russell Clinical Research Award at the 2014 Australasian Society for Parenteral and Enteral Nutrition (AuSPEN) conference for her poster on nutritional outcomes in allogeneic SCT recipients.

Postgraduate Students

4 PhD Students
4 Masters Students

Publications

6 Journal Articles

Occupational Therapy

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

The research activities of the Occupational Therapy (OT) Service have focused on the evaluation of quality, efficacy, and safety of OT assessments and interventions in the four key areas of neurotrauma, rehabilitation, ageing and musculoskeletal conditions.

Associate Professor Natasha Lannin has continued to build Alfred OT's profile in collaborative multi-site research in the areas of stroke recovery and acquired brain injury. Dr Lisa O'Brien continues her research into acute hand trauma, and is also leading the qualitative research component of a multi-site cluster RCT examining the effectiveness, cost-effectiveness and safety of weekend allied health cover in acute hospital wards, which attracted NHMRC Partnership Project and Victorian Department of Health funding for 2013 to 2015.



Associate Professor Natasha Lannin received the RACV Sir Edmund Herring Memorial Scholarship to develop and test a re-orientation program for patients with post traumatic amnesia.

Improving Memory after Acquired Brain Injury

Associate Professor Lannin and colleagues conducted an assessor-blinded RCT to determine the effectiveness of personal digital assistant devices on achievement of memory and organisation goals in 42 patients with poor memory after acquired brain injury. Use of a personal digital assistant led to greater achievement of functional memory goals and improvement on the 'General Frequency of Forgetting' subscale, providing evidence that OT training in the use of a handheld computer could improve patients' daily memory function over standard rehabilitation.

Lannin N, Carr B, Allaous J, Mackenzie B, Falcon A, Tate R. A randomized controlled trial of the effectiveness of handheld computers for improving everyday memory functioning in patients with memory impairments after acquired brain injury. Clin Rehabil 2014;28(5):470-481.

Comparing Treatment for Finger Fractures

Lisa O'Brien and colleagues conducted a multicentre prospective cohort study to compare swing traction versus no-traction management of complex fractures of proximal inter-phalangeal (PIP) finger joints. Adults from three public hospitals and one private clinic with a history of complex PIP fractures affecting $\geq 30\%$ of articular surface injury were invited to participate. X-rays taken at the time of injury were graded by two blinded assessors, and participants attended a clinic for measurement of range of motion and self-reported function, pain and satisfaction at least one year post injury. The primary outcome was combined motion of the PIP and distal inter-phalangeal joints. Patients treated with the swing traction protocol (n = 17) had greater range of motion in the

finger compared with the group receiving no traction (n = 14); however, swing traction treatment did not translate to improved patient ratings of function, pain or satisfaction. A basic cost comparison indicated that swing traction may be less expensive than other forms of surgical repair.

O'Brien LJ, Simm AT, Loh IWH, Griffiths KM. Swing traction versus no-traction for complex intra-articular proximal inter-phalangeal fractures. J Hand Ther 2014;27(4):309-16.

Achievements

Associate Professor Lannin was awarded:

- An NHMRC Project Grant of \$1,036,713 to commence in 2015 to conduct an RCT on the role of botulinum toxin A in optimisation of upper limb recovery following stroke.
- An Institute for Safety Compensation and Recovery Research (ISCR) grant of \$915,000 for the second phase of a research program examining the impact of the state-wide Alfred Health Brain Injury Rehabilitation Program.
- An RACV Sir Edmund Herring Memorial Scholarship of \$55,000 for 'Development and testing of a standardised re-orientation program for people in Post Traumatic Amnesia'.

The department had 19 oral presentations and 10 posters at national and international conferences.

Postgraduate Students

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

Publications

19 Journal Articles

Physiotherapy

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

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



Dr Carol Hodgson, Senior Physiotherapist and member of Monash University's Australian and New Zealand Intensive Care Research Centre, leads a program of research investigating early mobilisation in intensive care.

Mobilisation Study in Intensive Care

Dr Carol Hodgson leads physiotherapy research in intensive care with the TEAM (Trial of Early Activity and Mobilisation) research program. The TEAM study, a bi-national, multicentre prospective observational cohort study (n = 192), investigated current mobilisation practice, strength at ICU discharge and functional recovery at six months among mechanically ventilated patients across multiple ICUs. The study found

that in the cohort examined, mobilisation was uncommon with more than 50% of patients discharged from the ICU developing ICU-acquired weakness, in turn associated with death between ICU discharge and day 90. The study was published in *Critical Care* (TEAM Study Investigators, Hodgson C *et al*, *Crit Care* 2015), the third highest ranked intensive care journal (as assessed by Scopus) and achieved 'Editor's pick', as well as having the highest number of social media hits of any publication in the history of the journal. The manuscript was also published with a blog and a question and answer section from the authors. Funded by The Alfred Foundation, The Intensive Care Foundation and Monash University, other outputs from the TEAM program of research have included: publication of a systematic review; development of a novel outcome measure of mobilisation in intensive care; an international safety consensus meeting; and a pilot RCT. Other TEAM study investigators are Rinaldo Bellomo, Heidi Buhr, Belinda Gabbe, Megan Harrold, Lisa Higgins, Manoj Saxena, Jeff Presneil, Lizzie Skinner, Claire Tipping, Steve Webb and Paul Young.

Rehabilitation Following Trauma

Physiotherapist Lara Kimmel is undertaking a program of doctoral research exploring the role of rehabilitation following trauma. Using data from over 1,400 individuals in the Victorian Orthopaedic Trauma Outcomes Registry (VOTOR), Lara has developed a 'Trauma Rehabilitation and Prediction Tool' (TRaPT) to predict which patients will require inpatient rehabilitation following trauma. In 2014, Lara published a second study which prospectively validated TRaPT and showed that discharge destination could be accurately predicted in 80% of patients (Kimmel *et al*, *Phys Ther* 2014). A simplified version of TRaPT is now being used in the Trauma service at The Alfred to assist early and accurate discharge planning, with benefits seen for both patients and the health service.

Setting Technical Standards in Walking Tests

In 2014 Associate Professor Anne Holland led an international Task Force to develop a new Technical Standard for Field Walking Tests in chronic respiratory disease, on behalf of the American Thoracic Society and European Respiratory Society. The new Technical Standard, which is underpinned by a companion systematic review (Singh *et al*, *Eur Respir J* 2014), defines best practice in the conduct and interpretation of field walking tests based on current evidence. Published in the *European Respiratory Journal* (Holland *et al*, 2014), the new standards will have implications for conduct of field walking tests internationally, in research and clinical practice.

Postgraduate Students

10 PhD Students
11 Masters Students

Publications

38 Journal Articles
2 Book Chapters

Psychology

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

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

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

In 2014 research activities focused on factors contributing to poor outcome for individuals with mild traumatic brain injury (mTBI), the assessment of HIV-associated neurocognitive disorder in culturally and linguistically diverse individuals, research into the long-term wellbeing of burns patients and the evaluation of a therapeutic group program for young people with emerging personality disorder.



Neuropsychologist Dr Jacqueline Anderson leads a multidisciplinary, cross-institutional research team investigating the causes of poor long-term outcomes after mild traumatic brain injury.

Mild Traumatic Brain Injury

Dr Jacqueline Anderson, who holds an honorary role as a neuropsychologist in the Psychology department, leads a multidisciplinary, cross-institutional research team investigating the causes of poor long-term outcomes after mTBI. Together with colleagues from the Monash Alfred Psychiatry Research Centre (Dr Jerome Maller and Professor Paul Fitzgerald), The University of Melbourne (Dr Luke Smillie) and the Murdoch Childrens Research Institute (Dr Marc Seal), Dr Anderson is examining the pathological, cognitive, psychological and physical factors that contribute to poor long-term outcomes after mTBI. New cognitive tools that are sensitive to subtle mTBI pathology are being used together with cutting-edge neuroimaging technology and these measures are embedded in a broader examination of a range of psychological, psychiatric and physical factors (e.g. mood, pain, fatigue, coping style) that are known to increase the risk of poor long-term outcomes after mTBI.

Community Mental Health Program

The Psychology Department in partnership with OT conducted a retrospective audit of quantitative and qualitative data from four eight-week social skills groups run between 2011 and 2013 in the Community Mental Health program. Pre- and post-group measures assessing self-rated friendships and confidence with social skills and clinician-rated social functioning were analysed as well as qualitative feedback from the group participants. Analysis revealed significant improvements in participants' confidence with their social skills with a trend for improvement in self-rated engagement in friendships and observed social skills. The results indicate that the social skills groups with a focus on friendships, role-play and conversation games to practice new skills were an effective way to build social confidence among participants. The program added to the recovery-centred practice of the Community Mental Health service, while adding to the diversity of clinician skills for psychosocial-oriented practice.

Postgraduate Students

1 Doctor of Psychology Student

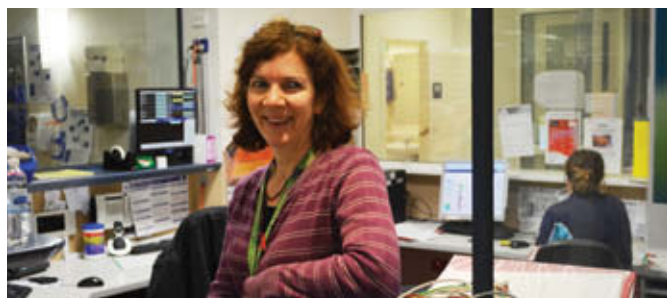
Publications

6 Journal Articles

Social Work

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

The former Patient and Family Services Department at The Alfred devolved some of its services to become 'Acute Social Work' managed by Bridget Wall, who also oversees the Aboriginal Health Liaison Officer Program and Pastoral Care. The research agenda of Acute Social Work is dominated by collaborative projects, which include:



Social Worker Cathie Smith leads the Allied Health Emergency Department (ED) team and is carrying out a project to explore what constitutes an effective ED Allied Health team.

- A collaboration between The Alfred and The Epworth Social Work teams looking at the impact of translocation stress in patients and families moving from an acute to rehabilitation setting.
- A collaboration with the OT Department on patient-centered goal setting in acquired brain injury and strategies for patient and family engagement. Social Work undertook a focus in the ICU setting.
- A collaboration with The Alfred Burns Unit on the identification of the psychosocial issues of burns patients presenting to a level 1 Burns Centre and implications for healthcare outcomes.
- Evaluation of the new Health Legal Partnership based in the Social Work Department, which has afforded the opportunity for a research partnership with The Michael Kirby Centre, Monash University.
- A joint project with multiple Social Work departments in health care settings across Victoria and the University of Melbourne, to evidence and document specific social work interventions.

The department continues to engage Associate Professor Lou Harms from the University of Melbourne in a consultancy arrangement. Individual social work research projects are also under way in the cancer, trauma, general medicine and infectious diseases areas.

Allied Health in the Emergency Department

Social Worker Cathie Smith, who leads the Allied Health Emergency Department (ED) team, has been carrying out the project 'Beyond KPIs - What makes an effective Allied Health Team'. Cathie undertook a descriptive exploratory study to consider the role (practice) of the ED Allied Health team. The intent is to explore the practice of the Allied Health team from the perspective of the broader ED team. The focus of data analysis is to identify the contribution of the Allied Health team to patient care and the discharge processes within the department. Cathie has completed a comparative analysis of two staff satisfaction surveys and will undertake a medical record data mining exercise.

The General Medical Social Work Team

The General Medical Social Work team undertook the project 'Looking at the Acute Social Work Role in the Transition into Residential Aged Care - Closing the Gap'. A standardised tool was developed that captured and consolidated the key social work roles in the transition into care. This tool has provided an educative role in relation to social work practice and informed other staff about the emotional impact of this process.

Clinical Support and Development Leader, Anna Wellington-Boyd and social work student, Roz Meredith commenced a systematic literature review, under the guidance of Associate Professor Megan Davidson (La Trobe University), to identify existing standardised outcome tools relating to a range of acute inpatient social work diagnostic and intervention variables.

Achievements

- Sue De Bono (Social Work) was awarded an Alfred Health Small Project Grant in collaboration with Lynda Katona (Psychology) and Dr Sharon Avery (Haematology) to undertake an RCT evaluating an intervention to reduce psychological distress and improve coping and quality of life in hemopoietic stem cell transplant patients.
- An Australian Association of Social Workers Maurice Blackburn Trauma Grant of \$5,000 was awarded to Margi Cowgill (Social Work) to undertake research in relation to the impact of the use of social media for trauma patients and their families in intensive care.

Publications

1 Journal Article

Speech Pathology

Head: Janine Mahoney BAppSc(SpPath)

The Speech Pathology Department has been participating in an NHMRC-funded Australia-wide project, led by Professor Beth Armstrong at Western Australia's Edith Cowan University, evaluating the efficacy of early intervention in aphasia rehabilitation after stroke. Work has been undertaken within the Stroke Unit with ten Alfred Health Speech Pathologists participating in the study across acute, subacute and community services. Known as the VERSE project (Very Early Rehabilitation in SpEech), the study investigates whether intensive, early aphasia therapy results in better communication outcomes for stroke patients and aims to accurately cost intensive aphasia therapy. Participants with aphasia are recruited within 14 days post stroke and are randomised to one of three groups: usual care; usual care plus additional therapy sessions; or, a standardised aphasia therapy program from independent speech pathologists. Patients are evaluated at 12 and 26 weeks post stroke after five weeks of therapy. The NHMRC has funded the study from 2013 to 2015.



Speech Pathologist Marissa Stone administers an assessment as part of the Very Early Rehabilitation in SpEech (VERSE) trial.



TheAlfred

Anatomical Pathology

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

The Department of Anatomical Pathology's main research areas involve collaborative projects on breast cancer, liver cancer, prostate cancer, melanoma, muscle disease and neurodegenerative diseases.

Neurodegenerative Disease

In collaboration with The Alfred Neurosciences department, we published a paper in *Neurology*, examining the neuropathology of a newly described syndrome CANVAS – cerebellar ataxia with neuropathy and bilateral vestibular areflexia syndrome. We identified by pathologic examination that the mechanism responsible for the disease is related to a loss of specific neurons. The work was highlighted at the 2014 International Congress of Neuropathology meeting in Rio de Janeiro to alert neuropathologists to this newly described condition. Our cohort of patients with CANVAS includes six sibling pairs, which points to a genetic component for inheritance of the disease. The frequency of the disease is yet to be established, and identification of the culprit gene is currently a target of investigation.

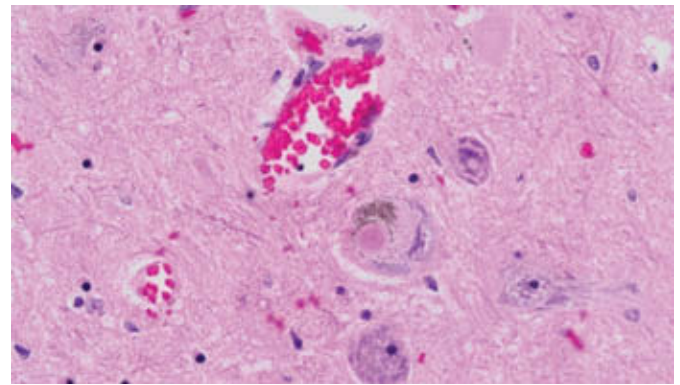
**Szmulewicz DJ, McLean CA, Rodriguez ML, Chancellor AM, Mossman S, Lamont D, Roberts L, Storey E, Halmagyi GM. Dorsal root ganglionopathy is responsible for the sensory impairment in CANVAS. Neurology 2014;82(16):1410-5.*

In collaboration with The Florey Institute of Neuroscience and Mental Health, we published a paper in the *American Journal of Human Genetics* outlining a novel mutation in RAB39B as a cause for X-linked intellectual disability and early-onset Parkinson's Disease (PD) with α -synuclein pathology. Genetic analysis demonstrating the RAB39B mutation correlated with post mortem pathological studies confirming PD. Additional work in the paper outlined mechanisms of disease and the potential for significant advances in an understanding of the mechanism of sporadic PD.

***Wilson GR, Sim JC, McLean C et al., Mutations in RAB39B cause X-linked intellectual disability and early-onset Parkinson disease with α -synuclein pathology. Am J Hum Genet 2014;95(6):729-35.*

Breast Cancer

As part of a collaboration with Cancer Council, Victoria and International Colleagues at the University of Cambridge, we published work in *Nature Communications* and *Human Molecular Genetics* identifying new breast cancer risk gene loci and novel associations of regions of chromosome 2 with breast cancer. We also published evidence for genetic variation in regulatory pathways of cell division associated with tumour grade.



Histological staining of tissue from a Parkinson's Disease brain shows a Lewy body within a neuron.

Achievements

Grants

- Professor McLean is a co-investigator on the Victorian Cancer Agency Melbourne Melanoma Project Award (2014-2017), of over \$3 million, led by Professor Grant McArthur of Peter MacCallum Cancer Centre. The Victorian Melanoma Service is also a co-investigator on this project.

In collaboration with her Monash University partner Professor Christina Mitchell, Professor Catriona MacLean was awarded:

- A five-year NHMRC Project Grant (2015-2019) of \$916,231 entitled 'Characterisation of autophagy deficiency in skeletal muscle homeostasis' (CIA: Mitchell; CIC: McLean).
- A 12-month Cancer Council Victoria Grant-in-Aid for 2015 of \$100,000 entitled 'Characterisation of a novel oncogenic pathway in breast cancer' (CIA: Mitchell; CIB: McLean). Studies will be aimed at looking at both primary and secondary tumour growth.

Prizes

- In 2014, trainee Dr Louise Jackett and Professor McLean were awarded first prize at the National Update in Pathology (a Royal College of Pathologists of Australia meeting) for their work on 'Correlation of autopsy pathology with clinical diagnoses in life'. Appreciating the diagnoses that are missed provides an important contribution to improving clinical practice at Alfred Health.



L-R: Paul Kennedy (Senior Scientist), Fatima Tajbhai (Scientist) and Professor Catriona McLean, Head of Anatomical Pathology, analyse human tissue specimens in the laboratory.

Publications

34 Journal Articles



Burns

Head: Dr Heather Cleland MBBS, FRACS



Dr Heather Cleland, Director of the Victorian Adult Burns Service, with a burns patient at The Alfred.

The Victorian Adult Burns Service at The Alfred provides the state-wide service for adult patients with severe burn injuries. Clinical research in 2014 has focused on the management and outcomes of patients with Toxic Epidermal Necrolysis (TENS); the effect of gender on mortality in burn patients; and fluid management and blood transfusion practices.

Alfred Burns Unit clinicians serve as the clinical lead for the Burns Registry of Australia and New Zealand (BRANZ), a clinical quality registry managed by Monash University's Department of Epidemiology and Preventive Medicine that provides data to support burn research projects and quality improvement initiatives. Basic science research, carried out in the Skin Culture Laboratory, is focused on evaluation of composite tissue engineered skin substitutes using an animal model and providing cultured epithelial autografts for a clinical trial currently under way.

Toxic Epidermal Necrolysis

TENS is life-threatening skin condition usually caused by a reaction to drugs. A systematic review of TENS patients managed across Burns Units established a baseline for reporting standards and benchmarking of outcomes. Review of The Alfred hospital's clinical experience resulted in recommendations for clinical management and evidence that these critically unwell patients are best managed in a multidisciplinary setting that includes burns clinicians. TENS patients with extensive skin loss should now be transferred early in their disease to The Alfred. Information regarding these catastrophic adverse drug reactions will be notified to Pharmacy using a report generated from the Burns Unit database.

Fluid Management Practices

A study in the Intensive Care Unit (ICU) of fluid resuscitation practices in burn patients demonstrated potential benefits of the use of sophisticated haemodynamic monitoring to provide clear endpoints for resuscitation. It supports titration of fluid administration and the avoidance of inadequate or excessive volume administration. A new guideline with clear endpoint targets for resuscitation enables the nurse in the cubicle to titrate fluid administration based on hemodynamic parameters. Assessment of practice and outcomes since implementation of the guideline is under way.

Gender and Mortality

A study conducted by Alfred clinicians on burns patients admitted to Australian and New Zealand (ANZ)-based ICUs showed that women had more than double the risk of death compared to men. Trends towards a survival disadvantage for women were seen across all ages, at all levels of severity of illness, at every proportion of body surface area burnt and across all centres. Our study showed worse outcomes for women with burns admitted to ANZ ICUs. In order to examine possible reasons for this finding, we are currently conducting a pilot study on adiposity and cytokine levels in patients admitted with extensive burns.

Burns Registry

Clinical data on all patients admitted with acute burn injury to all ANZ specialist Burns Units is collected for the BRANZ in order to monitor care and examine risk-adjusted outcomes. In the 2014 fifth annual report, data were presented for 2,656 burns patients treated at 15 of 17 ANZ Burns Units. BRANZ data from the last five years provide emerging evidence of variation in clinical practice between units. A review of the dataset and quality indicators as the first stage of the Burns Quality Improvement Program (BQIP) has commenced. The BQIP will assist burn centres to monitor individual performance and provide quality improvement resources to assist in making changes directed at achieving best outcomes for our patients.

Skin Tissue Culture Laboratory

The work of the Skin Tissue Culture Laboratory in evaluating the role of dermal templates in physiologic wound closure as a scaffold for tissue repair has demonstrated significant differences between different scaffolds. Differences in inflammatory response and vascularisation rates in a mouse model require further investigation to relate early responses to take rates, and longer term scarring outcomes. This work informs a clinical trial, expected to commence in 2015, evaluating a novel synthetic dermal substitute. A clinical trial using cultured epithelial autografts produced in our laboratory is currently under way, and will provide further information of the role of dermis in the healing of burn injury.

Postgraduate Students

3 PhD Students
3 Masters Students

Publications

15 Journal Articles

Cardiothoracic Surgery

Director: Professor David McGiffin MD, FRACS



Associate Professor Silvana Marasco shows her design of a rib fixation prosthesis used for fixation of fractured ribs in patients with flail chest injury.

The Cardiothoracic Unit performs a full range of adult cardiac and thoracic surgery including minimally invasive valve operations, off-pump surgery and aortic surgery, as well as providing state heart and lung transplant services. The transplant program is supported by the mechanical assist device program, which involves 20-30 Ventricular Assist Device (VAD) implants per year as well as supporting a busy extracorporeal membrane oxygenation (ECMO) program.



Professor Frank Rosenfeldt with his prototype box for storage and perfusion of a donor heart before transplant.

The main areas of research for the department centre around improving outcomes in transplantation, particularly donor organ optimisation and preservation as well as innovations in cardiothoracic surgery, including sutureless valves, bidirectional ECMO cannulae and new generation VADs. The Cardiothoracic Unit also supports a busy trauma service at The Alfred and continues rib fixation research for severe chest wall injuries.

Several major projects described below received sizable external funding for 2014 and 2015.

Heart Preservation for Transplantation

An organ preservation project led by Professor Frank Rosenfeldt will assess a new, improved technique of donor heart preservation based on cold crystalloid microperfusion. It is hoped that this will improve preservation, particularly of long ischemic time organs, and may also have a role in the preservation of 'donation after circulatory death' hearts. A great deal of work has gone into improving the technology of the transport and preservation system for these hearts and further animal experiments to validate the system are planned for 2015.

Professor David McGiffin is collaborating with Professor John Fraser from Prince Charles Hospital, Queensland on a donor heart preservation project. Detailed experiments involving heart transplants in large animals will be undertaken in Queensland. Professor McGiffin (CIB) and Professor Fraser (CIA) have secured an NHMRC grant of \$2.5 million for the Centre for Research Excellence in Advanced Cardio-respiratory Therapies Improving Organ Support (ACTIONS).

Cannulation System Development

A first-in-man clinical trial led by Associate Professor Silvana Marasco will assess a new bidirectional ECMO cannula designed by Melbourne cardiothoracic surgeon Mr Randall Moshinsky. The cannula aims to improve downstream blood flow and limb preservation in patients requiring femoral artery cannulation for either ECMO or minimally invasive cardiac surgery. The clinical trial is due to start in 2015 as soon as the prototypes of the device have been manufactured.

Postgraduate Students

3 PhD Students
1 Master of Surgery Student

Publications

26 Journal Articles

Cardiovascular Medicine

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



Clinical Cardiologist, Dr Leah Iles, commenced a co-funded NHMRC-Heart Foundation Early Career Fellowship in 2014 to study the utility of cardiac MRI for evaluation of myocardial fibrosis in cardiac disease.

The Department of Cardiovascular Medicine provides clinical services for all aspects of adult cardiology including mechanical cardiac support as well as cardiac transplantation. All major clinical services of the department have active research programs. The Heart Failure service addresses the phenomenon of heart failure with preserved left ventricular function, the use of novel agents in systolic heart failure and the role of fibrosis. Electrophysiology research is particularly concerned with the consequences and best management of atrial fibrillation.

The department also has several research projects in imaging, particularly in cardiac MRI with the focus on cardiac fibrosis. Coronary disease research is concerned with novel risk markers as well as the coronary microcirculation. There is an active program in structural heart disease therapy, particularly in relation to trans-catheter treatment of aortic and mitral valve disease. The department contributes extensively to state and national registries of cardiac procedures. There are a number of projects in relation to cardiac risk factors, particularly hypertension and newer treatments for elevated blood lipids.

In addition to investigator led research, the department participates in a large number of multicentre sponsored trials, particularly in relation to lipid disorders, atherosclerosis and the management of acute coronary syndromes. We have a number of collaborative studies with Baker IDI Heart and Diabetes Institute, the Burnet Institute and other Alfred departments including Gastroenterology, Rheumatology, Infectious Diseases, Cardiothoracic Surgery and Intensive Care. Members of the department authored or co-authored a significant number of publications during the year, including in journals of the American Heart Association, American College of Cardiology and European Society of Cardiology.

Heart Failure Research

Professor David Kaye and his colleagues in the Heart Failure and Transplant service undertook a series of studies to investigate the causes and to develop new treatments for patients with heart failure.

Medical therapy for advanced heart failure: The care of patients with very advanced heart failure represents a significant challenge with many patients having no further treatment options available due to the presence of other complicating factors. In this context, we have developed an oral formulation of a drug (milrinone) that was previously only available intravenously. Early clinical trial experience has been positive, and this research will continue to expand, with multicentre trials planned.

Cardiac fibrosis: Diffuse (interstitial) scarring of the heart is a major feature of many forms of heart failure, contributing to both symptoms and outcomes. The Heart Failure research group, in collaboration with the Imaging group, has worked extensively to better understand the causes of fibrosis and the potential targets for therapy. In patients with hypertrophic cardiomyopathy, we used cardiac MRI to demonstrate that although extensive fibrosis is present in the heart, the actual rate of turnover of fibrosis is low, suggesting that anti-fibrotic therapies may require long periods of administration to provide benefit.

Mechanical circulatory support: In some patients with a severe reduction in cardiac function the use of ventricular assist devices (VADs) can be life-saving. The management of patients with long-term VADs can be challenging for a variety of reasons. In an effort to optimise the performance of the VAD for each patient, we conducted a detailed series of exercise studies with invasive hemodynamic monitoring. For the first time, these studies highlight the need to tailor device settings to each patient, particularly in the context of activity.

Invasive Cardiology: Catheter Laboratory

Associate Professor Antony Walton has led a number of studies in structural heart disease and trans-catheter therapy. Areas of interest include investigation into trans-catheter aortic valve implantation using Medtronic's CoreValve and Edwards Lifesciences' valve devices with a contribution to the Australian Solace study for Edwards Lifesciences. There are several related local sub-studies including assessment of left ventricular pressure volume loops with Professor Kaye.

A program for occlusion of the left atrial appendage commenced using the Coherex device in Warfarin-intolerant patients who have atrial fibrillation and are at high risk of stroke. New procedures for the treatment of refractory diastolic heart failure are being evaluated including the creation of an atrial septal defect to offload the left atrium during absence of heart failure. Renal denervation for refractory hypertension continues in follow-up phase for the Simplicity and Spyral studies.

The department is a leading site in Victoria and, indeed, Australia for cardiovascular device registries. The Alfred was one of the original sites in 2005 for data collection for the Melbourne Interventional Group (MIG) registry, which now has more than 25,000 patient procedures enrolled with detailed follow up available. In the last 18 months this registry has been complemented by the Victorian Cardiac Outcomes Registry (VCOR), a purely quality assurance registry, which was officially launched by the Victorian Minister for Health at the AMREP site in October 2014. Dr Stephen Duffy is a founding member of both of these registries and is on the Steering Committee for both MIG and VCOR.

Biomarkers

Dr James Shaw has directed a number of studies into the connection between blood levels of vitamin D and coronary artery disease (CAD). One study showed a strong relationship between vitamin D levels and the presence and extent of CAD, with a lower vitamin D level being a major predictor for the extent of CAD. A randomised, double blind study conducted in patients with a history of CAD and low vitamin D levels compared a 3-month course of vitamin D supplementation to placebo, with the main end point being attenuation of platelet function. This study was performed in conjunction with Professor Karlheinz Peter who, in addition to his clinical role in the department, leads a highly successful program of platelet research at Baker IDI.

Non-Invasive Cardiology

The non-invasive cardiology imaging service, headed by Associate Professor Andrew Taylor, comprises echocardiography (led by Dr Helen Thomson), cardiac MRI (magnetic resonance imaging) and CT (computed tomography) coronary angiography. A particular focus continues to be the evaluation of cardiac fibrosis with cardiac MRI and its relationship with cardiac failure and cardiac arrhythmia. The group has important local, national and international collaborations across this theme.

Using cardiac MRI T1 mapping to quantify diffuse fibrosis, the group demonstrated an important link between diffuse fibrosis and cardiac stiffness, which is likely to be an important contributor to heart failure with preserved ejection fraction. Several papers also demonstrated that T1 mapping of the ventricle and atria could be used to predict which patients would benefit from a pulmonary vein isolation procedure to treat atrial fibrillation. The non-invasive cardiac imaging group also published important papers using echocardiography and cardiac CT angiography.

Electrophysiology

The electrophysiology service, headed by Professor Peter Kistler, has a particular interest in the relationship between atrial fibrillation and heart failure. The group closely collaborates with the cardiac MRI service to examine the role of fibrosis and other structural abnormalities in the genesis of arrhythmias. A large multicentre international study (MINIMAX) pioneered at The Alfred, which investigates techniques of catheter ablation in atrial fibrillation, is in the process of submission to a major international journal.

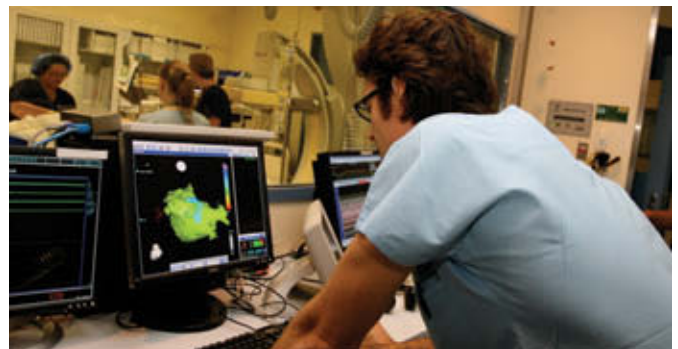
In collaboration with Associate Professor Taylor and several centres around Melbourne, Dr Sandeep Prabhu is coordinating the CAMERA-MRI study, which is a large randomised study assessing the role of cardiac MRI in patients with atrial fibrillation and heart failure.



Cardiologist Dr Andris Ellims, Head of Alfred and Baker IDI, Cardiovascular Clinics, won the 2014 Baker IDI Paul Korner medal for outstanding achievement.

Achievements

- Dr Andris Ellims won the 2014 Baker IDI Paul Korner medal for outstanding achievement.
- Associate Professor Peter Kistler was promoted to Professor by the Department of Medicine, University of Melbourne.
- Dr Alex McLellan was awarded the Noel and Imelda Foster Prize for Cardiovascular Research for his poster entitled 'Reverse cardiac remodelling following renal denervation - atrial electrophysiologic and structural changes associated with blood pressure lowering' presented at 2014 Alfred Health week. This work also afforded Dr McLellan a nomination for the Young Investigator award for the second year running by the Asia Pacific Heart Rhythm Society.
- Dr Dion Stub secured an NHMRC/Heart Foundation co-funded Early Career Fellowship commencing in 2015 for his project 'Assessment of remote ischemic conditioning on post-cardiac arrest myocardial dysfunction by magnetic resonance imaging, invasive coronary hemodynamic measurements and markers of inflammation'.



Professor Peter Kistler, Head of the Electrophysiology Service.

Postgraduate Students

15 PhD Students
1 MD Student

Publications

72 Journal Articles
1 Book Chapter



Professor Henry Krum was profiled in the Perspectives section of The Lancet in February 2014 for his contribution to clinical trials for cardiovascular disease.

Clinical Pharmacology

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

The department provides a clinical service in addition to education, training and research regarding optimal drug prescribing to The Alfred hospital. Main research interests are in the area of cardiovascular therapeutics encompassing efficacy and safety of novel drug, device and cell-based interventions. The department continued to conduct both investigator-initiated and commercially supported clinical research during 2014 with approximately 20 active trials at any one time.

Renal Denervation

Renal denervation is a procedure that involves catheter-based radiofrequency ablation via femoral access to knock out the sympathetic nerves that run adjacent to the renal arteries. New developments with this technique have caused much debate. The publication of Simplicity HTN-3, a controlled trial of renal denervation to treat resistant hypertension, has raised more questions than it has answered. Research into renal denervation in heart failure (both reduced ejection fraction and preserved ejection fraction) as well as in the diabetic population is continuing within our department.

Other Research

Investigator initiated projects around bio-impedance have proved promising and work in this area is continuing. Additional investigator-initiated research included a number of projects focused on poly-pharmacy, which form the foundation of Dr Ingrid Hopper's doctoral thesis. Dr Hopper is investigating the effects of withdrawing commonly used but poorly indicated medications in heart failure patients to determine if these 'routine' medications have a benefit that outweighs their possible side effects. Dr Ingrid Hopper, who is also a Clinical Pharmacologist, was invited to the United Arab Emirates to speak at the 2014 World Heart Failure Society Congress. Dr Hopper presented three talks on heart failure entitled: 'Challenges in the design of future trials'; 'Acutely decompensated heart failure – the new kid in town'; and 'Which drugs can we possibly withdraw in heart failure?'

Therapy for heart failure may be limited by the deterioration of renal function secondary to pharmacological reagents used in the management of the condition. Clinical Pharmacology Registrar Dr Fiona Bodey, together with Dr Hopper and Professor Krum, sought to determine the renal effects of Neprilsin inhibitors by conducting a meta-analysis of randomised controlled trials.

Dr Bodey presented results at Alfred Week in a poster entitled 'Neprilysin inhibitors preserve renal function in heart failure – meta-analysis of randomised controlled trials'. This work has subsequently been published as a Letter to the Editor (Bodey *et al.*, *Int J Cardiol* 2015).

Achievements

Professor Henry Krum was profiled in the Perspectives section of *The Lancet* in February 2014 for his contribution to clinical trials for cardiovascular disease. Professor Krum also reached the milestone of 500 publications to his name.



Clinical Pharmacologist, Dr Ingrid Hopper, is undertaking PhD research on the appropriate use of medications in heart failure patients.

Postgraduate Students

8 PhD Students

Publications

36 Journal Articles
1 Book Chapter

Diagnostic and Interventional Radiology

Director: Professor Kenneth Thomson MD,
FRANZCR, FRCR



*Professor Kenneth Thomson,
Head of Diagnostic and
Interventional Radiology, leads
studies on the use of irreversible
electroporation for tumour
ablation in prostate cancer.*

The Radiology Department delivers diagnostic services and interventional procedures using state-of-the-art facilities. Our research focuses on improving patient care through evidence-based medicine and working with the industry to facilitate and expedite innovation into clinical practice. Main areas of research in 2014 were focal tumour ablation with irreversible electroporation (IRE), the effectiveness of balloon angioplasty in multiple sclerosis patients and utility of contrast-enhanced-ultrasound for the detection of synovitis in haemophilia patients.

Imaging is essential for diagnosis, monitoring of therapy and performing procedures. Consequently, we conduct a broad range of internally-initiated, collaborative and commercial research. A collaboration with Health Informatics has yielded a computational platform for radiology image retrieval and analysis, providing a tool to facilitate future imaging research projects.

Collaborative papers published in 2014 included work on hyperthermia-induced posterior reversible encephalopathy syndrome; chronic obstructive pulmonary disease; Tenckhoff catheters for peritoneal dialysis; recurrent artery of Heubner aneurysm; comparison of ultrasound-guided and fluoroscopy-assisted antegrade common femoral artery puncture techniques; whole-body computed tomography (CT) in the early management of multi-trauma patients; after-hours staffing of trauma centres and outcomes among patients presenting with acute traumatic coagulopathy; cervical artificial disc replacement; and clinical outcome of endovascular treatment for intracranial-intradural arterial dissections.

Radiation Safety

Radiation safety projects completed in 2014 included one that involved establishing local diagnostic reference levels for angiographic and fluoroscopic procedures and another aimed at reducing the radiation exposure for patients undergoing a CT scan of the chest, abdomen and pelvis. We were able to reduce radiation dose by 25% without compromising image quality by modifying the imaging and contrast injection protocols.

Prostate Cancer: Tumour Ablation

Interim data were published from a phase I trial on the use of IRE in focal tumour ablation in prostate cancer. IRE delivers brief electric pulses to attain non-thermal focal ablation that spares blood vessels, connective tissue and other sensitive organs. The phase I trial was designed to determine the safety of the procedure and the optimal electric field thresholds to attain complete ablation of the cancerous tissue.

Patients had the IRE procedure three to four weeks prior to prostatectomy, which enabled post-procedural microscopic examination of the ablation results. Pre-specified ablation zones were safely and accurately achieved in cancerous human prostates with no serious adverse events associated with the IRE procedure or the prostatectomy. The prostate capsule was unaffected and histology showed regions of tissue necrosis in the areas of electrode placement, all of which were contained within the healthy prostatic parenchyma. A variable extent of reactive stromal fibrosis and regenerative change in epithelial lining of prostatic ducts was observed surrounding the necrotic focus.

Commercial Trials

Two major device trials commenced in 2014: one is testing a drug-coated angioplasty balloon for the treatment of stenosis in the arteries of the legs and the other a novel endoluminal device for the creation of fistulas between the ulna vein and ulna artery for renal patients requiring dialysis.

Grants and Awards

- Professor Thomson (CIA) and Dr Helen Kavnoudias (CIC) secured a three-year NHMRC Project Grant of \$281,746 to study the use of IRE in prostate cancer.
- Robert Neal II was awarded a Monash Comprehensive Cancer Consortium Travel Grant to attend the 29th Annual European Association of Urology Congress 2014.
- Drs Philip Chan and Tom Snow were awarded 2014 Royal Australian and New Zealand College of Radiologists (RANZCR) grants for their respective projects 'Incidence and treatment of clinically significant dysphagia amongst patients treated in halo-thoracic orthoses for cervical spine injury' and 'A randomised, controlled study comparing intra-operative, patient controlled and radiologist controlled conscious sedation with midazolam and fentanyl for patients undergoing insertion of a central venous line'.
- A collaborative study with Radiation Oncology entitled 'Clinical use of a novel technique for ablation of prostate cancer, IRE and characterisation of the resulting prostate pathology' was awarded the Best Poster in Clinical Urology Award at the 15th Asia-Pacific Prostate Cancer Conference in Melbourne in 2014 (Millar JL, Neal II RE, Kavnoudias H, Pham A, Smith R, Royce P, Thomson KR).

Postgraduate Students

1 PhD Student
6 Masters Students

Publications

15 Journal Articles



Associate Professor Biswadev Mitra (L) with BMedSc student James Brennan (R), in the Emergency and Trauma Centre.

Emergency and Trauma

Head: Dr De Villiers Smit MBChB, FACEM

The Alfred Emergency and Trauma Centre (ETC) is a tertiary referral centre for Victoria and provides a statewide emergency medical service for adult trauma, hyperbaric medicine, burns, HIV medicine, cystic fibrosis, haemophilia, haematological malignancies, heart and lung transplant and critical neurosurgery. Research is concentrated on pre-hospital care, emergency medicine (EM) and trauma resuscitation and focuses on improving safety, satisfaction and quality. There is an emphasis on research methods education, evidence-based medicine and international development of EM. In 2014, Associate Professor Biswadev Mitra, Dr Gerard O'Reilly and Professor Peter Cameron provided specialised postgraduate level EM research training for 60 Australian and 20 international students.

The ETC is a participant in the Monash Partners Academic Health Science Centre under the critical care, trauma and perioperative medicine theme. This involves working with national research networks including the Australian and New Zealand Intensive Care Society (ANZICS) Clinical Trials Group; the ANZ College of Anaesthetists Clinical Trials Group; the National Trauma Research Institute; the Australasian Cochrane Centre; and Monash University School of Epidemiology and Preventive Medicine (SPHPM).

Research Highlights

- The ARISE study, a multicentre, randomised controlled trial (RCT) of Early Goal-Directed Therapy in patients (n = 1600) presenting to Australasian emergency departments (EDs) with severe sepsis, was completed in September 2014. The study concluded that in critically ill patients presenting to the ED with early septic shock, EGDT did not reduce all-cause mortality at 90 days. Results were presented at the 27th Annual Congress of the European Society of Intensive Care Medicine (ESICM) in Spain and published in the *New England Journal of Medicine*. Professor Peter Cameron is a co-author on this landmark paper.

**ARISE Investigators, ANZICS Clinical Trials Group, Peake SL, Delaney A, Bailey M, Bellomo R, Cameron PA, Cooper DJ, Higgins AM, Holgate A, Howe BD, Webb SA, Williams P. Goal-directed resuscitation for patients with early septic shock. N Engl J Med 2014;371(16):1496-506.*

- A pragmatic RCT evaluating emergency nurse practitioner (NP) service effectiveness on achieving timely analgesia demonstrated that NP service delivered timely analgesia within recommended national clinical targets more often than standard ED care (Jennings N *et al.*, *Aacd Emerg Med* 2015).
- The NHMRC funded PATCH (Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage) study, a world first pre-hospital trial in the use of tranexamic acid for

patients with acute traumatic coagulopathy, started enrolling patients while the RESPOND and POLAR studies continued enrolling patients. RESPOND is a multicentre RCT to prevent secondary falls in older people presenting to the ED with a fall. POLAR is an RCT investigating if early therapeutic cooling of patients with severe traumatic brain injury is associated with better outcomes at six months.

- The BioBIT study, examining novel biomarkers in brain injury funded by The Alfred commenced enrolling patients.

Grants

- Our department (Professor Cameron: CIC; Associate Professor Mitra: AI) is collaborating on the NHMRC Partnership Project Grant (2014-2016) of \$861,706, led by Professor Jamie Cooper (Alfred Intensive Care / Monash SPHPM), on 'Improving outcomes for patients with critical bleeding requiring massive transfusion'.
- The Department of Health and the Transport Accident Commission extended support for the Victorian State Trauma Outcomes Registry managed by Professor Cameron and Monash SPHPM Professors John McNeil and Belinda Gabbe.

Conferences

- Associate Professor Mitra was co-convenor of the 2014 Australasian College for Emergency Medicine 31st Annual Scientific Meeting held in Melbourne.
- In 2014, Professor Peter Cameron was invited speaker at various international EM Conferences held in Hong Kong, Dubai and India.
- Cath Walker presented the results of the 'Eliminating Blood Errors' project at the 12th International Conference for Emergency Nurses held in Perth in 2014.

Other Awards and Achievements

- Professor Peter Cameron was awarded the 2014 Rank Lectureship by the UK Royal College of Anaesthetists, which he used to give lectures in Leeds, Nottingham and London in 2014.
- James Brennan achieved an H1 on completion of his Bachelor of Medical Science.
- Natasha Jennings won the 2014 Janet A Secatore Research Prize at Alfred Health Week for her poster 'Time to analgesia for care delivered by nurse practitioners in the ED' (Jennings N, Gardner G, O'Reilly G, Kansal A, Mitra B).

Postgraduate Students

4 PhD Students
32 Masters Students

Publications

42 Journal Articles
21 Book Chapters
1 Book

Endocrinology and Diabetes

Head: Professor Duncan Topliss MBBS, MD, FRACP



Sue Wyatt (L), Manager of Diabetes Education, and Consultant Endocrinologist Dr Kavita Kumareswaran (R) discuss a continuous glucose monitor report from a patient enrolled in a study of steroid-induced diabetes.

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

Mechanisms of Diabetic Complications

Professor Leon Bach

The high glucose levels characteristic of diabetes lead to complications such as kidney damage; however, the precise mechanisms by which this occurs is not understood. Professor Bach's laboratory studies the role of proteins that are modified by glucose, namely AGEs (advanced glycation end products). They have identified a novel interaction between AGEs and the ERM (erzin-radixin-moesin) proteins, which are important for maintaining cell shape and function. In 2014, they studied whether this interaction damaged podocytes, which are key cells within the kidney filtering apparatus.

Regulation of Growth Factor Activity

Professor Leon Bach

The insulin-like growth factor (IGF) system is perturbed in many diseases, including diabetic complications and cancer. Professor Bach's laboratory studies IGF binding protein-6 (IGFBP-6) and, particularly, its role as an IGF-II inhibitor in cancer. In 2014 the group showed that IGFBP-6 has different effects in two ovarian cancer cell lines, which may lead to novel insights into its actions.

New Technologies for Diabetes Treatment

Professor Leon Bach and Dr Kavita Kumareswaran

In type 1 diabetes, damage to the pancreas prevents insulin secretion to regulate glucose levels in the blood. Professor Bach and Dr Kumareswaran are involved in a collaborative project with colleagues at St Vincent's, Royal Melbourne and Royal Perth Hospitals to study an artificial pancreas, which utilises glucose sensors and insulin pumps.

Glucocorticoids are used to treat many conditions but are known to raise blood sugar levels in some patients with diabetes. Professor Bach commenced a study examining optimal ways to treat this condition.

Clinical Trials in Diabetes and Thyroid Care

Professor Duncan Topliss

- **SELECT** was a phase 3, randomised, placebo-controlled trial of lenvatinib in advanced radioiodine-refractory thyroid cancer, which recruited 392 patients worldwide, including 17 in Australia with 7 of those at The Alfred. Patients receiving

the therapy had a marked benefit in progression-free survival (Schlumberger M *et al.*, *N Engl J Med* 2015). Lenvatinib has been registered by the FDA and registration is being pursued in Australia.

- **TECOS** is a randomised, placebo-controlled, international clinical trial designed to assess the impact of sitagliptin therapy on cardiovascular event rates in type 2 diabetes. It is now in close-out phase with results expected in late 2015.
- **CANVAS** is a randomised, placebo-controlled, international study of the effects of canagliflozin on cardiovascular outcomes in type 2 diabetes.
- **ADJUNCT-ONE** is a 12-month, randomised, placebo-controlled trial of liraglutide, a GLP-1 (glucagon-like peptide-1) analogue, as an adjunct to insulin in type 1 diabetes. The trial will conclude in June 2015.
- **DECLARE** is a randomised, placebo-controlled, international study of the effects of dapagliflozin on cardiovascular outcomes in type 2 diabetes.

Diabetes Burden

In collaboration with Professor Greg Snell (The Alfred Lung Transplant Unit), Dr Kathryn Hackman and Professor Bach have shown that lung transplant patients with diabetes have reduced survival (Hackman K *et al.*, *Am J Transplant* 2014) and changes in blood glucose levels during a glucose tolerance test before lung transplantation predicts development of post-transplant diabetes (Hackman K *et al.*, *Diabetes Care* 2014).

Professor Bach published a study outlining the high prevalence of diabetes in Melbourne hospital inpatients, including The Alfred, Caulfield and Sandringham (Bach L *et al.*, *Med J Aust* 2014). Patients with diabetes were older, heavier and more likely to be on lipid-lowering, antihypertensive and blood-thinning medications; the frequency of diabetes complications was very high. The high burden of diabetes in Melbourne hospital inpatients has major implications for patient health and health care expenditure.

Achievements

- Professor Leon Bach (CIF) is part of a team led by Professor Mark Cooper (Baker IDI), who were awarded \$2.5 million for the JDRF/NHMRC Diabetes Complications Centre of Research Excellence for 2014-2019.
- Dr Kathryn Hackman and James Lee completed PhDs on their respective topics of 'Diabetes and lung transplantation' and 'Thyroid cancer and microRNA'.

Postgraduate Students

2 PhD Students

Publications

6 Journal Articles

Gastroenterology

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



Irritable bowel syndrome sufferers can now use Monash University's Low FODMAP Diet app at the supermarket to avoid foods rich in poorly absorbed short-chain carbohydrates that will aggravate their symptoms.

The four main areas of research for the Gastroenterology department are hepatology, endoscopy, inflammatory bowel disease and translational nutritional science. Hepatology research spans the clinical management of viral hepatitis (particularly type C), epidemiology, hepatocellular cancer therapy, non-invasive staging and prognostic markers of liver disease, and management of portal hypertension. Endoscopy focuses on improving the safety and quality of colonoscopic practice and of polypectomy, and colorectal neoplasia in cystic fibrosis. Inflammatory bowel disease (IBD) research includes studies on optimising thiopurine therapy (with a focus on the use of allopurinol to improve efficacy and counteract side effects), the clinical utility of measurement of anti-TNF drug levels, and intestinal ultrasound. The Translational Nutritional Science Group studies diet as a therapy in chronic intestinal disorders, including implementation of new approaches in the community.

Translational Nutritional Science

A landmark paper on the efficacy of a dietary intervention in patients with irritable bowel syndrome (IBS) was published in the journal *Gastroenterology* in January 2014*. A randomised controlled cross-over dietary trial provided high-quality evidence to support the use of a diet low in FODMAPs (fermentable oligosaccharides, disaccharides, monosaccharides, and polyols) as a first-line therapy for patients with IBS.

FODMAPs are poorly absorbed short-chain carbohydrates, which appear to be associated with the gastrointestinal symptoms experienced by people with IBS. The low-FODMAP diet has changed the paradigm of treatment for IBS. Monash University released an 'App' to help implement the low-FODMAP diet, which was downloaded more than 45,000 times in more than 75 countries during 2014.

**Halmos EP et al. A diet low in FODMAPs reduces symptoms of irritable bowel syndrome. Gastroenterology 2014; 146(1):67-75.*

We published two papers in 2014 in which the psychological and cognitive effects of gluten were addressed. In a pilot study, the often-described 'brain fog' associated with coeliac disease was quantified for the first time using a battery of cognitive tests over the first 12 months of gluten-free diet after diagnosis of coeliac disease (Lichtwark IT et al., *Aliment Pharmacol Ther* 2014). The study showed that untreated

coeliac disease impaired cognition similarly to having a blood alcohol level of 0.05%. In patients with presumed non-coeliac gluten sensitivity and IBS, gluten did not induce gut symptoms but was specifically associated with feelings of depression (Peters SL et al., *Aliment Pharmacol Ther* 2014). The demonstration of the links between food, gut diseases and brain function has created widespread interest in the scientific, medical and lay communities.

Hepatology

Alfred Hepatology researchers published a meta-analysis and systematic review regarding vitamin D and virological response to interferon-based therapy for chronic hepatitis C (Kitson MT et al., *J Hepatol* 2014). Results of their analysis did not support the notion that circulating levels of vitamin D are predictive of sustained virological response to interferon-based therapy. This work has had a considerable impact, as the 'magic' associated with vitamin D in many areas of clinical medicine undergoes critical and realistic review to inform clinical practice.

Achievements

- Dr Jane Muir (CIB) and Professor Peter Gibson (CIC) secured a two-year NHMRC Development Grant of \$515,372 (2014-2015) with their collaborators at RMIT University (Professor Kourosh Kalantar-Zadeh: CIA and Dr Chris McSweeney: CID) to design and evaluate an ingestible capsule that can measure gas production within the human bowel and send information in real time by telemetry.
- Dr Jane Muir and Professor Gibson secured a grant of \$448,125 for 2014-2016 from Meat and Livestock Australia to study natural food-related prebiotics and their influence over gut and psychological function.
- Sreepurnar Malakar won equal first prize for best student poster presentation at the Nutrition Society of Australia's 2014 Annual Scientific Meeting for her work on measuring natural salicylates in food.

Postgraduate Students

14 PhD Students
1 MD Student

Publications

52 Journal Articles
1 Book Chapter

General Surgery

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



Surgeons from The Alfred Upper Gastrointestinal Surgical Unit perform a radical oesophageal resection for carcinoma.

The General Surgery Department is committed to clinical and translational research, clinical trials and the development and maintenance of databases and clinical registries, including cancer-related registries. The Breast and Endocrine Surgery Unit undertakes research in the areas of breast cancer and endocrine surgery including thyroid, parathyroid and adrenal surgery. The Upper Gastrointestinal (GI) Surgical Unit's interests include outcomes of bariatric surgery, inflammatory effects of radical cancer surgery and the physiology of upper GI surgery. Research activities of the Colorectal Surgical Unit relate to colorectal cancer (CRC) and the unit has commenced or completed projects in the areas of inflammatory bowel disease, novel surgical techniques and investigation of *Clostridium difficile* infection (CDI). In 2014 the department commenced projects investigating the interplay of obesity and CRC.

Endocrine Unit

The anatomy and pathophysiology of the recurrent laryngeal nerve (RLN) is a research focus of the Endocrine Unit. We have detected differential rates of RLN palsy for both hemithyroidectomy and total thyroidectomy, which may be related to differences in the RLN diameter, the tensile stress within the RLN and different rates of bifurcation of the nerve on the right and left side.

In prospective studies to understand the underlying mechanism of neurapraxia, we examined changes in electromyography (EMG) amplitude as a result of nerve stimulation following traction on the RLN at the time of thyroidectomy. A further study found a correlation between change in nerve diameter during thyroidectomy with postoperative changes in voice in the absence of RLN palsy.

A Monash University-wide Thyroid Cancer Registry has been established and we have ongoing collaborative projects with The Royal North Shore Hospital in both papillary and medullary thyroid cancer (Lee JC *et al.*, *Oncology* 2014). A study with the Anaesthetic Department described airway management in patients undergoing thyroidectomy who have large retrosternal goiters.

Upper Gastrointestinal Surgical Unit

Oesophago-gastric cancer: In a prospective study on patients undergoing radical oesophago-gastric cancer surgery, we observed a consistent inflammatory reaction within the peritoneum both distal to and adjacent to the surgical site. The nature of the immune response substantially favours tumour

implantation and dissemination. This is potentially a significant mechanism in mediating recurrence after surgical resection and offers the possibility of novel therapeutic targets.

Bariatric surgery: An analysis of prospective data collected since 2007 of 1,453 patients undergoing weight loss (bariatric) surgery at The Alfred hospital showed patients were older, heavier, with a mean body mass index over 50 kg/m² and suffered a higher number of baseline metabolic co-morbidities (mean 4.2) compared to other series. Complications resulting from surgery were low (3.4%) with no mortality. Patients lost substantial amounts of weight 25 kg (50% excess weight loss) at five years and co-morbidities improved as did quality of life (Sf-36). Importantly, at six years over 88% of patients were still engaged in the follow up system. These data validate the high intermediate term success of bariatric surgery in the public health care system in a large and metabolically unwell cohort.

Colorectal Surgical Department

Colorectal cancer (CRC): In a study aiming to assess whether there has been an increase in the incidence of CRC in young Victorians, we searched the Victorian Cancer Registry database for patients aged 18-50 years of age who were diagnosed with CRC between 2000 and 2010. A small non-significant increase in the incidence of CRC was observed in the 18-50 year old cohort during the study period. Rectal cancer was more common in the 18-50 age group compared with CRC patients over 50 years of age (42% versus 34%, $p < 0.0001$). Interestingly, patients in the 18-50 age group were more likely to have node positive disease.

Clostridium colitis: We published a retrospective review of CDI seen at The Alfred between 2010 and 2012, which revealed a four-fold increase in infection during the study period that could not be attributed to increases in testing (Buxey *et al.*, *ANZ J Surg* 2014). Our paper also described a case series of CDIs including a presentation with a colonic pseud-obstruction, which resolved after CDI treatment. We also described a novel treatment of fulminant colitis using diverting loop ileostomy and colonic washout and subsequent antegrade colonic vancomycin enemas.

Publications

29 Journal Articles

Intensive Care and Hyperbaric Medicine

Director: Professor Carlos Scheinkestel MBBS, FRACP, FCICM

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



Dr Andrew Udy, Monash-ICU Practitioner Fellow, examines the CT scan of a patient admitted to the ICU with an aneurysmal subarachnoid haemorrhage (aSAH), a devastating form of stroke that typically affects younger patients. A large multicentre study is under way to determine the efficacy of routine ICU care for aSAH patients.

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

In 2014, our research active group consisted of 16 consultants with one NHMRC Practitioner Fellow (Professor Jamie Cooper), two Alfred-Monash Practitioner Fellows (Associate Professor David Pilcher and Dr Andrew Udy). Dr Chris Nickson joined us as the Monash SPHPM Alfred ICU Education Practitioner Fellow. We had four Professors (Stephen Bernard, Jamie Cooper, Carlos Scheinkestel and David Tuxen) and two Associate Professors (Warwick Butt and David Pilcher).

The department's publications in high impact journals for 2014 included: two in the *American Journal of Respiratory and Critical Care Medicine* by our ECMO team; two in *The Journal of the American Medical Association (JAMA)*; and one in *New England Journal of Medicine (N Engl J Med)*. The two ECMO team publications included a position paper from a group of international experts on the use of ECMO and a paper describing the development and validation of a score to predict survival factors for patients receiving ECMO for respiratory failure.

The *JAMA* papers included an ANZIC Clinical Trials Group (CTG) study on the cost-effectiveness of dalteparin versus unfractionated heparin for the prevention of thromboembolism and a study examining patterns of mortality related to severe sepsis and septic shock in ICU patients in Australia and New Zealand over a 12-year period. *The N Engl J Med* paper reported on an ANZIC CTG study, known as ARISE, which showed that early goal directed therapy did not significantly change survival rates in ICU patients in Australia and New Zealand compared with usual care.

Dr Andrew Udy authored 11 publications, including one looking at renal function in ICU patients in the context of a multicentre observational study (Udy A *et al.*, *Crit Care Med* 2014). Associate Professor David Pilcher led the productive interrogation of the unique bi-national ICU registry resulting in the paper 'Systemic Inflammatory Response Syndrome Criteria in Defining Severe Sepsis' (Kaukonen KM *et al.*, *New Engl J Med* 2015).

The total of funding to Alfred ICU department investigators for grants active in 2014 was more than \$31 million (for the duration of the grants), with \$20 million being from the NHMRC.

Achievements

Awards and Prizes

- In 2014 Alfred ICU won the Australian Human Resources Institute's Wayne Cascio Award for Organisational Change and Development; an Australian Mobile and App Design Award for their Alfred ICU Waiting Room app; and a Victorian Government People in Health Award in the Metropolitan Health Workforce Initiative section for their 'Out of hours workforce model and training program'.
- Alfred ICU Nurses were recognised with the 2014 Alfred Nurses League Award for Excellence in Patient Centred Care.
- Dr Helen Ackland won a 2014 Monash University Faculty of Medicine, Nursing and Health Sciences Early Career Researcher prize in the Clinical Sciences category for a publication in *Spine*.
- Emma Ridley, a senior ICU dietician, was awarded an NHMRC Postgraduate Scholarship (2014-2016) to complete her PhD study on nutrition therapy in ICU patients.

Major Project Grants

Project Grants that commenced in 2014 include the studies:

- Immediate Cooling and Emergency Decompression for the treatment of spinal cord injury, an NHMRC three-year award of \$581,561 to University of Melbourne's Dr Peter Batchelor (CIA) with Professor Stephen Bernard as CIE.
- The three-year NHMRC-European Union Collaborative Research Grant of \$358,348 titled 'OzENTER-TBI (Australia-Europe NeuroTrauma Effectiveness Research in TBI)' awarded to Professor Jamie Cooper for Australian participation in an international €30m program.
- Improving outcomes in critical illness, a \$3.4 million six-year collaborative grant from the Health Research Board of Ireland awarded to Professors Alistair Nichol and Jamie Cooper and colleagues.

Postgraduate Students

4 PhD Students

Publications

119 Journal Articles
5 Book chapters



Dr Andrew Haydon, Medical Oncologist, is involved in clinical trials evaluating treatment for colorectal cancer as well as translational research in melanoma.

Medical Oncology

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

The Medical Oncology Unit is a clinical service incorporating a research program that provides coordinated multidisciplinary care for patients with a wide range of malignancies. The unit conducts clinical trials investigating new drug therapies such as targeted systemic treatments and chemotherapy in patients with malignancy. The main areas of research are in malignant melanoma and gastrointestinal malignancies. In 2014 the unit continued to contribute to both national and international research projects, as well as phase 1, 2 and 3 clinical trials.

Colorectal Cancer

An evaluation of the outcomes of patients who achieved complete pathological responses to neo-adjuvant chemo-radiotherapy for rectal cancer led us to change our practice to not routinely recommending post-operative chemotherapy to rectal cancer patients. In grant funding, Dr Andrew Haydon received a Cancer Australia Award to continue the follow up of patients throughout Australia who had been enrolled in the SCOT (Short Course Oncology Therapy) trial. This international phase 3 study randomised patients to either three or six months of adjuvant chemotherapy following resection of stage III colon cancer. Dr Haydon is also a co-investigator on a three-year (2014-2017) Victorian Cancer Agency (VCA) Award led by Dr Jean Tie of the Walter and Eliza Hall Institute, which is investigating the utility of circulating tumour DNA as a biomarker for prognosis and treatment benefit of chemotherapy in patients with advanced colorectal cancer.

Melanoma

In 2014, our focus in melanoma research moved from advanced disease to treating earlier stage disease with the hope of finding effective systemic adjuvant treatments. Earlier research involving many Alfred patients established targeted therapy as the new standard of care for advanced melanoma in which a B-Raf mutation is detected. In 2014 we were involved in two large international studies looking at the role of targeted therapies as potential adjuvant treatments for stage III melanoma. As the highest recruiter in Victoria to these studies, The Alfred has played a major role in rapidly moving this area forward.

In other translational research, Dr Haydon is a co-investigator on a multimillion VCA award entitled 'The Melbourne Melanoma Project: Translating immunology and molecular biospecimen profiles into the management of melanoma patients'. This project is led by Professor Grant McArthur of Peter MacCallum Cancer Centre and other AMREP participants are the heads of the Victorian Melanoma Service (Professor John Kelly) and Anatomical Pathology (Professor Catriona McLean).

Publications

5 Journal Articles
1 Book Chapter



Lead investigator for ARISE, Monash University Adjunct Associate Professor Sandra Peake (L) and her colleague Monash University Adjunct Research Fellow Tricia Williams (R) at the bedside of the first ARISE patient. The ARISE study demonstrated that early goal directed therapy did not significantly change survival rates in patients in ICUs in Australia and New Zealand compared with standard of care in these settings.



TheAlfred

Melanoma

Head: Associate Professor John Kelly MBBS, MD, FACD

The Victorian Melanoma Service (VMS) is a multidisciplinary consultative clinic for the management of melanoma and is one of the largest such clinics in Australia. In 2014 we celebrated the 20th anniversary of the commencement of the service. Our research direction principally focuses on primary melanoma, particularly to enhance the detection and understanding of aggressive primary melanoma with the purpose of preventing the dominant contribution of such melanomas to deaths.

A series of publications from the VMS in 2014 addressed the factors that lead to misdiagnosis of melanoma with a view to avoiding misdiagnosis. We identified the key features of melanomas that elude diagnosis and the legal framework for addressing inappropriate misdiagnosis. To understand the time window available for early diagnosis, we measured the growth rate of melanomas and described the associations and identifying features of fast-growing, high-mitotic rate tumours.

In other publications we described a new diagnostic sign of melanoma. We also described the use of dermoscopy to distinguish imitators of nodular melanoma such as squamous cell carcinoma and keratoacanthoma. We collaborated on studies to progress the understanding of new mutations in melanoma that may be useful in the development of new

treatments (mutational targeted therapy). We also described the first case of resistance to a mutational targeted therapy for metastatic basal cell carcinoma.

Achievements

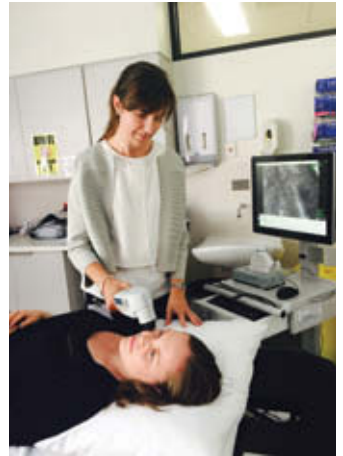
- As a partner in the Melbourne Melanoma Project with Peter MacCallum Cancer Centre, we were a co-recipient of a large Translational Research Project Grant from the Victorian Cancer Agency, entitled 'Translating Immunology and Molecular Bio-specimen Profiles into the Management of Melanoma Patients'.
- We received funding from Cancer Australia for a randomised controlled multicentre clinical trial of imiquimod versus radiation treatment for lentigo maligna.
- Dr Victoria Mar was awarded a PhD for her NHMRC-funded doctoral project and was awarded the prize for best presentation at the Australasian College of Dermatologists' 2014 scientific meeting.

Postgraduate Students

1 PhD Student

Publications

9 Journal Articles



Dermatologist, Dr Victoria Mar, examines a patient with a new confocal microscope, which can non-invasively identify melanoma cells in the skin. In 2014, Dr Mar completed PhD research on the clinical and molecular analyses of nodular melanoma.



Dr Matthew Lin examines a patient with a dermoscope.



Dr Yan Pan (R) shows a patient re-growth of melanoma outside a scar, which is a feature of melanoma recently described by the Victorian Melanoma Service.

Neurosurgery

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

Neurosurgery Registrar Dr Andy Nichols holds a standard (white: left) and antibiotic 'Bactiseal' impregnated external ventricular drain side by side. The Alfred neurosurgery registrars are carrying out a randomised controlled trial to test if the antibiotic impregnated drain reduces the risk of infection in patients with head injuries who require these devices to be placed in their brain ventricles.



The Neurosurgery Department provides a comprehensive in-patient and out-patient neurosurgical service, treating the full range of intracranial, spinal and peripheral nerve disorders. The department treats approximately 2,100 in-patients (with around 50% being elective and 50% emergency) and 4,000 out-patients annually. Trauma accounts for approximately 35% of the caseload. Sub-specialty interests are in cerebrovascular surgery, spinal surgery, skull base surgery, pituitary surgery and neurotrauma.

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

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

Antibiotic Impregnated Catheters

The placement of catheters in the ventricles of the brain in patients with severe head injury carries a risk of infection. Commercially available antibiotic impregnated catheters are purported to reduce the risk of infection. Our neurosurgery registrars initiated an RCT to evaluate the use of these catheters. The trial, which was funded by the Alfred Foundation and the Australian Brain Foundation, should definitively answer the question of whether the antibiotic impregnated drain reduces the risk of infection in the ventricles.

Bionic Vision Project

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

Achievements

- Professor Jeffrey Rosenfeld was appointed Foundation Director of the newly established Monash Institute of Medical Engineering (MIME) in 2014.
- Philip Lewis completed his PhD entitled 'Monitoring of cerebral autoregulation: clinical, physiological and technical concepts'.
- Professor Jeffrey Rosenfeld was appointed a Knight of Grace in The Order of St John in October 2014.

Selected Grants

Professor Rosenfeld's grant funding for 2014 included:

- Two NHMRC Project Grants as a co-investigator (CI) for 2014-2016: (i) 'A mechanistic approach to therapy development for chronic traumatic encephalopathy using small and large animal models of concussion', led by Professor Robert Vink (CIA) from the University of Adelaide (\$475,640); and (ii) 'Immediate cooling and decompression for the treatment of spinal cord injury: pilot safety and feasibility studies', led by Dr Peter Batchelor (CIA) from the University of Melbourne (\$581,561).
- A Booster Grant of \$300,000 for 2014-2016 from the Defence Health Foundation for work to reduce alcohol-related incidents in Navy trainees as part of The Alfred's P.A.R.T.Y (Prevent Alcohol and Risk-related Trauma in Youth) program.
- Co-investigator status on a Convergence Science Research Award of \$US500,000 funded by the U.S. Department of Defence's Peer Reviewed Alzheimer's Research Program entitled 'US Army Medical Research and Material Command and Telemedicine and Advanced Technology Research Centre' for 2014-2017 (CI: M Weiner).

Postgraduate Students

1 PhD Student

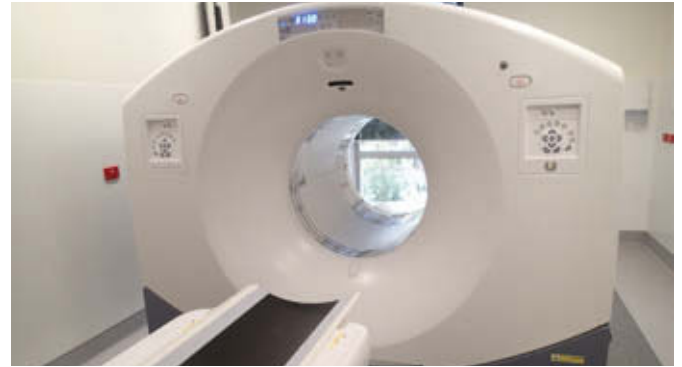
Publications

19 Journal Articles
2 Book Chapters



Nuclear Medicine

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



Nuclear Medicine's newly installed state-of-the-art PET/CT system (GEHC Discovery 710) will improve efficiency and decrease the radiation dose that patients will receive.

Our department's objective is to provide a comprehensive and timely clinical nuclear medicine (NM) service. A wide range of clinically relevant studies are available including cardiac, ¹⁸F-FDG-positron emission tomography (PET), bone and lung scans. We take a lead role in training of NM specialists, radiology registrars and technologists, with our department one of the busiest accredited training sites for NM and the busiest accredited training site for nuclear cardiology in Australia.

Our research areas include not only NM and PET, but also other specialties via collaboration with various institutions and hospital departments such as Cardiology, Endocrinology, Transplantation Medicine, Psychiatry, Cancer Care and Surgical Units. NM techniques employed span conventional to advanced gamma camera and PET imaging technologies. The department's full time NM physicians are Associate Professor Victor Kalff, Dr Kenneth Yap, Dr Martin Cherk and Dr Thomas Barber.

Radiation Synovectomy

We conducted a retrospective review of ⁹⁰yttrium radio-synovectomy carried out on 167 joints between 2000 and 2010 to assess clinical response and complication rates in patients (n = 119) who had the procedure for either rheumatoid, psoriatic, hemophilic, large joint mono-arthritis or other miscellaneous arthropathies refractory to conventional therapy. Comparison of response rates pre- and post-introduction of improved disease modifying anti-rheumatic drugs (DMARDs) in the mid 2000s was also performed.

The study demonstrated that in an era of improved DMARDs, ⁹⁰yttrium synovectomy is a safe and effective procedure across a broad spectrum of arthropathies and should continue to

be considered in cases refractory to conventional therapies. Complete responders can be expected to have symptom relief for at least 36 months with low complication rates.

Wong Y, Cherk MH, Powell A, Cicuttini F, Bailey M, Kalff V. Efficacy of ⁹⁰yttrium synovectomy across a spectrum of arthropathies in an era of improved disease modifying drugs and treatment protocols. Int J Rheum Dis 2014;17(1):78-83.

Monitoring Lymphoma with PET

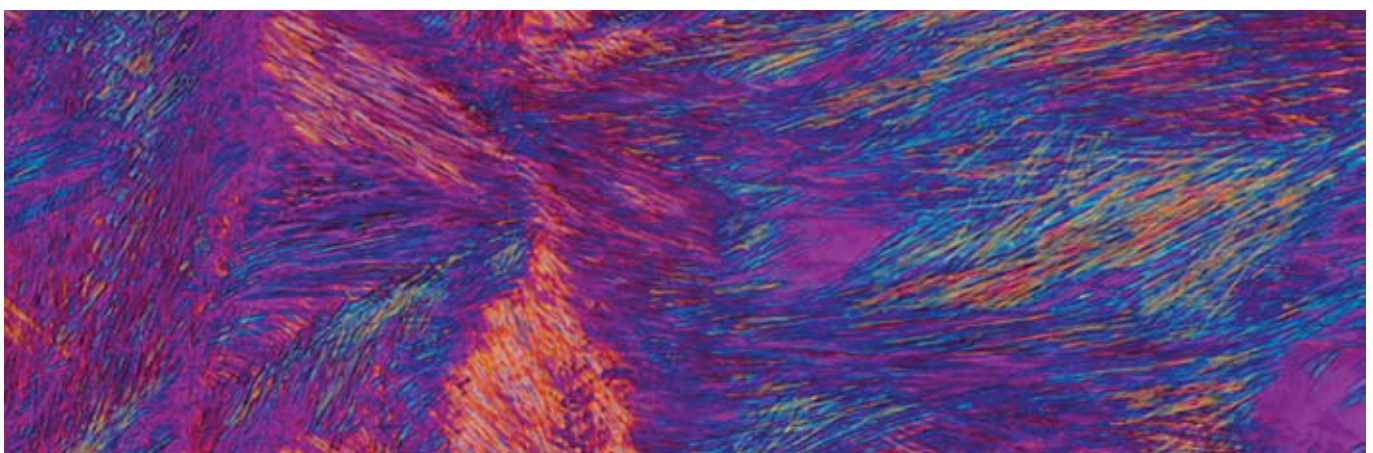
¹⁸F-FDG PET scanning is considered the standard of care for baseline staging and assessment of treatment response for higher grade lymphomas. We reported a case in which an interim PET scan carried out after three cycles of chemotherapy appeared to suggest progressive disease, whereas further bone marrow biopsies, repeat ¹⁸F-FDG PET scanning and a white cell scan confirmed that the interim irregular scan was due to an unusual pattern of scattered islands of regenerating normal marrow.

Our case report highlighted that apparent severe bone marrow abnormalities on ¹⁸F-FDG PET scans in lymphoma patients treated with chemotherapy are not always due to disease. Clinicians should, therefore, retain a high index of suspicion for benign causes when ¹⁸F-FDG PET scan results appear incongruent with clinical response.

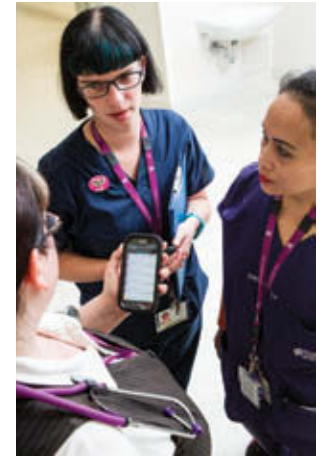
Cherk MH, Patil S, Beech P, Kalff V. Heterogeneous bone marrow uptake on interim ¹⁸F-FDG- PET for lymphoma mimicking disease progression: a case report. J Med Case Rep. 2014;8:362.

Publications

4 Journal Articles



Gout crystals in joint tissue. Credit: Professor Catriona McLean, Head of Anatomical Pathology.



Nurses discuss prioritisation of care as part of the 'Hospital at Night' model of care program.

Nursing Services

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

Director of Nursing Research: Professor Tracey Bucknall BN, GradDip Adv Nursing, PhD

In 2014, Nursing Services implemented a strategic plan for nursing research that comprised four objectives: to conduct high quality research that improves patient and organisational outcomes; to strengthen research training and support for nursing staff within Alfred Health; to integrate research evidence into clinical practice; and to develop partnerships between consumers, staff and researchers to strengthen research, education and health service delivery.

External research funding of approximately \$1.3 million was received in 2014. Three concurrent programs of research are focused on improving clinical decision making and patient care. The programs are: Health Service Evaluation; Symptom Management, and; Knowledge Translation. Research programs are linked closely with the National Safety and Quality Health Service (NSQHS) Standards, either establishing research evidence or assisting clinicians in using evidence in clinical practice to improve patient outcomes.

Patient Engagement in Transitions of Care

In 2014, the Australian Commission on Safety and Quality in Health Care awarded funding to Professor Tracey Bucknall (Principal Investigator) and researchers from Deakin and Griffith Universities to review and report on tools and strategies that facilitate the engagement of patients in communication during transitions of health care. The aim of the review was to inform the future development of resources to assist health professionals, patients and their families to improve communication at transitions of care in acute health facilities.

An integrative review was conducted, including interviews with patients, families and health professionals across health services nationally. Three guiding principles were evident from the review: (i) A strong organisational commitment to patient-centred care must be embedded at all levels of the health service and across all disciplines; (ii) Patients and families need training, support and encouragement to engage in transition discussions; and (iii) Tools and strategies need to be appropriate for the setting, but also require a level of standardisation to ensure consistency of information.

Care Bundle to Prevent Pressure Injury

A pressure injury is an area of localised damage to the skin and underlying tissue caused by pressure or shearing force.

In Australia, hospital acquired pressure injuries range from 7.4% to 17.4%. The issue is now listed as an NSQHS Standard and reviewed for hospital accreditation. Professors Tracey Bucknall (CIB) and Wendy Chaboyer (CIA), together with other researchers from Griffith University, Australian Catholic University and University of the Sunshine Coast, were awarded a \$1.07 million NHMRC Project Grant to carry out a cluster randomised controlled trial to evaluate the effectiveness of a patient-centred care bundle to prevent pressure injuries in 'at-risk' patients (INTACT trial). A care bundle consists of a structured group of interventions, based on best research evidence, that are used to improve patient outcomes. The trial includes three Victorian sites including Alfred Health.

Patient Participation in Patient Safety

Research evidence shows that patient participation in patient safety activities improves patient outcomes, prevents adverse events and leads to positive ratings on the quality of hospital care. Professor Tracey Bucknall (CIB) is carrying out an ARC supported study, in collaboration with Griffith University colleagues Professor Wendy Chaboyer (CIA) and Associate Professor Jennifer Whitty (CIB), to provide a better understanding of the patients' perceived role, which may be useful in promoting patient participation during their care at The Alfred. Results will provide the foundations for health policy, education and practice to promote patient participation.

Achievements

- In 2014, Deakin University's 'Tri-focal Model of Care: Teaching and Research in Aged Care Services' project was awarded Deakin University's Pro-vice Chancellor for Health Award for Innovation and the Australian Association of Gerontology National Conference People's Choice Poster Prize.
- PhD student Jessica Guinane was awarded the Nursing Scholarship prize for 2014 at Deakin University.

Postgraduate Students

7 PhD Students
4 Masters Students

Publications

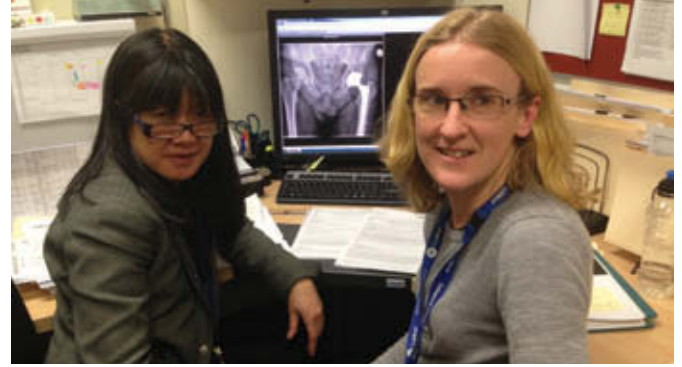
19 Journal Articles



TheAlfred

Orthopaedic Surgery

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



Clinical Associate Professor Susan Liew (L) (Head of Orthopaedic Surgery) and Zoe Murdoch (R) (Research Assistant) discuss the HEALTH study, a clinical trial investigating treatment for displaced femoral neck fractures.

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

In 2014 we continued our strong collaboration with McMaster University in Canada in three of their international, multicentre RCTs. We continue to recruit into HEALTH (Hip fracture Evaluation using the ALternatives of Total hip arthroplasty versus Hemi-arthroplasty), which investigates treatment for displaced femoral neck fractures.

We await the adjudication process in FAITH (Fixation using Alternative Implants for the Treatment of Hip fractures), which looks at what is better for undisplaced femoral neck fractures

– a sliding hip screw or three cancellous screws. We await the results from FLOW (Fluid Lavage of Open Wounds), which will give us the evidence for the type of irrigant and delivery pressure to use in open fractures.

We are planning to participate in FAITH2, which adds vitamin D versus placebo, and HipATTACK which randomises hip fracture patients to rapid care (within 6 hours) or the standard care pathway, which in our case is on average 13 hours.

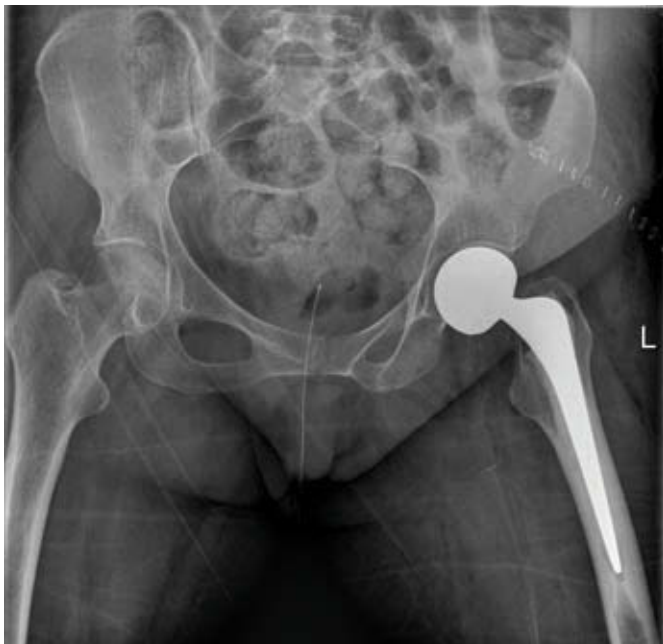
VOTOR continues to accrue data with a 12-month follow up rate consistently above 90% and a number of projects across four different research streams currently under way. Our most recent project is examining the effect of non-steroidal anti-inflammatory drugs (NSAIDs) on fracture healing.

Postgraduate Students

1 Master of Surgery Student

Publications

6 Journal Articles
1 Book Chapter



The HEALTH (Hip fracture Evaluation using the ALternatives of Total hip arthroplasty versus Hemi-arthroplasty) trial compares which is better for displaced femoral neck fractures – a hemiarthroplasty (L) or total hip replacement (R).



TheAlfred

Pathology Services

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



Emma Hallett, Laboratory Haematology Scientist, analyses flow cytometry data to monitor the treatment response of a patient with acute myeloid leukaemia.

Alfred Health Pathology Services incorporates Laboratory Haematology, Microbiology and Clinical Biochemistry (also known as Chemical Pathology) and Anatomical Pathology. This year's report focuses on Haematology. Anatomical Pathology, headed by Professor Catriona McLean, is reported on page 47.

Laboratory Haematology

Head: Dr Sue Morgan MBBS, FRACP, FRCPA

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

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

Current research includes:

- Development of highly sensitive flow cytometric techniques for detection of small volume minimal residual disease after potentially curative therapy, particularly in multiple myeloma and acute myeloid leukaemia (AML);
- Coagulopathy associated with mechanical circulatory assist devices and heart valve dysfunction (ACBD collaboration);
- PTP1B expression in myeloproliferative disorders as a marker of JAK-STAT pathway dysregulation;
- Haematological and biochemical complications of dapsone therapy;
- Predicting outcome in AML: molecular testing for founder mutations;
- Blood product use in bone marrow transplant and cardiac surgery patients;
- Pre-operative optimisation of hemoglobin in orthopedic patients to limit need for transfusion.

Acute Myeloid Leukaemia: Predicting Outcome

Disease aggressiveness and treatment responses in AML patients vary widely, despite cytogenetic prognostic categories at diagnosis broadly defining patient outcome. This prompted us to examine new ways to stratify risk and guide therapy. Our first study showed that preserved immune function within the bone marrow, as detected by higher T-lymphocytes at diagnosis, led to markedly improved survival from AML. The technique used is relatively cheap and readily available, and the findings suggest targeting the immune system for both therapy and further research.

The second study found that some mutations (IDH1/2, DNMT3A) within leukaemia cells persist after therapy despite patients achieving disease remission by all other criteria. These 'founder mutations' are present in marrow cells prior to the development of acute leukaemia. In some of the cases studied, a PCR-based test performed on the Sequenom platform on sequential samples showed that rising levels of the DNMT3A mutation predicted relapse prior to any other indicator of leukaemia. These results mirror those found in larger overseas studies and support molecular testing for 'founder mutations' to guide therapy in routine clinical practice.

Inappropriate Pre-operative Testing

Studies in the UK have determined that up to 25% of pathology testing is inappropriate or unnecessary. In conjunction with the Anaesthesia Department we reviewed the role of coagulation testing prior to elective surgery in over 2000 patients from 2012 and 2014. Abnormal results of possible significance were found in 0.2% of tests, with further testing not pursued in 40% of these cases. These findings support multiple international guidelines suggesting that such testing is wasteful of resources and does not contribute to patient care; ongoing feedback to ordering clinicians to change practice continues.

Side Effects of Ventricular Assist Devices

Patients on ventricular assist devices or with some cardiac valve disorders develop bleeding complications due to the mechanical effect of shear stress on blood components. In collaboration with the ACBD, we demonstrated that as well as acquired Von Willebrand disease, new platelet dysfunction develops in this patient group as indicated by increased shedding of platelet receptors GP1b and GPVI. Both of these receptors play critical roles in platelet function and their loss is likely to contribute to the bleeding noted in one third of the patients studied. Ongoing research continues to further elucidate the pathogenesis of bleeding in this high risk cohort.

Achievements

- Dr Victoria Ling, Haematology RACP /RCPA Advanced Trainee, won the 2014 Victorian RACP Trainee Research Award for Excellence in Adult Medicine.
- Dr Kay Htun, Haematology RACP /RCPA Advanced Trainee, won the 2014 Alfred Hospital prize for Best Advanced Physician Trainee Project.
- Dr Mandy Davis, Haematologist and Transfusion Specialist, was awarded the WTMS (Whole Time Medical Specialist) grant of \$56,000 for expansion of the BloodTrack program to improve safety of blood administration.

Publications

33 Journal Articles

Pharmacy

Director: Professor Michael Dooley BPharm, Grad-DipHospPharm, FSHPA, FISOPP, FAAQHC

Pharmacy Intern Anna Le reviews the use of the medication library on a 'smart' infusion pump in intensive care as part of Pharmacy's medication delivery safety initiative.



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

Research activities come under the broad banner of evaluating the Quality Use of Medicines with the following themes: medication safety; therapeutics; pharmacy practice research; and health-outcomes research. The department is involved in a wide range of studies, from NHMRC and ARC multicentre funded collaborations through to industry partnerships and investigator-initiated practice evaluation programs. Here we report on two key projects completed in 2014.

Timely Antibiotic Delivery in the Emergency Department

We evaluated the effect of the hospital-wide reform, 'Timely, Quality Care' (TQC), designed to improve access and flow, on the timely delivery of the first dose of intravenous (IV) antibiotics in the Emergency Department (ED) setting. A pre- and post-implementation prospective cohort study was conducted prior to and after implementation of TQC. Among patients who had IV antibiotics prescribed in the ED, data were prospectively collected at times of patient presentation, prescription and administration of the antibiotic.

Demographics and discharge diagnoses were retrospectively extracted from the ED Information System. There were 380 cases included with 179 cases prior to the introduction of the TQC model and 201 cases after its introduction. Time from presentation to administration of antibiotics improved significantly from 192 (99-320) to 142 (81-209) minutes ($p < 0.01$). The time from presentation to prescription pre- and post-TQC was 120 (51-230) and 92 (49-153) minutes respectively ($p < 0.01$). The time from prescription to administration pre- and post-TQC was 43 (20-83) and 34 (15-66) minutes respectively ($p = 0.03$).

This study is one of the first to evaluate the impact of a hospital re-design such as TQC on a clinical process occurring in the ED. Overall, times to administration of antibiotics were significantly reduced, confirming improved quality of care can be achieved with processes aimed at improved hospital-wide access and flow. Ongoing evaluation and vigilance is necessary to ensure sustainability and drive further improvements (Study authors: Roman CP, Poole SG, Dooley MJ, Smit DV, Mitra B).

Evaluation of Medication Delivery Safety Initiatives

We evaluated the impact of two medication safety initiatives on infusion-related administration errors over a five-year period. A semi-structured observational methodology was employed over four study periods between 2009 and 2014, across all general and critical care ward areas. The study periods provided both pre- and post-observational data for both interventions. On average, 9.3% of patients were receiving medications for administration via IV infusion at the time of observation. A total of 2599 infusions were observed over the four study periods.

After implementation of pharmacist annotations to clarify the administration requirements of the IV medication order, medication related error rate fell from 16.6% to 8.1%. Pharmacist annotations were completed for 62.5% of the total infusions compared with 49.8% for medication related infusion errors. After implementation of smart infusion pump technology containing a comprehensive drug library, and with high user compliance, the medication related error rate further reduced from 8.1% to 5.1%. Average user compliance was 90.9%. The most common type of error found was administration rate error, followed by administration volume error.

The rate of medication related IV infusion errors was reduced by 69.3% with the implementation of two infusion safety strategies; the introduction of formal pharmacist annotation of the prescriber's medication order and the implementation of smart pumps with a comprehensive drug library and high user compliance (Study authors: Wiseman M, Dooley MJ, Poole SG, Botti M, Ingram P).

Achievements

- Laura Morphett (Senior Supervisory Technician, Inpatient Services) won the 'Best Technician Oral Presentation' at the 2014 Society of Hospital Pharmacists of Australia (SPHA) Medicines Management Conference for her presentation 'Importance of a technician manager on discharge performance'.
- Rochelle Gellatly (Senior Pharmacist, Cardiology) received the SPH A 2014 Hospira Young Pharmacists Award.

Postgraduate Students

9 PhD Students
13 Masters Students

Publications

26 Journal Articles
1 Book Chapter

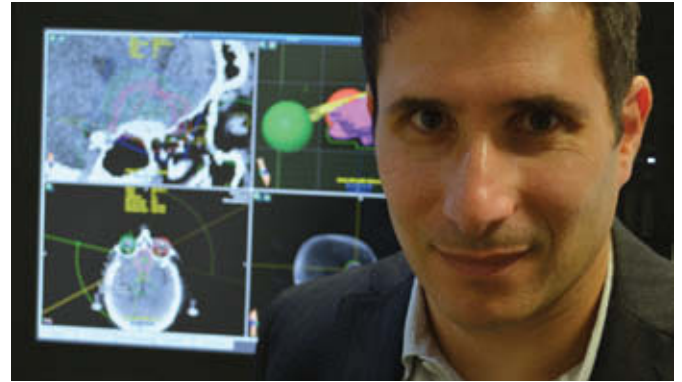


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Radiation Oncology

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



Dr Jeremy Ruben is a Radiation Oncologist with the William Buckland Radiotherapy Centre.

The William Buckland Radiotherapy Centre (WBRC) is a major Alfred Health Oncology Service comprising treatment facilities at The Alfred and the Gippsland regional centre in Traralgon. WBRC is the busiest cancer unit in Alfred Health, seeing almost 2,000 new cases each year. The unit engages in undergraduate and postgraduate teaching in a number of cancer-related disciplines. A research program exists across the spectrum of Radiation Oncology related areas, from basic biology and physics, through to clinical trials and translation of research outcomes into clinical practice. During 2014 WBRC participated in 12 cooperative group clinical trials.

In 2014, research focused on image-guided and stereotactic (ST) external beam treatments and prostate brachytherapy (BT). In research translation efforts, verification of *in vivo* external beam dose and high-dose rate (HDR) BT are becoming embedded into our work as quality assurance processes.

External grant funding was obtained from sources including NHMRC, Victorian Cancer Agency and Cancer Council Victoria. We secured two grants through the Gippsland Regional Integrated Cancer Services (GRICS) to support assessing the feasibility of a prostate seed implant service and telemedicine through our Gippsland facility.

Radiation Therapy Trials

WBRC was the largest Australian contributor to the UK Medical Research Council coordinated international randomised controlled trial comparing escalated-dose and control-dose conformal radiotherapy (RT) for prostate cancer. Results were published in *The Lancet Oncology* (Dearnaley DP *et al.*, *Lancet Oncol* 2014).

The research program also included:

- A phase 1b/2 dose-finding, pharmacokinetic / pharmacodynamic study of NVX-108 (NuVox) combined with radiation and temozolomide in patients with newly-diagnosed glioblastoma multiforme. We treated the first patient in the world in collaboration with the Nucleus Network clinical trials unit.
- Surface dose for breast plans.
- Psychological needs of adolescent and young adult cancer patients – in collaboration with the Murdoch Children’s Research Institute.
- Long term outcomes following adjuvant RT for testicular seminoma.
- Feasibility study of deformable image registration to quantify changes in lung cancer RT targets.
- A comparison of initial treatment setup accuracy in external beam radiation therapy (EBRT) using temporary ink skin marks with and without tattoos.

- Analysis of dose-volume outcome data of the urethra for BT patients treated at a single Victorian Institution.
- RT of glomus jugulare, ST-RT of large brain metastases and outcomes of meningioma treated with low-dose RT.
- Outcomes of patients with nodal squamous cell carcinoma of unknown mucosal primary site within the head and neck.
- RT in penile cancer: 20-year outcomes for men treated in Victoria from 1992 to 2011.
- Retrospective assessment of perioperative opioid dose on cancer outcomes.
- Treatment information needs of patients with early-stage non-small cell lung cancer.
- A pilot study in collaboration with Alfred Health Radiology assessing the safety and efficacy of irreversible electroporation for the ablation of prostate cancer.

Treatment Advances

WBRC first in Australia efforts: (i) Exac Trac imaging software and robotic couch for precision robotic radiation for prostate cancer; (ii) AlignRT technology for deep-inspiration breath-holding techniques to minimise cardiac radiation dose for breast cancer patients. Also, as a first in Victoria and public hospitals in Australia, Dr Sabeena Beveridge led the start-up of real time *in vivo* silicon diode-based dose verification in EBRT.

Achievements

- Dr Kim Ung commenced as our ST Research Fellow supported by the Peter Grant Hay Trust.
- David Gration, Senior Radiation Therapist, won ‘Rural and Regional Educator Award’ and was short listed as a finalist for the ‘Rural and Regional Learner Award’ as part of the Victorian Government’s 2014 People in Health Awards initiative.
- Ryan Smith presented his PhD research ‘*In vivo* treatment verifications for HDR BT using a flat panel detector’ at the ‘Milestone in Physics Seminar’ at RMIT, which will become a standard verification system for HDR treatment in our department.
- Nicola Mein completed her Honours research, which compared dosimetry with RapidArc versus Brainlab’s HybridArc volumetric modulated arc therapy.

Postgraduate Students

3 PhD Students
1 Masters Student
1 MD Student

Publications

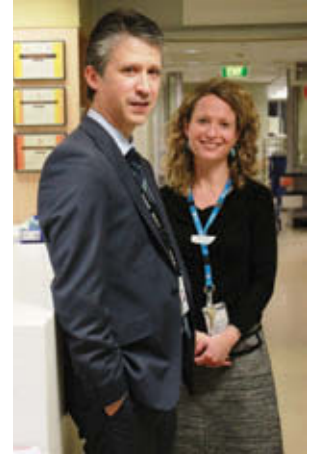
22 Journal Articles
1 Book Chapter



Caulfield
HOSPITAL

Rehabilitation, Aged and Community Care

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



Clinical Services Director Andrew Perta (L) and Danielle Bolster (R) are part of the Nursing Services team with Professor Tracey Bucknall (not pictured), who investigate the role of sub-acute nurses in a changing healthcare context.

Research activity is diverse across Rehabilitation, Aged and Community Care (RACC) as it strives to become a nationally recognised leader in research. Our intention is to contribute significantly to the implementation of effective translational research and interdisciplinary, person-centred models of care, with links to defined clinical outcomes in areas of greatest need. Research growth is being achieved with participation from many of our services and interdisciplinary relationships across our hospital services and departments. In 2014 our internal research grants program awarded \$55,000 in funding.

Interdisciplinary Research

Interdisciplinary collaboration within and beyond RACC is essential due to the nature of the services provided and the complexity of the patient population. Research projects with a strong interdisciplinary focus in 2014 included investigating the process of goal setting between patients and health care workers across Allied Health; a cross campus trial scoping the role of advanced practitioners in Aged Care and the development of an Allied Health Assistant workforce.

Allied Health

The Social Work and Psychology departments submitted the final report for the Sexuality after Stroke project, which aimed to evaluate the level of compliance with the National Stroke Foundation Guideline 8.5. The Physiotherapy and Occupational Therapy (OT) departments were involved in a large number of projects including acquired brain injury rehabilitation, stroke assessment / interventions and spasticity. The OT department investigated patient-directed rehabilitation, home visits and discharge planning, while Physiotherapy staff researched areas of clinical education, Parkinson's disease, safety culture and traumatic brachial plexus injury.

Physiotherapist Genevieve Tole was awarded a \$10,000 Caulfield Hospital Research Grant for the project: 'Ballistic Strength Training in Stroke: A randomised controlled assessor blinded study'. The Speech Pathology Department participated in an NHMRC funded, national, randomised, controlled trial (RCT) investigating if intensive and early aphasia therapy results in better communication outcomes for stroke patients.

Aged Care Services

In 2014 Aged Care Services had an active role in research, particularly in clinical research in the older population. A large focus within the service is the Advanced Trainee Program, which involves trainees working closely with consultant geriatricians in developing and implementing a research project. Final Advanced Trainee projects completed and passed in 2014 included 'Weight bearing status and clinical

outcomes in a sub-acute population (Dr Gillian Mason) and 'Quality-of-Life and functional state in older patients receiving hemodialysis and association with treatment duration (Dr Rachel Aitken).

Advanced Trainees continued their strong interest in frailty with a number of projects across the geriatric sub-acute, rehabilitation and intensive care unit populations. Other developing projects include the association between delirium and opioid management in the post-operative geriatric patient; insomnia and rehabilitation participation; and discharge outcomes of patients admitted to The Alfred Emergency and Trauma Centre Short Stay Unit.

Aged Psychiatry

The first major piece of investigator-driven research for the Caulfield Aged Psychiatry department investigated the neuropsychology of hoarding and squalor. Previously, the largest case series within the world literature comprised a total of six cases. After three years of data collection, our research group was able to report 69 cases in an article published in *International Psychogeriatrics*. The team has also achieved a national profile in the Alzheimer's disease clinical trials space and was selected as the lead site for the Anavex Life Sciences sponsored phase 2a study of the novel compound ANAVEX 2-73, a trial run in collaboration with Nucleus Network.

Community and Ambulatory Services

The Advance Care Planning Program successfully completed the research study entitled 'Can community dwelling older adults complete a person based advance care directive to provide useful information to substitute decision makers?' This project was funded through the Department of Health Victoria and the final report provided invaluable guidance for the future use of Advance Care Planning documentation.

The Community Rehabilitation Program continued to be involved in projects investigating falls prevention strategies and outcome measures for community rehabilitation at a service level. The service received a \$10,000 Caulfield Hospital Research Grant for the project 'The health literacy profile of clients attending the Alfred Health Community Rehabilitation Program' in conjunction with Deakin University (Principal Investigator: Kelly Joyce).

Caulfield Pain Management and Research Centre has an active program in applied clinical research and has participated in NHMRC funded trials investigating anti-depressant therapy for the management of chronic low back pain and the utility of simple analgesics to reduce pain-related agitation and aggression in persons with dementia living in residential aged care facilities. The centre is also participating

in an ARC funded Linkage Project, partnering with the Transport Accident Commission, aimed at investigating the role of compensation status on chronic pain and functional outcomes after traumatic injury, with a focus on psychological factors.

A major stream of research involves the development of better outcome measures for the assessment of chronic pain conditions and the centre was one of the first Victorian sites to commence participating in the electronic Persistent Pain Outcomes Collaboration in 2014.

Nursing

The Nursing Services team was awarded a \$25,000 Caulfield Hospital Major Research Grant for their study investigating the role of sub-acute nurses in a changing healthcare context (Principal Investigator: Danielle Bolster). The study aims to describe changes in the active medical management of patients and nursing workforce needs over the previous five years, and to explore the current role of nurses in a sub-acute population. Results will be utilised to develop recommendations for workforce planning and nursing training and education.

Rehabilitation

The Acquired Brain Injury (ABI) Unit is a new service with a program of research headed by Associate Professor Natasha Lannin and funded by the Transport Accident Commission through the Institute for Safety, Compensation and Recovery Research. The program involves a multidisciplinary research group across Caulfield and Alfred Health collaborating together to improve the outcomes of rehabilitation patients with an ABI.

The Cardiac Rehabilitation Unit (CRU) continued research on the SCAR project in 2014, an RCT evaluating the routine application of silicone sheeting to newly healed median sternotomy scars. Other research projects included outcomes following cardiac rehabilitation in regards to return to work, eating behaviours, fat loss and changes in muscle mass. The

CRU was awarded a \$10,000 Caulfield Hospital Research Grant to evaluate cognitive change following cardiac rehabilitation (Principal Investigator: Robyn Sheppard).

The Spinal Rehabilitation Unit's international activities include involvement in a World Health Organisation publication on Spinal Cord Injury; lead investigator in a multicentre rehabilitation outcomes collaboration; and participation in a working party with the National Institute of Neurological Disorders and Stroke (NIH) on Spinal Cord Injury Common Data Elements.

Achievements

- Associate Professor Natasha Lannin received an RACV Sir Edmund Herring Memorial Scholarship of \$55,000 for 'Development and testing of a standardised re-orientation program for people in Post Traumatic Amnesia'.
- Physiotherapists, Natalie Fini and Melissa Raymond, were both successful in obtaining postgraduate scholarships to support their doctoral studies. Natalie was awarded a Heart Foundation Scholarship and Melissa received an Australian Postgraduate Award.
- Physiotherapist, Genevieve Tole, obtained a grant from the Australian Catholic University to support her Masters studies.
- Dr Eli Kotler was awarded most outstanding Advanced Trainee project by the Binational Executive of the Faculty of Old Age Psychiatry.
- Social Worker, Susie Leech, won Best Oral Presentation at the 2014 Health Social Work Director's Group Research Symposium in Melbourne for her presentation entitled 'Supporting carers and families of neurological rehabilitation inpatients at Caulfield Hospital'.

Postgraduate Students

12 PhD Students
18 Masters Students
1 Doctor of Clinical Science Student

Publications

36 Journal Articles



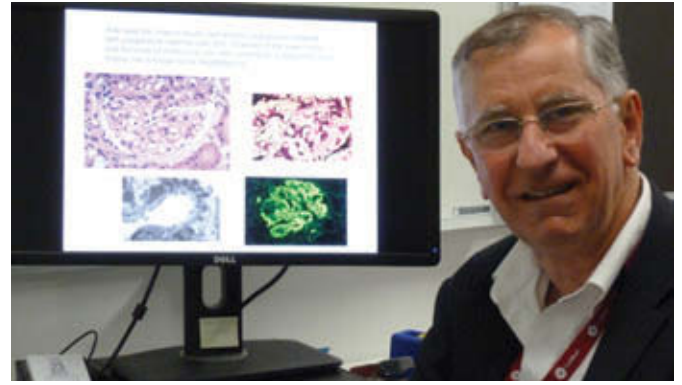
The Acquired Brain Injury Unit (ABI) has a research program embedded within the service, which is led by Associate Professor Natasha Lannin (2nd left) and funded by the Institute for Safety, Compensation and Recovery Research (ISCRR).

Alfred Health Allied Health staff with a patient, his mother (far right) and the ISCRR's CEO Professor Alex Collie (far left) and research lead Verna Smith (4th left).



Renal Medicine

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



Professor Rowan Walker, Head of Renal Medicine.

Renal Medicine provides clinical services across the full spectrum of chronic kidney disease (CKD) (stages 1 to 5), including maintenance dialysis and kidney transplantation as well as acute kidney injury (AKI). Clinical research and expanding the evidence base is the key focus across several themes.

End-stage kidney disease (ESKD) population

- Assessment of cardiovascular physiology during routine dialysis and the effects of fluid volume removal;
- Objective assessment of the quality-of-life and symptom burden in patients undergoing maintenance home dialysis;
- Randomised trials of the treatment of CKD anaemia and metabolic bone disease;
- The impact of radiological insertion of Tenckhoff catheters on home dialysis rates and costs.

Detection of kidney disease and AKI

- Proteinuria and kidney function in lung and heart transplant populations;
- AKI in orthopaedic patients undergoing elective arthroplasty;
- Tubulopathy and metabolic syndromes in HIV treated patients.

CKD progression

- A health-based needs analysis to develop an improved model of care for patients with diabetes and CKD;
- Multicentre collaboration in randomised controlled trials of newer agents for diabetic nephropathy and to slow the progression of CKD;
- Establishment of a state-based collaborative registry of kidney diseases – the ROKD.

Strengthened Collaborative Research

Throughout 2014 the Alfred Renal Service strengthened collaborative research links across local and national renal units, Monash University and Baker IDI with a focus on hypothesis-driven clinical and quality-based research to answer clinically relevant questions. Activity in multicentre clinical trials increased substantially and was supported through the appointment of an extra clinical trials coordinator. New cross disciplinary projects were initiated between social workers, nurse practitioners, medical staff and laboratory scientists.

Understanding Treatment Stress

Projects in the area of dialysis service provision focus on the underlying physiology and symptom stresses of treatment. A collaborative study is looking beyond the traditional medical model of 'dialysis adequacy' to objectively assess the longitudinal changes in the patient-centred domains of symptom burden, mental health, cognition and physical function from dialysis initiation to maintenance phase. Alfred Health is ideally placed to carry out this research with a busy home dialysis program servicing 90 patients and approximately 35 to 40 new incident ambulatory dialysis patients per year.

We have forged new cross-specialty collaborations with Alfred Health Psychiatry and Baker IDI's Neuropharmacology Laboratory to leverage the expertise of similar work undertaken in other non-renal diseases states. This project has enormous implications for the 12,000 Australian patients requiring dialysis.

Registry of Kidney Disease: ROKD

The Alfred Renal Service is leading the establishment of the ROKD in conjunction with six other metropolitan hospitals and Monash University. This registry will collect data from Australian CKD patients across a spectrum of renal specific diseases.

Aims of ROKD

- Increase the accuracy of estimates of disease incidence and prevalence;
- Improve understanding of the phenotypic expression and natural history of disease;
- Identify factors that predict prognosis and outcomes, particularly in relation to progression to ESKD (dialysis/transplantation) or death;
- Assess current patterns of care and clinical practice;
- Improve evidence for best practice-based guidelines for patient management;
- Reduce variation in treatment and improve outcomes as a result of better implementation of evidence-based guidelines;
- Facilitate awareness and promotion of clinical trials nationally and potentially facilitate identification and recruitment of eligible volunteers to relevant clinical trials.

In 2014 we presented 8 papers as proceedings at national and international meetings and gave two invited presentations.

Publications

11 Journal Articles



Tracey Phan (L) and Dr Jade Jaffar (R), members of the Allergy Research Group, Department of Allergy, Immunology and Respiratory Medicine.

Major Grants

Listed are the major national and international competitive, peer-reviewed research grants held by AMREP staff in 2014.

AUSTRALIAN GRANTS

Cooperative Research Centres (CRC) Program

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

National Health and Medical Research Council

Program Grants

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

Cooper D, Davenport M, Emery S, Kelleher A, Kent S, Lewin S, Purcell D. HIV latency, pathogenesis and immunity. 2014-2018: \$12,826,660. Administering institution: University of New South Wales.

Goodnow C, MacKay C, MacKay-Fisson F, Tangye S, Sprent J, Cook M, Vinuesa C, Brink R. Molecular and cellular basis of inflammatory and immunodeficiency diseases. 2012-2016: \$15,718,075. Administering institution: Australian National University.

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.

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

Krum H, Kelly D, Reid C. Prevention and treatment of chronic heart and kidney disease via epidemiological, pharmacological device and cell-based approaches. 2010-2014: \$5,390,000. Administering institution: Monash University.

Owen N, Bauman A, Brown W. Sitting less and moving more: Population health research to understand and influence sedentary behaviour. 2011-2014: \$3,773,000. Administering institution: Baker IDI.

Centres of Research Excellence

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

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

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

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

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

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

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

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

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

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

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

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

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

Development Grants

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

Febbraio M, Cowley M, Adams T. Development of a modified gp130 ligand to treat obesity-induced insulin resistance. 2012-2014: \$424,363. Administering institution: Baker IDI.

Hagemeyer C. Site-specific bioconjugation to improve antibody drug conjugate production. 2012-2014: \$391,805. Administering institution: Baker IDI.

Kaye D. Development of an extended release oral formulation of milrinone for patients with advanced heart failure. 2013-2014: \$455,000. Administering institution: Baker IDI.

Meikle P, Kingwell B, Dart AM, Pekarsky B. Plasma lipid profiling for risk assessment of unstable coronary artery disease. 2012-2014: \$499,750. Administering institution: Baker IDI.

Peter K, Sampson D, Lorensen K. Development of a catheter-based device for the detection of vulnerable atherosclerotic plaques. 2013-2014: \$545,507. Administering institution: Baker IDI.

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

Enabling Grants

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

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

European Union Collaborative Research Grants

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

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

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

Global Alliance for Chronic Diseases

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

Partnership Projects

Barker AL, Cameron P, Hill K, Flicker L, Haines T, Lowthian J, Waldron N, Arendts G, Redfern J, Forbes A, Morris R. A multi-centre RCT to prevent secondary falls in older people presenting to the emergency department with a fall. 2013-2015: \$1,488,315. Administering institution: Monash University.

Cadilhac D, Anderson C, Donnan G, Levi C, Thriff A, Middleton S, Lannin N, Faux S, Sundararajan V, Grimley R. STROKE123: A collaborative, national effort to monitor, promote and improve the quality of stroke care in hospitals and patient outcomes. 2012-2014: \$1,200,000. Administering institution: National Stroke Research Institute.

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

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

Kaldor J, Ward J, Baillie R, Guy R, Rumbold A, Ryder N, Connors C, Pavlin N, Law M, Skov S. STRIVEplus: Refinement and translation of an intervention designed to improve sexual health service delivery in remote communities. 2013-2018: \$1,340,745. Administering institution: University of New South Wales.

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.

Middleton J, Cameron P, McClure R, Marshall R, Bowen D, Harrison J, Lyons N, Brown D. Right care, right time, right place: improving outcomes for people with spinal cord injury through early intervention and improved access to specialised care. 2012-2015: \$1,068,089. Administering institution: University of Sydney.

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

Zoungas S, Teede H, Kerr P, Cass A, Gallagher M, Fulcher G, Walker R, Polkinghorne K, Russell G, Johnson G. The diabetes renal project: better outcomes for patients with diabetes and chronic kidney disease. 2012-2015: \$628,148. Administering institution: Monash University.

Project Grants

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

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

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

Barker A, 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.

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

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

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

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

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

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

- Bozaoglu K. Chemerin may be a novel therapeutic target for modulation of adipose tissue mass. 2012-2014: \$516,325. Administering institution: Baker IDI.
- Bozaoglu K, Blangero J, Nyholt D. Exome sequencing by NGS to identify rare variants affecting Type 2 diabetes. 2012-2014: \$553,510. Administering institution: Baker IDI.
- Brown A, Carrington M, Eades S, Thompson D, Zeitz C. The Central Australian Heart Protection Study: a randomised trial of nurse-led, family based secondary prevention of acute coronary syndromes. 2011-2015: \$1,830,401. Administering institution: Baker IDI.
- Buchbinder R. Comparative effectiveness of ultrasound-guided injection with either autologous platelet rich plasma or glucocorticoid for ultrasound-proven lateral epicondylitis: a three-arm randomised placebo-controlled trial. 2013-2015: \$510,135. Administering institution: Monash University.
- Cameron P, Lewin S, Chomont N. HIV latency and regulation of HIV life cycle. 2013-2015: \$489,927.26. Administering institution: Monash University.
- Cameron P, Mallal S, Vatakis D. The impact of HIV integration sites on eliminating HIV latency. 2014-2016: \$752,950. Administering institution: Monash University.
- Caminschi I, Heath W, Mueller S. Enhancing vaccine efficacy by harnessing dendritic cell receptors and their unique properties. 2014-2016: \$664,890. Administering institution: Burnet Institute.
- Caminschi I, O'Keefe M. The identification and characterisation of a new DNA receptor. 2014-2016: \$634,890. Administering institution: Burnet Institute.
- Churchill M, Gorry P, Wesselingh S. Viral determinants of HIV-1 transcriptional latency in the central nervous system. 2013-2015: \$610,658.10. Administering institution: Burnet Institute.
- Cooper DJ, Nichol AD, French C, Street A, Bellomo R. STandaRd Issue TrANsfusion versus Fresher red blood cell Use in intenSive carE (TRANSFUSE): a randomised controlled trial. 2012-2015: \$2,761,870. Administering institution: Monash University.
- Cooper M, Chai Z. Targeting the CDA1 axis to confer renoprotection. 2014-2016: \$641,226. Administering institution: Baker IDI.
- Cooper M, El-Osta A, Jandeleit-Dahm K. Role of Set7 in diabetes related end-organ injury. 2012-2014: \$864,770. Administering institution: Baker IDI.
- Cooper M, Kantharidis P. Role of microRNA-21 in diabetic kidney disease. 2014-2016: \$729,623. Administering institution: Baker IDI.
- Coughlan M. Does excess consumption of dietary advanced glycation end products activate the complement pathway contributing to diabetic nephropathy? 2013-2015: \$454,373.89. Administering institution: Baker IDI.
- Crabb B, Beddoe T, de Koning-Ward T, Gilson P. The structural resolution of PTEX, the translocon of virulence proteins and malaria parasites. 2014-2016: \$542,562. Administering institution: Burnet Institute.
- Curtis D, Pimanda J, McCormack M. The bHLH transcription factor LYL1 in normal and leukemic haematopoiesis. 2013-2015: \$502,964.28. Administering institution: Monash University.
- Davis S, Brown K, Bell R. Investigating the use of metformin for the prevention of endometrial cancer. 2014-2016: \$655,321. Administering institution: Monash University.
- Drummer H. Roles of the hepatitis C virus glycoprotein E2 variable regions in virus entry, immunogenicity and immune evasion. 2012-2014: \$659,685. Administering institution: Burnet Institute.
- Dunstan D, Green D, Ellis K, Cerin E. Taking a break for brain health: interacting effects of exercise bouts with breaks in sitting time on cognitive and cerebrovascular function in overweight adults. 2014-2016: \$748,285. Administering institution: Baker IDI.
- Dworkin S, Jane S, Anderson P. Identifying the critical pathways which regulate vertebrate craniofacial development. 2014-2016: \$534,033. Administering institution: Monash University.
- Eades S, 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.
- Eisen D, Leder K, McBryde E, Wolfe R, Pilcher D, Woods R. The AspiriN To Inhibit SEPSIS (ANTISEPSIS) trial; an ASPREE substudy to measure the benefit of low dose aspirin in the prevention of severe sepsis. 2013-2016: \$391,879.56. Administering institution: Monash University.
- El-Osta A, Du XJ. Regulating gene expression changes in cardiac hypertrophy. 2012-2014: \$667,350. Administering institution: Baker IDI.
- El-Osta A, Thomas M, Tikellis C. Exploring the upstream mediators of metabolic memory. 2013-2015: \$614,104.73. Administering institution: Baker IDI.
- Esler M, Lambert E. Neural mechanisms of recurrent postural syncope. 2014-2016: \$589,569. Administering institution: Baker IDI.
- Febbraio M. Blocking IL-6 trans-signalling: a therapeutic strategy to prevent metabolic disease. 2013-2015: \$521,975.03. Administering institution: Baker IDI.
- Febbraio M. IC7: a gp130 receptor ligand to treat type 2 diabetes. 2013-2015: \$578,169.64. Administering institution: Baker IDI.
- Febbraio M, Whitham M. Is the role of IL6 in metabolism dependent on its cellular origin? 2014-2016: \$690,558. Administering institution: Baker IDI.
- Fisher J. Banking on the future: Establishing evidence for policy, protocols, and patient care relating to storage of reproductive material before treatment for cancer. 2013-2015: \$576,916. Administering institution: Monash University.
- Fisher J, Rowe H, Lorgell P, Ranasinha S, Proimos J. A brief couple-focused psychoeducational intervention to prevent postnatal mental health problems in women: a cluster randomised trial. 2012-2014: \$679,499. Administering institution: Monash University.
- Fitzgerald P, Hoy K. Accelerated repetitive transcranial magnetic stimulation in the treatment of depression. 2013-2015: \$471,252.60. Administering institution: Monash University.
- Fowkes F. Human malarial immunity and risk of malaria post-partum and during infancy. 2013-2015: \$254,165.93. Administering institution: Burnet Institute.
- Fowkes F, Simpson J, Nosten F. Human malarial immunity and assessment of emerging artemisinin resistance. 2014-2016: \$302,647. Administering institution: Burnet Institute.
- Gabbe B, Cameron P, Harrison J, Lyons R, Ponsford J, Collie A, Ameratunga S. Outcomes after serious injury: what is the recovery trajectory and how do the priorities for treatment and disability services change over time? 2014-2017: \$738,450. Administering institution: Monash University.
- Gerondakis S. The NF- κ B transcription factors c-Rel and RelA control multiple steps in natural CD4 regulatory T cell development. 2012-2014: \$548,005. Administering institution: Monash University.

- Gibson P, Muir J, Boyd B. Use of oral enzymes to treat carbohydrate intolerance: adjunct therapy to the low FODMAP dietary treatment of irritable bowel syndrome. 2013-2015: \$590,365.43. Administering institution: Monash University.
- Glass D, Sim M, Dennekamp M, Abramson M. Immunological and respiratory effects among workers exposed to engineered nanoparticles. 2012-2014: \$499,222. Administering institution: Monash University.
- Gorry P. Elucidating unique molecular mechanisms involved in HIV-1 subtype C pathogenicity. 2012-2014: \$686,365. Administering institution: Burnet Institute.
- Gorry P, Lee B, Payne R, Ramsland P. Elucidating the mechanisms and consequences of clinical HIV-1 resistance to the CCR5 antagonist maraviroc. 2014-2016: \$602,670. Administering institution: Burnet Institute.
- Green S, Jeffery J, McDonald S, Lahra M, Laopaiboon M, McKenzie J, Lumbiganon P. SEA-URCHIN: South East Asia - Using Research for Change in Hospital-acquired Infection in Neonates. 2011-2015: \$2,219,157. Administering institution: Monash University.
- Gruen R, Mitra B, Bernard S, Jacobs I, Medcalf R, Reade M, Tran H. Pre-hospital Antifibrinolytics for Traumatic Coagulopathy and Haemorrhage (The PATCH Study). 2013-2016: \$1,668,152.46. Administering institution: Monash University.
- Guthridge M. Dual inhibition of independent cell survival pathways as a new approach for targeting leukaemic stem cells. 2012-2014: \$543,675. Administering institution: Monash University.
- Guthridge M, Wei A. Targeting the apoptosis machinery in cancer. 2014-2016: \$527,948. Administering institution: Monash University.
- Hagemeyer C, Johnston A, Peter K. Antibody targeted thrombin-activatable μ -plasminogen fusion proteins and nanocapsules for the treatment of acute thrombosis. 2012-2014: \$518,675. Administering institution: Baker IDI.
- Hamilton J. Defining the function of the thrombin receptor, PAR4, on human platelets. 2013-2015: \$522,270.16. Administering institution: Monash University.
- Head G, Davern P. Role of the paraventricular hypothalamus in angiotensin induced neurogenic hypertension. 2013-2015: \$431,586.68. Administering institution: Baker IDI.
- Head G, Davern P, Marques F, Charchar F. Mechanisms responsible for neurogenic hypertension: role of a novel interaction between amygdala-hypothalamic GABA pathways and the microRNA regulation of rennin. 2014-2016: \$557,562. Administering institution: Baker IDI.
- Hogarth M, Pietersz G, Baker R, Powell M. Human Fc receptors in antibody mediated inflammation. 2014-2016: \$619,890. Administering institution: Burnet Institute.
- Holland A, McDonald C, Mahal A. Benefits and costs of home-based pulmonary rehabilitation in chronic obstructive pulmonary disease. 2013-2015: \$364,360.82. Administering institution: La Trobe University.
- Jackson S. Investigation of a new leukocyte recruitment mechanism at sites of vascular injury. 2012-2014: \$528,675. Administering institution: Monash University.
- Jackson S. Investigation of a novel mechanism causing platelet hyperactivity in diabetes. 2013-2015: \$562,892.85. Administering institution: Monash University.
- Jackson S. Investigation of the proinflammatory function of platelets during ischaemia-reperfusion injury. 2013-2015: \$533,642.85. Administering institution: Monash University.
- Jackson S. Identification of a novel adhesion mechanism regulating platelet-endothelial interactions. 2014-2016: \$485,179. Administering institution: Monash University.
- Jackson S, Schoenwaelder S. Investigating a novel role for the haemopoietic growth factor receptor, c-Mpl, in regulating shear-dependent platelet adhesive function. 2014-2016: \$551,524. Administering institution: Monash University.
- Jandeleit-Dahm K, Kantharidis P. The role of the microRNA let 7 in diabetic proliferative vascular disease. 2014-2016: \$651,896. Administering institution: Baker IDI.
- Jandeleit-Dahm K, Thomas M, Tikellis C. The role of methylglyoxal and RAGE in diabetes associated atherosclerosis. 2013-2015: \$454,375.35. Administering institution: Baker IDI.
- Jane S. A novel genetic element controlling adult haemoglobin production. 2012-2014: \$477,260. Administering institution: Monash University.
- Jane S. Identification of critical factors for the establishment and maintenance of the epidermal barrier. 2012-2014: \$648,675. Administering institution: Monash University.
- Jane S. The role of the mammalian Grainyhead-like gene family in neural tube closure. 2013-2015: \$613,612.35. Administering institution: Monash University.
- Jane S. Towards a cure for the beta-hemoglobinopathies. 2014-2016: \$617,562. Administering institution: Monash University.
- Jane S, Pearson R, Darido C. Translating molecular insights in squamous cell carcinoma into novel therapeutics. 2013-2016: \$823,336.80. Administering institution: Monash University.
- Jaworowski A, Crowe S, Cameron P, Elliott J. A longitudinal study of natural killer cell function in HIV-infected individuals initiating therapy. 2013-2015: \$598,938.60. Administering institution: Burnet Institute.
- Kingwell B, Duffy S, Siebel A. HDL elevation and glucose metabolism: a mechanistic proof-of-concept intervention trial in pre-diabetes. 2014-2016: \$490,468. Administering institution: Baker IDI.
- Kinner S, Preen D, Lennox N, Butler T, Power R, Ober C, Ware R. Improving the health of Indigenous and non-Indigenous ex-prisoners: a multi-jurisdictional, mixed-methods study. 2011-2014: \$1,386,769. Administering institution: Burnet Institute.
- Kulkarni J. Adjunctive hormone therapy for treatment resistant depression in perimenopausal women. 2013-2015: \$599,514.44. Administering institution: Monash University.
- Kulkarni J, Barton D, Gurchich C. Selective estrogen receptor modulators - a new adjunctive treatment for men with schizophrenia? 2013-2015: \$788,419.13. Administering institution: Monash University.
- Kyaw T. B1a B cells: atheroprotective mechanisms and therapeutic application. 2014-2016: \$529,169. Administering institution: Baker IDI.
- Lahoud M. Molecular characterisation of the dendritic cell receptor Clec9a and its ligand interactions. 2012-2014: \$640,405. Administering institution: Burnet Institute.
- Lambert G, Barton D. Interactions between the serotonin transporter and sympathetic nervous activation in patients with major depressive disorder - Understanding the link between the brain and the heart. 2012-2014: \$509,250. Administering institution: Baker IDI.
- Lambert G, Barton D, Dixon J, Straznicki N. A randomised trial examining the effectiveness of sympathetic nervous inhibition in alleviating the metabolic side effects of antipsychotic medications in patients with schizophrenia. 2012-2014: \$461,250. Administering institution: Baker IDI.

- Lambert G, Teede H, Dixon J, Tilbrook A. Polycystic ovary syndrome - targeting the sympathetic nervous system to improve outcomes. 2012-2014: \$341,175. Administering institution: Baker IDI.
- Lazarus R, Blangero J, Bozaoglu K. Genetics to function: identifying transcripts mediating the biological effects of GWAS SNPs. 2012-2014: \$423,579. Administering institution: Baker IDI.
- Leslie K, Myles P, Paech M, Story D, Chow C. POISE-2: a large, international, placebo-controlled, factorial trial to assess the impact of clonidine and aspirin in patients undergoing non-cardiac surgery who are at risk of a perioperative cardiovascular event. 2011-2015: \$1,136,310. Administering institution: Monash University.
- Leslie K, Short T, Chan M, Myles P, Paech M, Corcoran T. The influence of anaesthetic depth on patient outcome after major surgery. 2013-2017: \$2,893,794.64. Administering institution: Monash University.
- Lewin S, Matthews G, Torresi J, Crane M. Liver disease in HIV-HBV co-infection. 2012-2015: \$682,330. Administering institution: Monash University.
- Luchters S, Crowe S, Stoové M, Anderson D, Markby J, Ryan C, Kelly A, Chen XS, Kelso D, Vallely A. Reduced HIV infection and increased survival among HIV-exposed infants using two newly developed point-of-care tests in Papua New Guinea and China. 2014-2016: \$923,691. Administering institution: Burnet Institute.
- Mackay F, Ting S. Restoration of immune competency in CLL. 2014-2016: \$557,565. Administering institution: Monash University.
- Maguire G, Ward J. Preventing hospital readmission in a regional Australian hospital setting. 2014-2016: \$546,862. Administering institution: Baker IDI.
- McMullen J. Targeting PI3K-regulated lipids to treat heart failure. 2013-2015: \$472,889.14. Administering institution: Baker IDI.
- McMullen J, Lin R. The cardioprotective role of PI3K-regulated small non-coding RNAs. 2013-2015: \$589,695.02. Administering institution: Baker IDI.
- McMullen J, Ritchie R. Identification of a microRNA-based therapy for the diabetic heart. 2014-2016: \$510,505. Administering institution: Baker IDI.
- McNeil J, Guymer R, Robman L, Woods R. Low dose aspirin and age-related macular degeneration: randomised controlled trial. 2013-2017: \$991,797.06. Administering institution: Monash University.
- Medcalf R, Lawrence D. Proteases and protease-inhibitor complexes as modulators of traumatic brain injury severity. 2013-2015: \$592,142.85. Administering institution: Monash University.
- Medcalf R, Mitchell A. New approaches to improve thrombolysis in ischaemic stroke. 2013-2015: \$565,847.10. Administering institution: Monash University.
- Meikle P, Best J. Lipidomic analysis of the FIELD trial: mechanism of action and prediction of response to fenofibrate treatment in type 2 diabetes. 2013-2015: \$621,134. Administering institution: University of Sydney.
- Meikle P, Tonkin A, Jowett J, Kowalczyk A, Hillis G, Zoungas S, Thompson P. Metabolomic insights into the pathogenesis and risk assessment of unstable coronary artery disease. 2012-2014: \$847,185. Administering institution: Baker IDI.
- Myles P, Bellomo R, Christophi C, Corcoran T, Forbes A, Peyton P, Story D. Restrictive versus Liberal Fluid Therapy in Major Abdominal Surgery: The RELIEF Trial. 2013-2017: \$2,384,173.35. Administering institution: Monash University.
- Myles P, Silbert B, Cooper DJ, McNeil J. Completion of the ATACAS trial. 2011-2014: \$3,328,614. Administering institution: Monash University.
- Nichol A, Davies A, Hodgson C, Fraser J, Bersten A, Cooper DJ. A multi-centre RCT of an open lung strategy including permissive hypercapnia, alveolar recruitment and low airway pressure in patients with ARDS. 2012-2015: \$997,535. Administering institution: Monash University.
- O'Hehir R, Rolland J, Bruce C, Hardy C. Impaired respiratory tolerance in obesity – the link with asthma? 2012-2014: \$644,685. Administering institution: Monash University.
- Oldenburg B, Hare D, Taylor C, McKenzie D, Forbes A, Sanderson K, Clarke D, Hollingsworth S. A prospective cohort study investigating the relationships between negative emotions, biomarkers and long term functioning in post-MI patients. 2012-2015: \$851,071. Administering institution: Monash University.
- Oldenburg B, Thankappan K, Tapp R, Zimmet P, Jolley D, Hollingsworth B, Fisher E. Kerala Diabetes Prevention Program (K-DPP): a cluster RCT of its effectiveness and cost-effectiveness. 2011-2015: \$1,046,991. Administering institution: Monash University.
- Peeters A, Wolfe R, Barendregt J, Backholer K. Implications of the increasing duration of life spent with obesity for population health. 2013-2014: \$245,631.65. Administering institution: Baker IDI.
- Peter K. Defining 'therapeutic' cells as well as establishing cell targeting and tracking technology for the treatment of myocardial infarction and atherosclerosis. 2014-2016: \$642,952. Administering institution: Baker IDI.
- Peter K. Developing functionalised microbubbles for molecular ultrasound imaging, drug and microRNA delivery. 2013-2015: \$653,597.10. Administering institution: Baker IDI.
- Peter K. Nanoparticle and virus assisted targeting of microRNA and DNA for the treatment of atherosclerosis, myocardial infarction and other inflammatory diseases. 2014-2016: \$640,853. Administering institution: Baker IDI.
- Peter K. The role of C reactive protein (CRP) in localising inflammation to misfolded proteins and stressed cells: a basis for the development of new anti-inflammatory reagents. 2014-2016: \$700,465. Administering institution: Baker IDI.
- Peter K, Hagemeyer C, Ackermann U, O'Keefe G. Novel 18F and 64Cu labelled targeted nanoparticles for molecular positron emission tomography: A means for early and sensitive detection of thrombosis, inflammation and vulnerable, rupture-prone atherosclerotic plaques. 2012-2014: \$553,510. Administering institution: Baker IDI.
- Ponsford J, Rajaratnam SW. Efficacy of melatonin for sleep disturbance following traumatic brain injury. 2012-2014: \$217,407. Administering institution: Monash University.
- Poumbourios P, Drummer H. Studies on the activation and immunogenicity of the HIV-1 glycoproteins, gp120-gp41. 2014-2016: \$615,558. Administering institution: Burnet Institute.
- Reid C, Liew D, Owen A, Williamson E, Ademi Z. Modelling of clinic and ambulatory blood pressure on cardiovascular risk and outcomes. 2013-2014: \$130,480.84. Administering institution: Monash University.
- Ritchie R, Gao XM, Yang Y. Annexin-A1 agonists rescue cardiac contractile function after myocardial infarction. 2013-2015: \$599,972.1. Administering institution: Baker IDI.
- Schlaich M. Renal denervation to improve outcomes in patients with end-stage renal disease. 2013-2015: \$992,544.64. Administering institution: Baker IDI.

- Schlaich M, Head G, Denton K. Mechanisms and consequences of renal denervation in chronic kidney disease. 2013-2015: \$1,247,960.90. Administering institution: Baker IDI.
- Schlaich M, Lambert G. Renal denervation for uncontrolled hypertension. 2012-2016: \$2,073,675. Administering institution: Baker IDI.
- Schoenwaelder S, Jackson S. The role of PI 3-kinase p110beta in regulating thrombus porosity. 2013-2015: \$500,502.60. Administering institution: Monash University.
- Schoenwaelder S, Josefsson E. Investigating the contribution of distinct mitochondrial cell death pathways to platelet survival and function. 2012-2014: \$613,375. Administering institution: Monash University.
- Shaw J, Zimmet P, Anstey K, Kavanagh A, Atkins R, Chadban S, Dunstan D, Balkau B. AusDiab 3: emerging risk factors for and long-term incidence of cardio-metabolic diseases. 2011-2014: \$2,537,113. Administering institution: Baker IDI.
- Shehabi Y, Bellomo R, Reade M, Seppelt I, McArthur C, Bailey M, Howe B. Early goal-directed sedation compared with standard care in mechanically ventilated critically ill patients: a prospective multicentre randomised controlled trial. 2013-2017: \$2,752,725.01. Administering institution: Monash University.
- Stewart S, Horowitz J, Carrington M, Scuffham P, Wong C, Newton P, Rischbieth A. Which Heart failure Intervention is most Cost effective in reducing Hospital care (WHICH? II) Trial: A multicentre, randomised trial of standard versus intensified management of metropolitan and regional-dwelling patients with heart failure. 2013-2016: \$1,817,824.76. Administering institution: Baker IDI.
- Storey E. Mechanisms of ataxia in spinocerebellar ataxia type 1 transgenic mice. 2013-2015: \$348,864.36. Administering institution: Monash University.
- Stoové M, Kinner S, Butler T, Aitken C, Ogloff J, Dietze P. A prospective cohort study of ex-prisoners with a history of injecting drug use: examining health service utilisation, physical and mental health and blood borne virus trajectories. 2012-2016: \$956,019. Administering institution: Burnet Institute.
- Storey E, Ward S, Woods R, Hamilton G, Janke A, Kawasaki R, Naughton M. The SNORE-ASA study: a study of neurocognitive outcomes, radiological and retinal effects of aspirin in sleep apnoea. 2012-2016: \$850,000. Administering institution: Monash University.
- Sviridov D, Bukrinsky M, Slobedman B, Mukhamedova N. ABCA1 – an intersection between infection, atherosclerosis and metabolic disorders. 2012-2014: \$631,671. Administering institution: Baker IDI.
- Sviridov D, Smyth I, Jowett J, Fu Y, Kelsell D. ABCA12 – a new regulator of cellular lipid metabolism. 2012-2014: \$699,685. Administering institution: Baker IDI.
- Tachedjian G, Chalmers D, Sluis-Cremer N, Arnold E, Simpson J. Towards a new class of reverse transcriptase inhibitor for HIV prevention. 2014-2016: \$663,918. Administering institution: Burnet Institute.
- Tachedjian G, Cone R, Perlmutter P. Lactic acid as a natural microbicide for HIV. 2012-2014: \$577,350. Administering institution: Burnet Institute.
- Taylor A. The role of diffuse myocardial fibrosis in myocardial stiffness. 2012-2015: \$479,940. Administering institution: Baker IDI.
- Teede H, Lombas C, Zoungas S, Keating C. Preventing weight gain in young to mid-aged women living in rural communities: a cluster randomised controlled trial. 2012-2015: \$863,888. Administering institution: Monash University.
- Ting S, Curtis D. Endocytosis and asymmetric cell division in leukaemia. 2013-2015: \$529,419.64. Administering institution: Monash University.
- Thomas M, Tikellis C. Exploring the therapeutic potential of TRAIL in diabetes and the metabolic syndrome. 2012-2014: \$431,250. Administering institution: Baker IDI.
- Urquhart D, Wluka A, Sim M, van Tulder M, Forbes A, Gibson S. Is low dose amitriptyline more effective than placebo in the management of chronic, neuropathic low back pain? A double-blind, randomised, placebo-controlled trial with an economic evaluation. 2012-2014: \$296,155. Administering institution: Monash University.
- Wang Y, Cicuttini F, Tonkin A, Hill C, Ding C. Does statin use have a disease modifying effect in symptomatic knee osteoarthritis? A multicentre randomised, double-blind, placebo-controlled trial. 2013-2015: \$971,019.95. Administering institution: Monash University.
- Wei A, Bradstock K, Levis M, Murray M, Roberts A. A randomised study to optimise clinical outcomes in patients with FLT3 mutant AML. 2013-2017: \$1,111,891.27. Administering institution: Monash University.
- Weller C, Haines T, Ward S, Darby I, Barker A, Underwood M. Clinical effectiveness of aspirin in healing chronic venous leg ulcers: a randomised double-blinded placebo-controlled trial. 2014-2017: \$766,311. Administering institution: Monash University.
- Woodcock E, Iismaa S. Identification of novel targets for treatment of heart failure. 2012-2014: \$470,286. Administering institution: Baker IDI.
- Wright M. The role of the tetraspanins CD37 and CD82 in leukocyte migration. 2012-2014: \$358,510. Administering institution: Monash University.

Australia Fellowships

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

Research Fellowships

- Andrews R. 2011-2015. Administering institution: Monash University.
 Crowe S. 2013-2017. Administering institution: Burnet Institute.
 Davis S. 2013-2017. Administering institution: Monash University.
 Dart A. 2010-2015. Administering institution: Baker IDI.
 Dietze P. 2011-2015. Administering institution: Burnet Institute.
 Dixon J. 2010-2014. Administering institution: Baker IDI.
 Drummer H. 2013-2017. Administering institution: Burnet Institute.
 Du XJ. 2013-2017. Administering institution: Baker IDI.
 El-Osta A. 2009-2014. Administering institution: Baker IDI.
 Esler M. 2010-2014. Administering institution: Baker IDI.
 Febbraio MA. 2012-2016. Administering institution: Baker IDI.
 Gerondakis S. 2011-2015. Administering institution: Monash University.
 Guthridge M. 2014-2018. Administering institution: Monash University.
 Head G. 2011-2015. Administering institution: Baker IDI.
 Hellard M. 2014-2018. Administering institution: Burnet Institute.
 Hibbs M. 2010-2014. Administering institution: Monash University.
 Jandeleit-Dahm K. 2014-2018. Administering institution: Baker IDI.
 Kaye D. 2013-2017. Administering institution: Baker IDI.
 Kingwell B. 2014-2018. Administering institution: Baker IDI.
 Lambert G. 2013-2017. Administering institution: Baker IDI.

Mackay F. 2012-2016. Administering institution: Monash University.

McMullen J. 2010-2014. Administering institution: Baker IDI. (Honorary)

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

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

Owen N. 2011-2015. Administering institution: Baker IDI.

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

Peter K. 2010-2014. Administering institution: Baker IDI. (Honorary)

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

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

Schlauch M. 2010-2014. Administering institution: Baker IDI.

Shaw J. 2010-2014. Administering institution: Baker IDI.

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

Tachedjian G. 2009-2014. 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.

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

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

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

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

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

Krum H. 2012-2016. Administering institution: Monash University.

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

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

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

Career Development Fellowships

Barker A. 2014-2017. Administering institution: Monash University.

Cheng A. 2014-2017. Administering institution: Monash University.

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

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

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

Kinner S. 2011-2014. Administering institution: Burnet Institute.

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

Leder K. 2011-2014. Administering institution: Monash University.

Maller J. 2011-2014. Administering institution: Monash University.

O'Keeffe M. 2011-2014. Administering institution: Burnet Institute.

Peeters A. 2013-2016. Administering institution: Baker IDI.

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

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

Urquhart D. 2011-2014. Administering institution: Monash University.

Wang Y. 2014-2017. Administering institution: Monash University.

Wluka A. 2014-2017. Administering institution: Monash University.

Early Career Fellowships

Agostino M. 2013-2016. Administering institution: Burnet Institute.

Bilardi J. 2011-2014. Administering institution: Monash University.

Binger K. 2012-2015. Administering institution: Baker IDI.

Boyle J. 2011-2014. Administering institution: Monash University.

Boyle M. 2014-2017. Administering institution: Burnet Institute.

Bray J. 2014-2017. Administering institution: Monash University.

Chan W. 2013-2016. Administering institution: Baker IDI.

Davern P. 2011-2014. Administering institution: Baker IDI.

Drew B. 2009-2014. Administering institution: Baker IDI.

Duncan R. 2014-2017. Administering institution: Burnet Institute.

Elliott J. 2012-2015. Administering institution: Monash University.

Freak-Poli R. 2013-2016. Administering institution: Monash University.

Hodgson C. 2012-2015. Administering institution: Monash University.

Howell J. 2014-2017. Administering institution: Burnet Institute.

Iles L. 2014-2017. Administering institution: Baker IDI.

Jenkinson R. 2013- 2016. Administering institution: Burnet Institute.

Lim K. 2013- 2016. Administering institution: Baker IDI.

Lowthian J. 2013-2016. Administering institution: Monash University.

Lynch B. 2010-2015. Administering institution: Baker IDI.

McKenzie J. 2014-2017. Administering institution: Monash University.

McNamara B. 2010-2015. Administering institution: Baker IDI.

Mitra B. 2014-2017. Administering institution: Monash University

O'Toole J. 2011-2014. Administering institution: Monash University.

Panjari M. 2012-2015. Administering institution: Monash University.

Pedrana A. 2014-2017. Administering institution: Burnet Institute.

Richards J. 2012-2015. Administering institution: Burnet Institute.

Roche M. 2014-2017. Administering institution: Monash University.

Sacre J. 2014-2017. Administering institution: Baker IDI.

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

Segrave R. 2012-2015. Administering institution: Monash University.

Teichtahl A. 2014-2017. Administering institution: Baker IDI.

Watson A. 2008-2014. Administering institution: Baker IDI.

Weiss G. 2013- 2016. Administering institution: Burnet Institute.

Westein E. 2012-2014. Administering institution: Baker IDI.

Wright E. 2011-2014. Administering institution: Burnet Institute.

Other Australian Grants

AusAID – NGO Cooperation Program

Anderson D, Poubourios P. Male participation in improving maternal and newborn health: A community-based intervention. 2014: \$206,666.

AusAID – NGO Project Grants

Beeson. Community-based HIV programs for youth and vulnerable populations. Improving Immunisation and Newborn Survival at Aid Post Level (IINSP) Project (East Sepik). Improving community demand for timely maternal and child health services in 4 rural townships in Yangon, Burma; Improving Women and Children's Health in Vilabouly District. 2012-2014: \$155,885. Administering institution: Burnet Institute.

Centre R. PNG Health and HIV AIDS. 2014: \$110,000. Administering institution: Burnet Institute.

Drummer H. Effective Child Nutrition Evaluation. 2014: \$40,000. 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.

Toole M. Tibet Health Capacity Building Program. 2013-2014: \$1,733,847. Administering institution: Burnet Institute.

Australian and New Zealand College of Anaesthetists – Research Grant

Konstantatos A, Chan M. Cultural influence of postoperative pain. 2014: \$52,079. Administering institution: Alfred Health.

McGuinness S, Bihari S, Bersten A, Hodgson C, Nichol A. DO ARDS patients with different subtypes behave differently - A PHARLAP sub-study. 2014-2015: \$34,950. Administering institution: Monash University.

McIlroy D, Marasco S. Does varying the chloride content of intravenous fluid alter the risk of acute kidney injury after cardiac surgery? 2014: \$60,000. Administering institution: Alfred Health.

Myles P, Christelis N, Bunnett N. Proteolytic mechanisms of chronic pain: research translation. 2014: \$55,626. Administering institution: Alfred Health.

Myles P, Leslie K, Chan M, Peyton P. ENIGMA-II trial long-term follow-up study. 2012-2014: \$180,000. Administering institution: Alfred Health.

Myles P, Shulman M, Wallace S, Wijeyesundera D, Cuthbertson B, Pearse R. Using the six-minute walk test to predict quality of recovery and disability-free survival following major noncardiac surgery. 2014: \$59,776. Administering institution: Alfred Health.

Australian National Preventative Health Agency – Research Fellowship

Lim M. 2013-2014. Administering institution: Burnet Institute.

Australian Research Council – Discovery Projects

Febbraio M. Discovery of novel myokines by innovative proteomic analyses. 2013-2015: \$345,000. Monash University.

Australian Research Council – Discovery Early Career Researcher Awards

Dworkin S. 2014-2016. Administering institution: Monash University.

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

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

Australian Research Council – Future Fellowships

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

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

Fowkes F. 2013-2017. Administering institution: Burnet Institute.

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

Hamilton J. 2013-2017. Administering institution: Monash University.

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

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

Australian Research Council – Linkage Grants

Bucknall T, Hutchinson AM. Listen to me, I really am sick! Understanding patient and family perspectives in triggering responses to medical emergencies. 2012-2015: \$197,293. Administering institution: Deakin University.

Fitzgerald PB, Fifield W. The development and testing of a device to enhance the application of repetitive transcranial magnetic stimulation. 2013-2016: \$581,643. Administering institution: Monash University.

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.

Kirkman M, Fisher J, Souter K, Dobson A, Butera R, Casper G, Dally G, Farrell E, L'Huillier E, Malone J, Michelmore J, Tomlinson J, Vollenhoven B. Elucidating the increasing demand for genital cosmetic surgery among girls and women in Australia. 2013-2016: \$327,220. Administering institution: Monash University.

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

Renzaho A, Polonsky M, Mellor DJ, Green JB, Nicholson J, Oldenburg B, Horton K. Community capacity building for healthy lifestyles (CBHL) initiative: engaging communities in childhood obesity prevention in disadvantaged areas. 2013-2016: \$252,000. Administering institution: Monash University.

Smith B, Ewing M, Newton F, Donovan R, Bauman A, Mahal A, Mackay B. Harnessing recreational infrastructure to improve physical activity and community well-being. 2013-2016: \$169,605. Administering institution: Monash University.

Smith P, Sim M, LaMontagne A, Hogg-Johnson S, Lilley R, McConnell-Lynch H, Ryan S, Hill J, Fitzpatrick T, Browne T. Understanding individual, workplace and system level influences on return to work in a changing Australian labour market. 2013-2016: \$416,282. Administering institution: Monash University.

Stevenson C, Peeters A, Magliano D, Martin J, Ball K, Beauchamp A. What will it take to decrease socio-economic inequalities in obesity? 2012-2014: \$140,208. Administering institution: Deakin University.

Ward J, Worth H, Smith A, Thiele D, Kaldor J, Bryant J, Pitts M. Sexual health and relationships in young Indigenous people. 2009-2014: \$755,000. University of New South Wales.

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. 2010-2014: \$8,000,000. Administering institution: Monash University.

beyondblue National Priority Drive Research Grant Program – Research Grant

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

Fitzgerald P, Miller R, Riley J. The F.A.D study: Facebook use in affective disorders. 2013-2014: \$38,550. Administering institution: Monash University.

Segrave R. Cognitive control training for treatment resistant depression: application, evaluation and augmentation. 2013-2015: \$97,598. Administering institution: Monash University.

BUPA Health Foundation – Project Grant

Davis S. Improving the health of Australian women at midlife. 2013-2015: \$200,000. Administering institution: Monash University.

Cancer Australia – Priority-driven Collaborative Cancer Research Scheme

Millar J, Davis I, Bolton D, Giles G, Costello T, McNeil J, Evans S. Pilot of a population-based prostate cancer clinical registry. 2010-2014: \$592,875. Administering institution: Monash University.

CASS Foundation – Science and Medicine Grants

Gray S. The role of Nox5 in atherosclerosis. 2014: \$52,500. Administering institution: Baker IDI.

Hamilton J. Developing novel therapeutics for the prevention of heart attack and stroke. 2014: \$50,000. Administering institution: Monash University.

Hovarth A. Development of a new therapeutic agent to dissolve pathological blood clots. 2013-2014: \$55,000. Administering institution: Monash University.

Jenkinson R. Developing a diagnostic tool for early detection of blood cancer (Leukemia). 2014: \$30,000. Administering institution: Burnet Institute.

Kyaw TS. Immunotherapy targeting inflammation to reduce myocardial infarction-accelerated atherosclerosis. 2014: \$45,000. Administering institution: Baker IDI.

Diabetes Australia Research Trust – General Grants

El-Osta A. Epigenomic atlas of T1D (Epitype 1). 2014: \$60,000. Administering institution: Baker IDI.

Gregorevic P. Follistatin as a novel therapeutic for Type 2 diabetes. 2014: \$56,000. Administering institution: Baker IDI.

Lee-Young R. Glucose-6-phosphate dehydrogenase in human skeletal muscle: mediator of skeletal muscle insulin sensitivity? 2014: \$59,553. Administering institution: Baker IDI.

McMullen J. Identification of a microRNA-based therapy for the diabetic heart. 2014: \$60,000. Administering institution: Baker IDI.

Reutens A. A randomised, open-label study using continuous glucose monitoring to compare the effects of once a day versus twice a day prednisolone dosing schedule on glycaemic control in people with type 2 diabetes mellitus. 2014-2015: \$54,832. Administering institution: Baker IDI.

Sourris K. Does the reduction of GLP-1 predict the onset of diabetic nephropathy. 2014: \$60,000. Administering institution: Baker IDI.

Diabetes Australia Research Trust – Millennium Awards

Ritchie R, Kemp-Harper B. Nitroxyl (HNO) donors as novel pharmacotherapy specifically for the cardiac complications of type 1 diabetes. 2013-2014: \$150,000. Administering institution: Baker IDI.

Straznicky N. Neuroadrenergic dysfunction along the diabetic continuum: Benefits of weight loss within different strata of metabolic risk. 2013-2014: \$150,000. Administering institution: Baker IDI.

Department of Health (Federal Government)

Cashin K. Targeting HIV immunogens to immune cells to enhance vaccine efficiency. 2014: \$100,000. Administering institution: Burnet Institute.

Crowe S. Ecstasy and Related Drug Reporting System (EDRS). 2010-2014: \$198,814. Administering institution: University of New South Wales.

Dietze P, Hellard M. Illicit Drug Reporting System (IDRS). 2010-2014: \$285,771. Administering institution: University of New South Wales.

Luchters S. Production and evaluation of a CHO cell derived Delta3 HCV vaccine candidate. 2014: \$110,786. Administering institution: Burnet Institute.

Department of Health (Victorian Government)

Borghmans B. Improving the capacity and capability of rehabilitation interdisciplinary teams to provide evidence-based assessment and treatment for stroke patients. 2014: \$22,430. Administering institution: Alfred Health.

Fisher J, Rowe H. Advancing perinatal mental health to diverse audiences with interactive social media applications. 2013-2015: \$148,141. Administering institution: Monash University.

Harding P. Advanced Musculoskeletal Physiotherapy (AMP) implementation program. 2014-2015: \$180,000. Administering institution: Alfred Health.

King S, Nyulasi I, Avery S. Malnutrition in Victorian Cancer Services, Phase II. 2014: \$36,000. Administering institution: Alfred Health.

Krum H. Development of a heart failure minimum dataset including devices as part of the Victorian Clinical Outcomes Registry. 2014: \$159,466. Administering institution: Monash University.

McNeil J, Reid C, Tonkin A. Australian Cardiac Procedures Registry. 2011-2014: \$955,000. Administering institution: Monash University.

Wright E. Victorian Pre-exposure Prophylaxis (PrEP) demonstration project. 2014-2016: \$320,000. Administering institution: Alfred Health.

Institute for Safety, Compensation and Recovery Research – Program Grant

Lannin N, Hunter P, Bragge P, Gabbe B, Tate R, Cameron I, Holland A, Ratcliffe J. Severe acquired brain injury slow stream rehabilitation research framework. 2012-2014: \$765,164. Administering institution: La Trobe University.

Institute for Safety, Compensation and Recovery Research – Development Grant

Lannin N. The use of Google Calendar to increase independence in target activities in survivors of traumatic brain injury. 2014-2015: \$49,894. Administering institution: La Trobe University.

Institute for Safety, Compensation and Recovery Research – Project Grants

Lannin N. Rehabilitation after catastrophic acquired brain injury (Phase II). 2014-2018: \$915,000. Administering institution: Alfred Health.

Smith P, Gabbe B. Understanding individual, workplace and system level influences on return to work (RTW) in the context of the ageing Victorian labour market: a feasibility study. 2013-2014: \$82,021. Administering institution: Monash University.

Leukaemia Foundation – Grants-in-Aid

Tremblay C. Finding new and more efficient treatments for T-cell acute lymphoblastic leukaemia. 2014-2015: \$100,000. Administering institution: Monash University.

Wei A, Huang DC. Targeting survival pathways in acute myeloid leukaemia for therapeutic benefit. 2013-2014: \$100,000. Administering institution: Monash University.

Multiple Sclerosis Research Australia – Incubator Grant

Peter K. Platelets as targets for molecular imaging of subclinical multiple sclerosis. 2013-2014: \$25,000. Administering institution: Baker IDI.

National Heart Foundation of Australia – Career Development Fellowships

Hagemeyer C. 2012-2016. Administering institution: Baker IDI.

National Heart Foundation of Australia – Future Leader Fellowships

Calkin A. 2014-2018. Administering institution: Baker IDI.

National Heart Foundation of Australia – Grants-in-Aid

Byrne M, Kaye D. Molecular mechanisms of atrial fibrillation induced heart failure. 2013-2014: \$126,041. Administering institution: Baker IDI.

Gardiner E, Andrews RK. Platelet receptor modulation. 2013-2014: \$130,000. Administering institution: Monash University.

Kaye D, Mackay F. Immune mechanisms in cardiac fibrosis. 2013-2014: \$130,000. Administering institution: Baker IDI.

Kingwell B, Meikle P, Chapman J, Duffy S, Ahimastos A, Montalescot G. The HDL lipidome: prediction of coronary plaque rupture & monitoring of therapeutic responses. 2013-2014: \$130,000. Administering institution: Baker IDI.

Krum H. Renal denervation in diabetes. 2013-2014: \$32,474. Administering institution: Monash University.

Peter K. A novel embryo-derived peptide, preimplantation factor (PIF), as a new therapeutic agent protecting against inflammatory diseases. 2013-2014: \$130,000. Administering institution: Baker IDI.

Ritchie R, McMullen J. Novel approaches to preserving cardiac function in diabetes. 2013-2014: \$130,000. Administering institution: Baker IDI.

Thomas M, El-Osta A, Tikellis C, Allen T. The persisting vascular effects arising from activation of the renin angiotensin system. 2013-2014: \$129,340. Administering institution: Baker IDI.

National Heart Foundation of Australia – Overseas Research Fellowships

Weeks K. 2013-2016: Administering institution: Baker IDI.

National Heart Foundation of Australia – Postdoctoral Fellowships

Backholer K. 2013-2015. Administering institution: Baker IDI.

Chen YC. 2014-2015. Administering institution: Baker IDI.

Harrison C. 2014-2015. Administering institution: Monash University.

Irvine J. 2013-2014. Administering institution: Baker IDI.

Sampson A. 2013-2014. Administering institution: Baker IDI.

Wang X. 2014-2015. Administering institution: Baker IDI.

National Heart Foundation of Australia – Vanguard Grants

Dunstan D. Feasibility and efficacy of a combined environmental and teaching-innovation approach to reducing sitting time in the primary-school classroom. 2014: \$69,400. Administering institution: Baker IDI.

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). 2011-2014: \$1,642,997. Administering institution: Monash University.

Gruen R, Rosenfeld J, Cooper DJ, Bernard S, Cameron P, Fitzgerald M, Ponsford J, Morganti-Kossmann C. Centre of Excellence in Traumatic Brain Injury Research. 2012-2014: \$3,340,000. Administering institution: Monash University.

Morganti-Kossmann C, Bye N. Enhancing the production of new neurons to promote neurological recovery following traumatic brain injury. 2011-2014: \$506,996. Administering institution: Monash University.

Victorian Neurotrauma Initiative – Program Grants

Gruen R, Green S. Improving evidence-based care and the outcomes of patients with traumatic brain injury through a program to facilitate knowledge transfer and exchange. 2009-2014: \$4,399,539. Administering institution: Monash University.

Victorian Neurotrauma Initiative – Project Grants

Cooper DJ, Bellomo R, Bernard S. Multi-centre randomised controlled trials of early acute interventions (hypothermia, and erythropoietin) to improve outcomes after traumatic brain injury. 2010-2014: \$2,100,000. Administering institution: Monash University.

INTERNATIONAL GRANTS

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 Awards

Tikellis C. 2010-2014. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Postdoctoral Fellowships

Higgins G. 2014-2017: Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Project Grants

Thallas-Bonke V. Synergistic actions of NADPH oxidase and PKC in diabetic nephropathy. 2012-2014: US\$269,820. Administering institution: Baker IDI.

Juvenile Diabetes Research Foundation International – Target Discovery and Validation for Diabetic Nephropathy

Coughlan M. Targeting the C5a-CD88 axis in diabetic nephropathy. 2014-2015: US\$110,000. Administering institution: Baker IDI.

Jandeleit-Dahm K. Nox5 is a new target for diabetic nephropathy. 2014-2016: US\$500,000. Administering institution: Baker IDI.

National Multiple Sclerosis Society

Petratos S. Delineating the role of the monocarboxylate transporter 8 (MCT8) in driving oligodendrocyte precursor cell maturation. 2014-2015: US\$40,000. Administering institution: Monash University.

Petratos S. Limiting axonal degeneration in a model of multiple sclerosis. 2014-2015: US\$107,786. Administering institution: Monash University.

National Institutes of Health (USA)

Bukrinsky M, Sviridov D. Mechanisms of virus-induced impairment in reverse cholesterol transport. 2009-2014: US\$641,399. Administering institution: George Washington University.

Bukrinsky M, Fitzgerald ML, Sviridov D. HIV disease and impairment of high density lipoprotein metabolism. 2010-2015: US\$3,658,822. 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.

Churchill M. Transcriptional HIV-1 latency in astrocyte and macrophage reservoirs of the central nervous system. 2013-2015: US\$296,944. Administering institution: Burnet Institute.

Grimm R, McNeil J. ASPirin in Reducing Events in the Elderly (ASPREE). 2010-2015: US\$23,372,347. Administering institution: Monash University.

Deeks S, McCune M, Seklay R, Lewin SR, Palmer S, Hazuda D, Stevenson M. DARE: Delaney AIDS Research Enterprise to Find a Cure. 2011-2014: US\$19,826,794. Administering institution: University of California, San Francisco.

McIndoe R, Chai Z. A potential role of CDA1 in inflammatory pathway in diabetic complications. 2014-2015: US\$1,460,000. Administering institution: Georgia Regent University.

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. 2010-2014: US\$929,809. Administering institution: Baker IDI.

Wright E, Hoy J. International Network for Strategic Initiatives in Global HIV Trials (INSIGHT). 2010-2014: US\$136,741. Administering institution: Monash University.

NIH Fogarty International Centre – Millennium Promise Awards

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.

Worldwide Cancer Research

Dietze P, O'Keefe M. Investigating dendritic cells of bone marrow in healthy and myeloid states. 2014-2016: \$114,445. Administering institution: Burnet Institute.

Mackay F, Ting S. Investigating and correcting immune system defects in chronic lymphocytic leukaemia (CLL). 2014-2016: \$376,036. Administering institution: Monash University.

NHMRC GRANTS COMMENCING IN 2015

Program Grants (funding commencing 2016)

Krum H, Reid C, Liew D. GNT1092642: Novel approaches to the prevention and treatment of chronic heart disease and its co-morbid complications. 2016-2020: \$5,603,110. Administering institution: Monash University.

Project Grants

Berk M, McNeil J, Nelson M, Shah R, Woods R, Mohebbi M. GNT1081901: ASPREE-D; Aspirin in the prevention of depression in the elderly. 2015-2018: \$767,594. Administering institution: Monash University.

Calkin A. GNT1080036: Regulation of lipid metabolism skeletal muscle by IDOL – a novel degrader of the very low density lipoprotein receptor. 2015-2017: \$536,260. Administering institution: Baker IDI.

Chapman M, Peake S, Bellomo R, Horowitz M, Davies A, Deane A. GNT1078026: The Augmented versus Routine approach to Giving Energy Trial (TARGET). 2015-2019: \$3,534,236. Administering institution: Monash University.

Corcoran T, Myles P, Cheng A, Bach L, Forbes A, Ho K, Chan M, Leslie K, Short T. GNT1079501: Perioperative Administration of Dexamethasone and Infection – the PADDI trial. 2015-2019: \$4,603,039. Administering institution: Monash University.

Curtis D, Jane S, Haigh J, Wei A, Powell J. GNT1086662: Eradicating leukaemic stem cells by targeting the arginine methyltransferase PRMT5. 2015-2018: \$742,353. Administering institution: Monash University.

Drummer H, Pountourios P, Center R. GNT1080045: A universal prophylactic vaccine for hepatitis C virus. 2015-2017: \$623,475. Administering institution: Burnet Institute.

Du XJ. GNT 1081710: Preclinical relaxin therapy to reverse cardiac fibrosis and gain functional benefits. 2015-2017: \$702,603. Administering institution: Baker IDI.

Dunstan D, Owen N, Straznicki N. GNT1081734 Breaking up prolonged sitting: a practical daily therapeutic tool in the management of type 2 diabetes? 2015-2016: \$310,257. Administering institution: Baker IDI.

Eades S, Banks E, Ward J, Wilkes E, Ivers R, Liu B, Gray D, D'Este C, Williamson A. GNT1089104: The Forgotten Generation: understanding health trajectories in Aboriginal adolescents and youth. 2015-2019: \$1,999,392. Administering institution: Baker IDI.

El-Osta A, Thomas M, Cooper ME, Groop PH. GNT1082572: Epigenetic determinants of nephropathy in adults with type 1 diabetes. 2015-2017: \$515,010. Administering institution: Baker IDI.

Fitzgerald P, Segrave R, Bittar R. GNT1077859: Deep brain stimulation in the treatment of severe depression. 2015-2019: \$967,355. Administering institution: Monash University.

Gregorevic P, Harrison C, de Kretser D. GNT1078907 Targeting activins to treat cachexia. 2015-2018: \$671,851. Administering institution: Baker IDI.

Gorry P, Lee B, Churchill M, Ramsland P. GNT1086178: Envelope glycoprotein determinants of HIV-1 subtype C tropism and pathogenicity. 2015-2017: \$636,760. Administering institution: Burnet Institute.

Hagemeyer C. GNT1078118: Delivery nanoparticles to prevent rupture of unstable arterial plaques. 2015-2017: \$593,813. Administering institution: Baker IDI.

Hibbs M, Anderson G. GNT1080274: Targeting macrophage subtypes as a strategy for chronic inflammatory lung disease therapy. 2015-2017: \$639,794. Administering institution: Monash University.

Hogarth M, Wines B, Grimbaldston M, O'Hehir R. GNT1079946: Structure and function of human Fc receptors. 2015-2017: \$673,472. Administering institution: Burnet Institute.

Krum H, Wang B, Kompa A, Kelly D. GNT1087355: Mechanisms underlying the contribution of uremic toxins to cardiorenal syndrome. 2015-2017: \$400,588. Administering institution: Monash University.

Lahoud M, Shortman K, Caminschi I. GNT1082665: Molecular basis for the efficient processing of antigens taken up by Clec9A, a DAMP receptor on dendritic cells. 2015-2019: \$1,248,500. Administering institution: Burnet Institute.

- Lannin N, Ratcliffe J, Ada L, English C, Crotty M. GNT1079542: Optimising upper limb recovery following stroke: a randomised controlled trial of the effects of botulinum toxin-A combined with intensive rehabilitation compared to botulinum toxin-A alone. 2015-2017: \$1,036,713. Administering institution: La Trobe University.
- Leder K, Boving T, Gautam S, Forbes A, Mahal A, Luby S. GNT1083408: Improving access to safe water using Riverbank Filtration Technology. 2015-2017: \$1,021,398. Administering institution: Monash University.
- Luchters S, Lim M, Hellard M, Stoové M, Jaoko W, Kingola N, L'Engle K, Chersich M, Temmerman M. GNT1087006: Reducing unintended pregnancies among female sex workers in Kenya using mHealth: a cluster randomised trial. 2015-2017: \$706,692. Administering institution: Burnet Institute.
- McNamara B, Eades S, Jorm L, Preen D, Jones J, Joshy G, Gubhaju L, Shepherd C, McAullay D. GNT1078214 'Defying the odds': exploring the impact of perinatal outcomes, maternal social and health outcomes and levels of culturally appropriate service availability on the health of Western Australian Aboriginal infants and children. 2015-2018: \$634,885. Administering institution: Baker IDI.
- McNeil J, Egan G, Brodtmann A, Ward S, Ferris N. GNT1086188: ASPREE-NEURO: aspirin and cerebral microhaemorrhages. 2015-2018: \$956,186. Administering institution: Monash University.
- O'Keefe M, Radford K, Lucas M. GNT1085934: Exploring the contribution of interferon-lambda to autoimmune disease. 2015-2017: \$807,787. Administering institution: Burnet Institute.
- Ritchie R. GNT1081770: Annexin-A1 mimetics: a novel therapeutic approach for targeting the cardiac complications of diabetes. 2015-2018: \$784,154. Administering institution: Baker IDI.
- Tachedjian G, Anderson D, Cone R, Hearps A, Gugasyan R. GNT1088564: Immune modulatory effects of vaginal microbiota metabolites and HIV susceptibility. 2015-2017: \$770,084. Administering institution: Burnet Institute.
- Thomas M, Pflieger K. GNT1081013: Interactions between RAGE and the type 1 angiotensin receptor determine the pro-atherosclerotic actions of angiotensin II. 2015-2017: \$505,615. Administering institution: Baker IDI.
- Thomson K, Millar J, Kavnoudias H, Stricker P, Neal II R. GNT1088377: Developing irreversible electroporation non-thermal tumor ablation for organ-confined prostate cancer treatment. 2015-2017: \$281,746. Administering institution: Monash University.
- Urquhart D, Cicuttini F, Rosenfeld J, Forbes A, Wluka A, Leder K. GNT1080774: Is antibiotic treatment effective in the management of chronic low back pain in those with disc herniation? A double-blind, randomised, placebo-controlled trial with an economic evaluation. 2015-2017: \$533,760. Administering institution: Monash University.
- Watson A. GNT1079645: Role of intrarenal nerves in the progression of hypertension and diabetic nephropathy. 2015-2017: \$713,337. Administering institution: Baker IDI.
- Westein E, Murphy A. GNT1083138: Investigation into the intervention of arterial thrombosis and atherosclerosis using shear sensitive nanoparticle drug delivery. 2015-2017: \$447,077. Administering institution: Baker IDI.
- Wilkinson-Berka J, Smith J, Schmidt H, Appukuttan B. GNT1078442: Inhibition of specific NOX isoforms as a new treatment for hypertensive and diabetic retinopathy. 2015-2018: \$823,373. Administering institution: Monash University.
- Wluka A, Cicuttini, Urquhart D, Teichtahl A. GNT1083664: Does low dose amitriptyline reduce pain in knee osteoarthritis? A double blind, randomised, pragmatic, placebo controlled clinical trial of amitriptyline in addition to usual care. 2015-2017: \$401,362. Administering institution: Monash University.
- Wood E, Stanworth S, Szer J, Westerman D, Cole-Sinclair M, McQuilten Z, Estcourt L. GNT1085062: Trial to Evaluate Anti-fibrinolytic Therapy in Thrombocytopenia (TREATT). 2015-2019: \$1,012,635. Administering institution: Monash University.

Practitioner Fellowships

- Fitzgerald P. PF2 (2015-2019). Administering institution: Monash University.
- Buchbinder R. PF2 (2015-2019). Administering institution: Monash University.

Research Fellowships

- Beeson J. SRF-B (2015-2019). Administering institution: Burnet Institute.
- Buchbinder R. SPRF (2015-2019). Administering institution: Monash University.
- Cooper M. SPRF (2015-2019). Administering institution: Baker IDI.
- Dixon J. SRF-B (2015-2019). Administering institution: Baker IDI.
- Dunstan D. SRF-A (2015-2019). Administering institution: Baker IDI.
- Esler M. SPRF (2015-2019). Administering institution: Baker IDI.
- McMullen J. SRF-A (2015-2019) Administering institution: Baker IDI.
- O'Keefe M. SRF-A (2015-2019). Administering institution: Burnet Institute.
- Peter K. PRF (2015-2019). Administering institution: Baker IDI.
- Schlauch M. SRF-A (2015-2019). Administering institution: Baker IDI.
- Shaw J. SRF-B (2015-2019). Administering institution: Baker IDI.

Career Development Fellowships

- Hoy K. Level 1 Biomedical (2015-2018). Administering institution: Monash University.
- Leder K. Level 2 Population Health (2015-2018). Administering institution: Monash University.
- Murphy A. Level 1 Biomedical (2015-2018). Administering institution: Baker IDI.
- Stoové M. Level 2 Population Health (2015-2018). Administering institution: Burnet Institute.

Early Career Fellowships

- Chang C. 2015-2018. Administering institution: Monash University.
- Chow E. 2015-2018. Administering institution: Monash University.
- Horyniak D. 2015-2018. Administering institution: Burnet Institute.
- Jackson K. 2015-2018. Administering institution: Baker IDI.
- Page M. 2015-2018. Administering institution: Monash University.
- Read T. 2015-2018. Administering institution: Monash University.
- Senthi S. 2015-2018. Administering institution: Monash University.
- Sharma A. 2015-2018. Administering institution: Baker IDI.
- Stub D. 2015-2018. Administering institution: Baker IDI.
- Zou H. 2015-2018. Administering institution: Burnet Institute.

Doctoral Degrees Completed and Passed 2014

PhD

Au A. Investigation into the effects of platelet-released factors (PRFs) on the brain. Monash University. *Australian Centre for Blood Diseases, Monash.*

Bain C. Developing effective hospital management information systems: a technology ecosystem perspective. Edith Cowan University. *Information Services, Alfred.*

Ball J. Optimising management of patients with atrial fibrillation. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Baker IDI.*

Chan J-X. Characterisation of a novel neural specific ATPase in cholesterol transport. Monash University. *Department of Immunology, Monash.*

Chang C. Immunopathogenesis and diagnosis of tuberculosis and tuberculosis-associated immune restoration disease in people with HIV. Monash University. *Department of Medicine, Monash / Infectious Diseases Unit, Alfred / Burnet.*

Chen J. The role of TGF beta ligands in muscle wasting and cachexia. University of Melbourne. *Baker IDI.*

Cheshire P. Establishing the role of serotonergic neurons in dyskinesias in Parkinson's disease. Monash University. *Neurology Department, Alfred / Department of Medicine, Monash.*

Chowdhury E. Hypertension in the elderly and its relation to cardiovascular outcomes and cost-effectiveness. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Clinical Pharmacology Unit, Alfred.*

Cox N. Physical activity in adults with cystic fibrosis: participation and effects of intervention. La Trobe University. *Physiotherapy Department, Alfred.*

Crammond B. Approaches to social justice and social determinants of health. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Cui L. HIV mediated impairment of reverse cholesterol transport. University of Melbourne. *Baker IDI.*

Deliyanti D. An evaluation of aldosterone's pathogenic role in the ischemic and diabetic retina. Monash University. *Department of Immunology, Monash.*

Ellims A. Ventricular remodelling in cardiomyopathy - impact on ventricular physiology and cardiovascular outcomes. Monash University. *Department of Medicine, Monash / Baker IDI / Department of Cardiovascular Medicine, Alfred.*

Govindaraj C. Investigation of CD25hi TNFR2hi T cells and their role in ovarian cancer. Monash University. *Department of Immunology, Monash.*

Hackman K. Diabetes Mellitus in lung transplant recipients - prevalence, risk factors and effect on survival. Monash University. *Department of Medicine, Monash / Department of Allergy, Immunology and Respiratory Medicine / Department of Endocrinology and Diabetes, Alfred.*

Halmos E. Management of irritable bowel syndrome and enteral nutrition associated diarrhoea by reducing intake of poorly absorbed sugars. Monash University. *Department of Gastroenterology, Alfred / Monash.*

Ho M. The bone and bone marrow interface and its relationship to haematopoiesis. Monash University. *Australian Centre for Blood Diseases, Monash.*

Horyniak D. Understanding health and harm among young people who inject drugs. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Burnet / Infectious Diseases Unit, Alfred.*

Huynh K. The causal role of ROS induced damage in the development of LV dysfunction in the diabetic heart in vivo. Monash University. *Department of Medicine, Monash / Baker IDI.*

Iles L. Myocardial fibrosis and heart failure. Monash University. *Department of Cardiovascular Medicine, Alfred / Department of Medicine, Monash / Baker IDI.*

Jackson K. Hypertension in genetic high blood pressure (BPH) mice is due to overactivity of specific hypothalamic pathways regulating sympathetic nervous system (SNS). Monash University. *Baker IDI.*

Jha JC. Role of NADPH oxidases NOX1 and NOX4 in diabetic nephropathy: Genetic Deletion and Pharmacological inhibition studies. Monash University. *Department of Medicine, Monash / Baker IDI.*

Joss N. Drivers of collaborative practice for health promotion. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

Karki S. Improving interventions to prevent the transmission of vancomycin-resistant enterococci in hospitals. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Infectious Diseases Unit, Alfred.*

Ko K. Characterisation of pathogenic inflammatory cells in autoimmune disease. University of Melbourne. *Burnet.*

Lam N. Biology of stem cells in the failing heart. Monash University. *Department of Medicine, Monash / Baker IDI / Department of Cardiovascular Medicine, Alfred.*

Lam L. The diagnosis and treatment of patients with acute decompensated heart failure. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Clinical Pharmacology Unit, Alfred.*

Latour P. The optimization of an immunotherapy to treat persistent HCV infection. Monash University. *Burnet.*

Lee J. MicroRNA and thyroid cancer. University of Sydney. *Department of Endocrinology and Diabetes, Alfred.*

Lewis P. Methodological considerations in cerebral autoregulation assessment. Monash University. *Department of Neurosurgery, Alfred / Department of Surgery, Monash / Department of Cardiothoracic Surgery, Alfred.*

Liu S. Cardiorenal syndrome: pathophysiology and potential role of uremic toxins. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Clinical Pharmacology Unit, Alfred.*

Mar V. Clinical and molecular analyses of nodular melanoma. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Victorian Melanoma Service, Alfred.*

Marasco S. Surgical rib fixation. Monash University. *Department of Cardiothoracic Surgery, Alfred / Department of Surgery, Monash.*

Mathiyalagan P. Epigenetics in human health and disease. Monash University. *Baker IDI / Department of Medicine, Monash.*

- Meehan A.** Investigating the function of natural killer cells during immunological responses following lung transplantation. Monash University. *Department of Medicine, Monash / Department of Allergy, Immunology and Respiratory Medicine, Alfred / Australian Centre for Blood Diseases, Monash.*
- Michell D.** Hypertension induced inflammation in the endothelium: the signalling pathways involved. Monash University. *Baker IDI / Department of Medicine, Monash / Department of Cardiovascular Medicine, Alfred.*
- Mohamud R.** The effects of nanoparticles on regulatory T cells in lungs: implication for asthma developments and immunotherapy. Monash University. *Department of Immunology, Monash / Department of Allergy, Immunology and Respiratory Medicine, Alfred.*
- Moore A.** Philosophical and professional aspects of Chinese medicine. Monash University. *Department of Medicine, Monash.*
- Moore E.** Renal function and renal biomarkers in traumatic brain injury treated erythropoietin and controlled hypothermia. Monash University. *Intensive Care Unit, Alfred / Department of Epidemiology and Preventive Medicine, Monash.*
- Nagorka-Tsindos T.** Loneliness and health status of Chinese and Anglo-Australian Manningham seniors. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Nasa Z.** The induction of immune tolerance through genetic manipulation of haematopoietic stem cells. Monash University. *Department of Immunology, Monash.*
- Olasoji M.** Role of mental health nurses in Australian Primary Health Care. RMIT University. *Nursing, Alfred.*
- Paton B.** Predictive coding in the brain: theory and experiment. Monash University. *Monash Alfred Psychiatry Research Centre.*
- Rawal Lal B.** Peer support to improve diabetes management: the impact on utilisation of health services in Australia. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Rodda L.** Alcohol congener analysis in a forensic context. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Rogasch N.** Prefrontal cortical plasticity and inhibition in the pathophysiology of schizophrenia. Monash University. *Monash Alfred Psychiatry Research Centre.*
- Sacks-Davis R.** Relationships between phylogeny of hepatitis C viruses and social network structure in a cohort of injecting drug users. Monash University. *Burnet / Department of Epidemiology and Preventive Medicine, Monash / Infectious Diseases Unit, Alfred.*
- Sanagou M.** Preoperative hierarchical risk prediction modelling for 30 day mortality following cardiac surgery in Australia. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Savvas S.** Opioid use in chronic pain. University of Melbourne. *Rehabilitation, Aged and Community Care, Alfred.*
- Senthi S.** Treatment of early-stage lung cancer: cure and survivorship. University of Amsterdam. *William Buckland Radiotherapy Centre, Alfred.*
- Shmela M.** Mechanisms of abnormal expression of the IGF2 gene in disorders affecting foetal growth. Monash University. *Department of Medicine, Monash / Baker IDI.*
- Tan E.** Speech disturbances and quality of life in schizophrenia. Monash University. *Monash Alfred Psychiatry Research Centre.*
- Teichtahl A.** The determinants of articular cartilage health. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / Department of Rheumatology, Monash.*
- Varnfield M.** Clinical outcomes and feasibility of an ICT-based home care model in primary and secondary prevention with lifestyle modifications for chronic diseases and mental health. Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- White D.** Macrophage migration inhibitory factor (MIF): pathological and therapeutic significance in post-myocardial infarct inflammation. Monash University. *Department of Medicine, Monash / Baker IDI.*
- Wrobel J.** Pulmonary mechanics and pulmonary hypertension in severe COPD. Monash University. *Department of Medicine, Monash / Department of Allergy, Immunology and Respiratory Medicine, Alfred.*
- Yap F.** The contribution of AGEs and their receptors to beta cell dysfunction. Monash University. *Baker IDI / Department of Immunology, Monash.*
- Yeung A.** The acceptability and feasibility of increased chlamydia testing in general practice. University of Melbourne. *Melbourne Sexual Health Centre, Alfred.*
- Zardo P.** Evaluating capacity for evidence informed decision making in an Australian health policy environment. Monash University. *Department of Epidemiology and Preventive Medicine, Monash / National Trauma Research Institute, Alfred.*

Other Doctorates

- Abouzeid M.** Evidence, equity and health: contemporary issues in the Australian public health arena, and lessons from abroad. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Doolan G.** Occupational exposure using self reports and a job exposure matrix in relation to prostate cancer from an Australian case-control study. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Grills N.** Role of networks in public health practice. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Lorains F.** Impulsivity, inhibitory control and decision making in problem gambling. Doctor of Psychology (Clinical Psychology), Monash University. *Monash Alfred Psychiatry Research Centre.*
- Moore K.** Evaluation of the nature and use of evidence in public health practice. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*
- Pillay B.** Quality of life and distress prior to and following stem cell transplantation as a treatment for cancer. Doctor of Psychology (Clinical Psychology), Monash University. *Department of Psychology, Alfred / Monash Alfred Psychiatry Research Centre.*
- Podubinski T.** Exploring the role of a hostile-dominant interpersonal style as a predictor of inpatient psychiatry aggression. Doctor of Psychology (Clinical Psychology), Monash University. *Monash Alfred Psychiatry Research Centre.*
- Tobin C.** Exploring the relationships between evidence, public opinion and policy in public health. Doctor of Public Health, Monash University. *Department of Epidemiology and Preventive Medicine, Monash.*

For a list of current postgraduate students, go to www.amrep.org.au

HIGH IMPACT FACTOR PUBLICATIONS 2014

*2013 impact factors > 10

ORIGINAL RESEARCH

ARISE Investigators; ANZICS Clinical Trials Group, Peake SL, Delaney A, Bailey M, Bellomo R, Cameron PA, Cooper DJ, Higgins AM, Holdgate A, Howe BD, Webb SA, Williams P. Goal-directed resuscitation for patients with early septic shock. *N Engl J Med* 2014;371(16):1496-506. **IIF: 54.420**

Benboubker L, Dimopoulos MA, Dispenzieri A, Catalano J, Belch AR, Cavo M, Pinto A, Weisel K, Ludwig H, Bahlis N, Banos A, Tiab M, Delforge M, Cavenagh J, Geraldles C, Lee JJ, Chen C, Oriol A, de la Rubia J, Qiu L, White DJ, Binder D, Anderson K, Femand JP, Moreau P, Attal M, Knight R, Chen G, Van Oostendorp J, Jacques C, Ervin-Haynes A, Avet-Loiseau H, Hulin C, Facon T; FIRST Trial Team. Lenalidomide and dexamethasone in transplant-ineligible patients with myeloma. *N Engl J Med* 2014;371(10):906-17. **IIF: 54.420**

King TE Jr, Bradford WZ, Castro-Bernardini S, Fagan EA, Glaspole I, Glassberg MK, Gorina E, Hopkins PM, Kardatzke D, Lancaster L, Lederer DJ, Nathan SD, Pereira CA, Sahn SA, Sussman R, Swigris JJ, Noble PW; ASCEND Study Group. A phase 3 trial of pirfenidone in patients with idiopathic pulmonary fibrosis. *N Engl J Med* 2014;370(22):2083-92. **IIF: 54.420**

Lee EB, Fleischmann R, Hall S, Wilkinson B, Bradley JD, Gruben D, Koncz T, Krishnaswami S, Wallenstein GV, Zang C, Zwillich SH, van Vollenhoven RF; ORAL Start Investigators. Tofacitinib versus methotrexate in rheumatoid arthritis. *N Engl J Med* 2014;370(25):2377-86. **IIF: 54.420**

Richeldi L, du Bois RM, Raghu G, Azuma A, Brown KK, Costabel U, Cottin V, Flaherty KR, Hansell DM, Inoue Y, Kim DS, Kolb M, Nicholson AG, Noble PW, Selman M, Taniguchi H, Brun M, Le Maulf F, Girard M, Stowasser S, Schlenker-Herceg R, Disse B, Collard HR; INPULSIS Trial Investigators. Efficacy and safety of nintedanib in idiopathic pulmonary fibrosis. *N Engl J Med* 2014;370(22):2071-82. **IIF: 54.420**

Zoungas S, Chalmers J, Neal B, Billot L, Li Q, Hirakawa Y, Arima H, Monaghan H, Joshi R, Colagiuri S, Cooper ME, Glasziou P, Grobbee D, Hamet P, Harrap S, Heller S, Lisheng L, Mancina G, Marre M, Matthews DR, Mogensen CE, Perkovic V, Poulter N, Rodgers A, Williams B, MacMahon S, Patel A, Woodward M; ADVANCE-ON Collaborative Group. Follow-up of blood-pressure lowering and glucose control in type 2 diabetes. *N Engl J Med* 2014;371(15):1392-406. **IIF: 54.420**

Elsworth B, Matthews K, Nie CQ, Kalanon M, Charnaud SC, Sanders PR, Chisholm SA, Counihan NA, Shaw PJ, Pino P, Chan JA, Azevedo MF, Rogerson SJ, Beeson JG, Crabb BS, Gilson PR, de Koning-Ward TF. PTEX is an essential nexus for protein export in malaria parasites. *Nature* 2014;511(7511):587-91. **IIF: 42.351**

Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, Shackelford KA, Steiner C, Heuton KR, Gonzalez-Medina D, Barber R, Huynh C, Dicker D, Templin T, Wolock TM, Ozgoren AA, Abd-Allah F, Abera SF, Abubakar I, Achoki T, Adelekan A, Ademi Z, Adou AK, Adsuar JC, Agardh EE,

Akena D, Alasfoor D, Alemu ZA, Alfonso-Cristancho R, Alhabib S, Ali R, Al Kahbouri MJ, Alla F, Allen PJ, AlMazroa MA, Alsharif U, Alvarez E, Alvis-Guzmán N, Amankwaa AA, Amare AT, Amini H, Ammar W, Antonio CA, Anwari P, Arnlöv J, Arsenijevic VS, Artaman A, Asad MM, Asghar RJ, Assadi R, *et al.* Global, regional, and national levels and causes of maternal mortality during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014;384(9947):980-1004. **IIF: 39.207**

ENCORE1 Study Group, Puls R, Amin J, Losso M, Phanuphak P, Nwizu C, Orrell C, Young B, Shahar E, Wolff M, Gazzard B, Read T, Hill A, Cooper DA, Emery S. Efficacy of 400 mg efavirenz versus standard 600 mg dose in HIV-infected, antiretroviral-naive adults (ENCORE1): a randomised, double-blind, placebo-controlled, non-inferiority trial. *Lancet* 2014;383(9927):1474-82. **IIF: 39.207**

Kotecha D, Holmes J, Krum H, Altman DG, Manzano L, Cleland JG, Lip GY, Coats AJ, Andersson B, Kirchhof P, von Lueder TG, Wedel H, Rosano G, Shibata MC, Rigby A, Flather MD; Beta-Blockers in Heart Failure Collaborative Group. Efficacy of β blockers in patients with heart failure plus atrial fibrillation: an individual-patient data meta-analysis. *Lancet* 2014;384(9961):2235-43. **IIF: 39.207**

Krum H, Schlaich MP, Böhm M, Mahfoud F, Rocha-Singh K, Katholi R, Esler MD. Percutaneous renal denervation in patients with treatment-resistant hypertension: final 3-year report of the Symplicity HTN-1 study. *Lancet* 2014;383(9917):622-9. **IIF: 39.207**

Myles PS, Leslie K, Chan MT, Forbes A, Peyton PJ, Paech MJ, Beattie WS, Sessler DI, Devereaux PJ, Silbert B, Schricker T, Wallace S; ANZCA Trials Group for the ENIGMA-II investigators. The safety of addition of nitrous oxide to general anaesthesia in at-risk patients having major non-cardiac surgery (ENIGMA-II): a randomised, single-blind trial. *Lancet* 2014;384(9952):1446-54. **IIF: 39.207**

Bennell KL, Egerton T, Martin J, Abbott JH, Metcalf B, McManus F, Sims K, Pua YH, Wrigley TV, Forbes A, Smith C, Harris A, Buchbinder R. Effect of physical therapy on pain and function in patients with hip osteoarthritis: a randomized clinical trial. *JAMA* 2014;311(19):1987-97. **IIF: 30.387**

Bove T, Zangrillo A, Guarracino F, Alvaro G, Persi B, Maglioni E, Galdieri N, Comis M, Caramelli F, Pasero DC, Pala G, Renzini M, Conte M, Paternoster G, Martinez B, Pinelli F, Frontini M, Zucchetti MC, Pappalardo F, Amantea B, Camata A, Pisano A, Verdecchia C, Dal Checco E, Cariello C, Faita L, Baldassarri R, Scandroglio AM, Saleh O, Lembo R, Calabrò MG, Bellomo R, Landoni G. Effect of fenoldopam on use of renal replacement therapy among patients with acute kidney injury after cardiac surgery: a randomized clinical trial. *JAMA* 2014;312(21):2244-53. **IIF: 30.387**

Emerging Risk Factors Collaboration, Di Angelantonio E, Gao P, Khan H, Butterworth AS, Wormser D, Kaptoge S, Kondapally Seshasai SR, Thompson A, Sarwar N, Willeit P, Ridker PM, Barr EL, Khaw KT, Psaty BM, Brenner H, Balkau B, Dekker JM, Lawlor DA, Daimon M, Willeit J, Njølstad I, Nissinen A, Brunner EJ, Kuller LH, Price JF, Sundström J, Knuiman MW, Feskens EJ, Verschuren WM, Wald N, Bakker SJ, Whincup PH, Ford I, Goldbourt U, Gómez-de-la-Cámara A, Gallacher J, Simons LA,

- Rosengren A, Sutherland SE, Björkelund C, Blazer DG, Wassertheil-Smoller S, et al.** Glycated hemoglobin measurement and prediction of cardiovascular disease. *JAMA* 2014;311(12):1225-33. [IF: 30.387]
- Fowler RA, Mittmann N, Geerts W, Heels-Ansdell D, Gould MK, Guyatt G, Krahn M, Finfer S, Pinto R, Chan B, Ormanidhi O, Arabi Y, Qushmaq I, Rocha MG, Dodek P, McIntyre L, Hall R, Ferguson ND, Mehta S, Marshall JC, Doig CJ, Muscedere J, Jacka MJ, Klinger JR, Vlahakis N, Orford N, Seppelt I, Skrobik YK, Sud S, Cade JF, Cooper J, Cook D; Canadian Critical Care Trials Group; Australia and New Zealand Intensive Care Society Clinical Trials Group.** Cost-effectiveness of dalteparin vs unfractionated heparin for the prevention of venous thromboembolism in critically ill patients. *JAMA* 2014;312(20):2135-45. [IF: 30.387]
- Garg AX, Kurz A, Sessler DI, Cuerden M, Robinson A, Mrkobrada M, Parikh CR, Mizera R, Jones PM, Tiboni M, Font A, Cegarra V, Gomez MF, Meyhoff CS, VanHelder T, Chan MT, Torres D, Parlow J, Clanchet Mde N, Amir M, Bidgoli SJ, Pasin L, Martinsen K, Malaga G, Myles P, Acedillo R, Roshanov PS, Walsh M, Dresser G, Kumar P, Fleischmann E, Villar JC, Painter T, Biccand B, Bergese S, Srinathan S, Cata JP, Chan V, Mehra B, Wijeyesundera DN, Leslie K, Forget P, Whitlock R, Yusuf S, Devereaux PJ; POISE-2 Investigators.** Perioperative aspirin and clonidine and risk of acute kidney injury: a randomized clinical trial. *JAMA* 2014;312(21):2254-64. [IF: 30.387]
- Günthard HF, Aberg JA, Eron JJ, Hoy JF, Telenti A, Benson CA, Burger DM, Cahn P, Gallant JE, Glesby MJ, Reiss P, Saag MS, Thomas DL, Jacobsen DM, Volberding PA; International Antiviral Society-USA Panel.** Antiretroviral treatment of adult HIV infection: 2014 recommendations of the International Antiviral Society-USA Panel. *JAMA* 2014;312(4):410-25. [IF: 30.387]
- Hinman RS, McCrory P, Pirotta M, Relf I, Forbes A, Crossley KM, Williamson E, Kyriakides M, Novy K, Metcalf BR, Harris A, Reddy P, Conaghan PG, Bennell KL.** Acupuncture for chronic knee pain: a randomized clinical trial. *JAMA* 2014;312(13):1313-22. [IF: 30.387]
- Kaukonen KM, Bailey M, Suzuki S, Pilcher D, Bellomo R.** Mortality related to severe sepsis and septic shock among critically ill patients in Australia and New Zealand, 2000-2012. *JAMA* 2014;311(13):1308-16. [IF: 30.387]
- DIAbetes Genetics Replication And Meta-analysis (DIAGRAM) Consortium; Asian Genetic Epidemiology Network Type 2 Diabetes (AGEN-T2D) Consortium; South Asian Type 2 Diabetes (SAT2D) Consortium; Mexican American Type 2 Diabetes (MAT2D) Consortium; Type 2 Diabetes Genetic Exploration by Nex-generation sequencing in multi-Ethnic Samples (T2D-GENES) Consortium, Mahajan A, Go MJ, Zhang W, Below JE, Gaulton KJ, Ferreira T, Horikoshi M, Johnson AD, Ng MC, Prokopenko I, Saleheen D, Wang X, Zeggini E, Abecasis GR, et al.** Genome-wide trans-ancestry meta-analysis provides insight into the genetic architecture of type 2 diabetes susceptibility. *Nat Genet* 2014;46(3):234-44. [IF: 29.648]
- Chan CJ, Martinet L, Gilfillan S, Souza-Fonseca-Guimaraes F, Chow MT, Town L, Ritchie DS, Colonna M, Andrews DM, Smyth MJ.** The receptors CD96 and CD226 oppose each other in the regulation of natural killer cell functions. *Nat Immunol* 2014;15(5):431-8. [IF: 24.973]
- Mauer J, Chaurasia B, Goldau J, Vogt MC, Ruud J, Nguyen KD, Theurich S, Hausen AC, Schmitz J, Brönneke HS, Estevez E, Allen TL, Mesaros A, Partridge L, Febbraio MA, Chawla A, Wunderlich FT, Brüning JC.** Signaling by IL-6 promotes alternative activation of macrophages to limit endotoxemia and obesity-associated resistance to insulin. *Nat Immunol* 2014;15(5):423-30. [IF: 24.973]
- Dearnaley DP, Jovic G, Syndikus I, Khoo V, Cowan RA, Graham JD, Aird EG, Bottomley D, Huddart RA, Jose CC, Matthews JH, Millar JL, Murphy C, Russell JM, Scrase CD, Parmar MK, Sydes MR.** Escalated-dose versus control-dose conformal radiotherapy for prostate cancer: long-term results from the MRC RT01 randomised controlled trial. *Lancet Oncol* 2014;15(4):464-73. [IF: 24.725]
- Palumbo A, Brinchen S, Kumar SK, Lupporelli G, Usmani S, Waage A, Larocca A, van der Holt B, Musto P, Offidani M, Petrucci MT, Evangelista A, Zweegman S, Nooka AK, Spencer A, Dimopoulos MA, Hajek R, Cavo M, Richardson P, Lonial S, Ciccone G, Boccadoro M, Anderson K, Barlogie B, Sonneveld P, McCarthy PL.** Second primary malignancies with lenalidomide therapy for newly diagnosed myeloma: a meta-analysis of individual patient data. *Lancet Oncol* 2014;15(3):333-42. [IF: 24.725]
- Dominguez E, Galmozzi A, Chang JW, Hsu KL, Pawlak J, Li W, Godio C, Thomas J, Partida D, Niessen S, O'Brien PE, Russell AP, Watt MJ, Nomura DK, Cravatt BF, Saez E.** Integrated phenotypic and activity-based profiling links Ces3 to obesity and diabetes. *Nat Chem Biol* 2014;10(2):113-21. [IF: 23.297]
- Boxer AL, Lang AE, Grossman M, Knopman DS, Miller BL, Schneider LS, Doody RS, Lees A, Golbe LI, Williams DR, Corvol JC, Ludolph A, Burn D, Lorenzl S, Litvan I, Robertson ED, Höglinger GU, Koestler M, Jack CR Jr, Van Deerlin V, Randolph C, Lobach IV, Heuer HW, Gozes I, Parker L, Whitaker S, Hirman J, Stewart AJ, Gold M, Morimoto BH; AL-108-231 Investigators.** Davunetide in patients with progressive supranuclear palsy: a randomised, double-blind, placebo-controlled phase 2/3 trial. *Lancet Neurol* 2014;13(7):676-85. [IF: 21.823]
- Sathe P, Metcalf D, Vremec D, Naik SH, Langdon WY, Huntington ND, Wu L, Shortman K.** Lymphoid tissue and plasmacytoid dendritic cells and macrophages do not share a common macrophage-dendritic cell-restricted progenitor. *Immunity* 2014;41(1):104-15. [IF: 19.748]
- White VM, Young MA, Farrelly A, Meiser B, Jefford M, Williamson E, Ieropoli S, Duffy J, Winship I.** Randomized controlled trial of a telephone-based peer-support program for women carrying a BRCA1 or BRCA2 mutation: Impact on psychological distress. *J Clin Oncol* 2014;32(36):4073-80. [IF: 17.879]
- Nagareddy PR, Kraakman M, Masters SL, Storzaker RA, Gorman DJ, Grant RW, Dragoljevic D, Hong ES, Abdel-Latif A, Smyth SS, Choi SH, Korner J, Bornfeldt KE, Fisher EA, Dixit VD, Tall AR, Goldberg IJ, Murphy AJ.** Adipose tissue macrophages promote myelopoiesis and monocytosis in obesity. *Cell Metab* 2014;19(5):821-35. [IF: 16.747]
- Ben-Shlomo Y, Spears M, Boustred C, May M, Anderson SG, Benjamin EJ, Boutouyrie P, Cameron J, Chen CH, Cruickshank JK, Hwang SJ, Lakatta EG, Laurent S, Maldonado J, Mitchell GF, Najjar SS, Newman AB, Ohishi M, Pannier B, Pereira T, Vasan RS, Shokawa T, Sutton-Tyrell K, Verbeke F, Wang KL, Webb DJ, Willum Hansen T, Zoungas S, McEniery CM, Cockcroft JR, Wilkinson IB.** Aortic pulse wave velocity improves cardiovascular event prediction: an individual participant meta-analysis of prospective observational data from 17,635 subjects. *J Am Coll Cardiol* 2014;63(7):636-46. [IF: 15.343]

- Ellims AH, Shaw JA, Stub D, Iles LM, Hare JL, Slavin GS, Kaye DM, Taylor AJ.** Diffuse myocardial fibrosis evaluated by post-contrast T1 mapping correlates with left ventricular stiffness. *J Am Coll Cardiol* 2014;63(11):1112-8. [IF: 15.343]
- White HD, Tonkin A, Simes J, Stewart R, Mann K, Thompson P, Colquhoun D, West M, Nestel P, Sullivan D, Keech AC, Hunt D, Blankenberg S; LIPID Study Investigators.** Association of contemporary sensitive troponin I levels at baseline and change at 1 year with long-term coronary events following myocardial infarction or unstable angina: results from the LIPID Study (Long-Term Intervention With Pravastatin in Ischaemic Disease). *J Am Coll Cardiol* 2014;63(4):345-54. [IF: 15.343]
- Wong DT, Ko BS, Cameron JD, Leong DP, Leung MC, Malaipan Y, Nerlekar N, Crossett M, Troupis J, Meredith IT, Seneviratne SK.** Comparison of diagnostic accuracy of combined assessment using adenosine stress computed tomography perfusion + computed tomography angiography with transluminal attenuation gradient + computed tomography angiography against invasive fractional flow reserve. *J Am Coll Cardiol* 2014;63(18):1904-12. [IF: 15.343]
- Pettersson A, Graff RE, Ursin G, Santos Silva ID, McCormack V, Baglietto L, Vachon C, Bakker MF, Giles GG, Chia KS, Czene K, Eriksson L, Hall P, Hartman M, Warren RM, Hislop G, Chiarelli AM, Hopper JL, Krishnan K, Li J, Li Q, Pagano I, Rosner BA, Wong CS, Scott C, Stone J, Maskarinec G, Boyd NF, van Gils CH, Tamimi RM.** Mammographic density phenotypes and risk of breast cancer: a meta-analysis. *J Natl Cancer Inst* 2014;106(5):dju078. [IF: 15.161]
- Roberts K, Maguire G, Brown A, Atkinson D, Reményi B, Wheaton G, Kelly A, Kumar RK, Su JY, Carapetis JR.** Echocardiographic screening for rheumatic heart disease in high and low risk Australian children. *Circulation* 2014;129(19):1953-61. [IF: 14.948]
- Thiele JR, Habersberger J, Braig D, Schmidt Y, Goerendt K, Maurer V, Bannasch H, Scheichl A, Woollard KJ, von Dobschütz E, Kolodgie F, Virmani R, Stark GB, Peter K, Eisenhardt SU.** Dissociation of pentameric to monomeric C-reactive protein localizes and aggravates inflammation: *in vivo* proof of a powerful proinflammatory mechanism and a new anti-inflammatory strategy. *Circulation* 2014;130(1):35-50. [IF: 14.948]
- von Elverfeldt D, Maier A, Duerschmied D, Braig M, Witsch T, Wang X, Mauler M, Neudorfer I, Menza M, Idzko M, Zirlík A, Heidt T, Bronsert P, Bode C, Peter K, von Zur Mühlen C.** Dual-contrast molecular imaging allows noninvasive characterization of myocardial ischemia/reperfusion injury after coronary vessel occlusion in mice by magnetic resonance imaging. *Circulation* 2014;130(8):676-87. [IF: 14.948]
- Wolf D, Jehle F, Michel NA, Bukosza EN, Rivera J, Chen YC, Hoppe N, Dufner B, Rodriguez AO, Colberg C, Nieto L, Rupprecht B, Wiedemann A, Schulte L, Peikert A, Bassler N, Lozhkin A, Hergeth SP, Stachon P, Hilgendorf I, Willecke F, von Zur Mühlen C, von Elverfeldt D, Binder CJ, Aichele P, Varo N, Febbraio MA, Libby P, Bode C, Peter K, Zirlík A.** Coinhibitory suppression of T cell activation by CD40 protects against obesity and adipose tissue inflammation in mice. *Circulation* 2014;129(23):2414-25. [IF: 14.948]
- Esler MD, Böhm M, Sievert H, Rump CL, Schmieder RE, Krum H, Mahfoud F, Schlaich MP.** Catheter-based renal denervation for treatment of patients with treatment-resistant hypertension: 36 month results from the SYMPPLICITY HTN-2 randomized clinical trial. *Eur Heart J* 2014;35(26):1752-9. [IF: 14.723]
- Lee G, Kumar S, Teh A, Madry A, Spence S, Larobina M, Goldblatt J, Brown R, Atkinson V, Moten S, Morton JB, Sanders P, Kistler PM, Kalman JM.** Epicardial wave mapping in human long-lasting persistent atrial fibrillation: transient rotational circuits, complex wavefronts, and disorganized activity. *Eur Heart J* 2014;35(2):86-97. [IF: 14.723]
- Callender T, Woodward M, Roth G, Farzadfar F, Lemarie JC, Gicquel S, Atherton J, Rahimzadeh S, Ghaziani M, Shaikh M, Bennett D, Patel A, Lam CS, Sliwa K, Barretto A, Siswanto BB, Diaz A, Herpin D, Krum H, Elias T, Forbes A, Kiszely A, Khosla R, Petrinic T, Praveen D, Shrivastava R, Xin D, MacMahon S, McMurray J, Rahimi K.** Heart failure care in low- and middle-income countries: a systematic review and meta-analysis. *PLoS Med* 2014;11(8):e1001699. [IF: 14.000]
- Elliott JH, Turner T, Clavisi O, Thomas J, Higgins JP, Mavergames C, Gruen RL.** Living systematic reviews: an emerging opportunity to narrow the evidence-practice gap. *PLoS Med* 2014;11(2):e1001603. [IF: 14.000]
- Priest P, McKenzie JE, Audas R, Poore M, Brunton C, Reeves L.** Hand sanitiser provision for reducing illness absences in primary school children: a cluster randomised trial. *PLoS Med* 2014;11(8):e1001700. [IF: 14.000]
- Halmos EP, Power VA, Shepherd SJ, Gibson PR, Muir JG.** A diet low in FODMAPs reduces symptoms of irritable bowel syndrome. *Gastroenterology* 2014;146(1):67-75. [IF: 13.926]
- Sandborn WJ, Feagan BG, Marano C, Zhang H, Strauss R, Johanns J, Adedokun OJ, Guzzo C, Colombel JF, Reinisch W, Gibson PR, Collins J, Järnerot G, Hibi T, Rutgeerts P; PURSUIT-Maintenance Study Group.** Subcutaneous golimumab induces clinical response and remission in patients with moderate-to-severe ulcerative colitis. *Gastroenterology* 2014;146(1):85-95. [IF: 13.926]
- Sandborn WJ, Feagan BG, Marano C, Zhang H, Strauss R, Johanns J, Adedokun OJ, Guzzo C, Colombel JF, Reinisch W, Gibson PR, Collins J, Järnerot G, Rutgeerts P; PURSUIT-Maintenance Study Group.** Subcutaneous golimumab maintains clinical response in patients with moderate-to-severe ulcerative colitis. *Gastroenterology* 2014;146(1):96-109. [IF: 13.926]
- Rafehi H, Balcerczyk A, Lunke S, Kaspi A, Ziemann M, Kn H, Okabe J, Khurana I, Ooi J, Khan AW, Du XJ, Chang L, Haviv I, Keating ST, Karagiannis TC, El-Osta A.** Vascular histone deacetylation by pharmacological HDAC inhibition. *Genome Res* 2014;24(8):1271-84. [IF: 13.852]
- Travis SP, Danese S, Kupcinskis L, Alexeeva O, D'Haens G, Gibson PR, Moro L, Jones R, Ballard ED, Masure J, Rossini M, Sandborn WJ.** Once-daily budesonide MMX in active, mild-to-moderate ulcerative colitis: results from the randomised CORE II study. *Gut* 2014;3(3):433-41. [IF: 13.319]
- Chan JC, Sui Y, Oldenburg B, Zhang Y, Chung HH, Goggins W, Au S, Brown N, Ozaki R, Wong RY, Ko GT, Fisher E; JADE and PEARL Project Team.** Effects of telephone-based peer support in patients with type 2 diabetes mellitus receiving integrated care: a randomized clinical trial. *JAMA Intern Med* 2014;174(6):972-81. [IF: 13.246]
- Lodge CJ, Lowe AJ, Allen KJ, Zaloumis S, Gurrin LC, Matheson MC, Axelrad C, Welsh L, Bennett CM, Hopper J, Thomas PS, Hill DJ, Hosking CS, Svanes C, Abramson MJ, Dharmage SC.** Childhood wheeze phenotypes show less than expected growth in FEV1 across adolescence. *Am J Respir Crit Care Med* 2014;189(11):1351-8. [IF: 11.986]

- Schmidt M, Bailey M, Sheldrake J, Hodgson C, Aubron C, Rycus PT, Scheinkestel C, Cooper DJ, Brodie D, Pellegrino V, Combes A, Pilcher D. Predicting survival after extracorporeal membrane oxygenation for severe acute respiratory failure. The Respiratory Extracorporeal Membrane Oxygenation Survival Prediction (RESP) score. *Am J Respir Crit Care Med* 2014;189(11):1374-82. [IF: 11.986]
- Shehabi Y, Sterba M, Garrett PM, Rachakonda KS, Stephens D, Harrigan P, Walker A, Bailey MJ, Johnson B, Millis D, Ding G, Peake S, Wong H, Thomas J, Smith K, Forbes L, Hardie M, Micallef S, Fraser JF; ProGUARD Study Investigators; ANZICS Clinical Trials Group. Procalcitonin algorithm in critically ill adults with undifferentiated infection or suspected sepsis. A randomized controlled trial. *Am J Respir Crit Care Med* 2014;190(10):1102-10. [IF: 11.986]
- Guo J, Ping Y, Ejima H, Alt K, Meissner M, Richardson JJ, Yan Y, Peter K, von Elverfeldt D, Hagemeyer CE, Caruso F. Engineering multifunctional capsules through the assembly of metal-phenolic networks. *Angew Chem Int Edit* 2014;53(22):5546-51. [IF: 11.336]
- Paterson BM, Alt K, Jeffery CM, Price RI, Jagdale S, Rigby S, Williams CC, Peter K, Hagemeyer CE, Donnelly PS. Enzyme-mediated site-specific bioconjugation of metal complexes to proteins: sortase-mediated coupling of copper-64 to a single-chain antibody. *Angew Chem Int Edit* 2014;53(24):6115-9. [IF: 11.336]
- Ferreira MA, Matheson MC, Tang CS, Granell R, Ang W, Hui J, Kiefer AK, Duffy DL, Baltic S, Danoy P, Bui M, Price L, Sly PD, Eriksson N, Madden PA, Abramson MJ, Holt PG, Heath AC, Hunter M, Musk B, Robertson CF, Le Souëf P, Montgomery GW, Henderson AJ, Tung JY, Dharmage SC, Brown MA, James A, Thompson PJ, Pennell C, Martin NG, Evans DM, Hinds DA, Hopper JL; Australian Asthma Genetics Consortium Collaborators. Genome-wide association analysis identifies 11 risk variants associated with the asthma with hay fever phenotype. *J Allergy Clin Immunol* 2014;133(6):1564-71. [IF: 11.248]
- Voskamp AL, Zubrinich CM, Abramovitch JB, Rolland JM, O'Hehir RE. Goat's cheese anaphylaxis after cutaneous sensitization by moisturizer that contained goat's milk. *J Allergy Clin Immunol* 2014;2(5):629-30. [IF: 11.248]
- Grebely J, Page K, Sacks-Davis R, van der Loeff MS, Rice TM, Bruneau J, Morris MD, Hajarizadeh B, Amin J, Cox AL, Kim AY, McGovern BH, Schinkel J, George J, Shoukry NH, Lauer GM, Maher L, Lloyd AR, Hellard M, Dore GJ, Prins M; InC3 Study Group. The effects of female sex, viral genotype, and IL28B genotype on spontaneous clearance of acute hepatitis C virus infection. *Hepatology* 2014;59(1):109-20. [IF: 11.190]
- Hellard M, Rolls DA, Sacks-Davis R, Robins G, Pattison P, Higgs P, Aitken C, McBryde E. The impact of injecting networks on hepatitis C transmission and treatment in people who inject drugs. *Hepatology* 2014;60(6):1861-70. [IF: 11.190]
- Holmes JA, Roberts SK, Ali RJ, Dore GJ, Sievert W, McCaughan GW, Crawford DH, Cheng WS, Weltman MD, Bonazinga S, Visvanathan K, Sundararajan V, Desmond PV, Bowden DS, Matthews GV, Thompson AJ; CHARIOT Study Group. ITPA genotype protects against anemia during peginterferon and ribavirin therapy but does not influence virological response. *Hepatology* 2014;59(6):2152-60. [IF: 11.190]
- Calkin AC, Lee SD, Kim J, Van Stijn CM, Wu XH, Lusic AJ, Hong C, Tangirala RI, Tontonoz P. Transgenic Expression of Dominant-Active IDOL in Liver Causes Diet-Induced Hypercholesterolemia and Atherosclerosis in Mice. *Circ Res* 2014;115(4):442-9. [IF: 11.089]
- Distel E, Barrett TJ, Chung K, Giris NM, Parathath S, Essau CC, Murphy AJ, Moore KJ, Fisher EA. miR33 inhibition overcomes deleterious effects of diabetes mellitus on atherosclerosis plaque regression in mice. *Circ Res* 2014;115(9):759-69. [IF: 11.089]
- Furtado MB, Costa MW, Pranoto EA, Salimova E, Pinto AR, Lam NT, Park A, Snider P, Chandran A, Harvey RP, Boyd R, Conway SJ, Pearson J, Kaye DM, Rosenthal NA. Cardiogenic genes expressed in cardiac fibroblasts contribute to heart development and repair. *Circ Res* 2014;114(9):1422-34. [IF: 11.089]
- Wang X, Palasubramaniam J, Gkanatsas Y, Hohmann JD, Westein E, Kanojia R, Alt K, Huang D, Jia F, Ahrens I, Medcalf RL, Peter K, Hagemeyer CE. Towards effective and safe thrombolysis and thromboprophylaxis: preclinical testing of a novel antibody-targeted recombinant plasminogen activator directed against activated platelets. *Circ Res* 2014;114(7):1083-93. [IF: 11.089]
- Wilson GR, Sim JC, McLean C, Giannandrea M, Galea CA, Riseley JR, Stephenson SE, Fitzpatrick E, Haas SA, Pope K, Hogan KJ, Gregg RG, Bromhead CJ, Wargowski DS, Lawrence CH, James PA, Churchyard A, Gao Y, Phelan DG, Gillies G, Salce N, Stanford L, Marsh AP, Mignogna ML, Hayflick SJ, Leventer RJ, Delatycki MB, Mellick GD, Kalscheuer VM, D'Adamo P, Bahlo M, Amor DJ, Lockhart PJ. Mutations in RAB39B cause X-linked intellectual disability and early-onset Parkinson disease with α -synuclein pathology. *Am J Hum Genet* 2014;95(6):729-35. [IF: 10.987]
- Ghousaini M, Edwards SL, Michailidou K, Nord S, Cowper-Sal Lari R, Desai K, Kar S, Hillman KM, Kaufmann S, Glubb DM, Beesley J, Dennis J, Bolla MK, Wang Q, Dicks E, Guo Q, Schmidt MK, Shah M, Luben R, Brown J, Czene K, Darabi H, Eriksson M, Klevebring D, Bojesen SE, Nordestgaard BG, Nielsen SF, Flyger H, Lambrechts D, Thienpont B, Neven P, Wildiers H, Broeks A, Van't Veer LJ, Th Rutgers EJ, Couch FJ, Olson JE, Hallberg E, Vachon C, Chang-Claude J, Rudolph A, Seibold P, Flesch-Janys D, Peto J, Australian Ovarian Cancer Management Group *et al*. Evidence that breast cancer risk at the 2q35 locus is mediated through IGFBP5 regulation. *Nat Commun* 2014;4:4999. [IF: 10.742]
- Abd El-Wahab EW, Smyth RP, Mailler E, Bernacchi S, Vivet-Boudou V, Hijnen M, Jossinet F, Mak J, Paillart JC, Marquet R. Specific recognition of the HIV-1 genomic RNA by the Gag precursor. *Nat Commun* 2014;5:4304. [IF: 10.742]
- Haeusler RA, Hartil K, Vaitheesvaran B, Arrieta-Cruz I, Knight CM, Cook JR, Kammoun HL, Febbraio MA, Gutierrez-Juarez R, Kurland IJ, Accili D. Integrated control of hepatic lipogenesis versus glucose production requires FoxO transcription factors. *Nat Commun* 2014;5:5190. [IF: 10.742]
- Luo L, Wall AA, Yeo JC, Condon ND, Norwood SJ, Schoenwaelder S, Chen KW, Jackson S, Jenkins BJ, Hartland EL, Schroder K, Collins BM, Sweet MJ, Stow JL. Rab8a interacts directly with PI3K γ to modulate TLR4-driven PI3K and mTOR signalling. *Nat Commun* 2014;5:4407. [IF: 10.742]

Sapra G, Tham YK, Cemerlang N, Matsumoto A, Kiriazis H, Bernardo BC, Henstridge DC, Ooi JY, Pretorius L, Boey EJ, Lim L, Sadoshima J, Meikle PJ, Mellet NA, Woodcock EA, Marasco S, Ueyama T, Du XJ, Febbraio MA, McMullen JR. The small-molecule BGP-15 protects against heart failure and atrial fibrillation in mice. *Nat Commun* 2014;5:5705. [IF: 10.742]

Kitson MT, Sarrazin C, Toniutto P, Eslick GD, Roberts SK. Vitamin D level and sustained virologic response to interferon-based antiviral therapy in chronic hepatitis C: a systematic review and meta-analysis. *J Hepatol* 2014;61(6):1247-52. [IF: 10.401]

Leung C, Herath CB, Jia Z, Goodwin M, Mak KY, Watt MJ, Forbes JM, Angus PW. Dietary glycotoxins exacerbate progression of experimental fatty liver disease. *J Hepatol* 2014;60(4):832-8. [IF: 10.401]

Muir AJ, Arora S, Everson G, Flisiak R, George J, Ghalib R, Gordon SC, Gray T, Greenbloom S, Hassanein T, Hillson J, Horga MA, Jacobson IM, Jeffers L, Kowdley KV, Lawitz E, Lueth S, Rodriguez-Torres M, Rustgi V, Shemanski L, Shiffman ML, Srinivasan S, Vargas HE, Vierling JM, Xu D, Lopez-Talavera JC, Zeuzem S; EMERGE study group. A randomized phase 2b study of peginterferon lambda-1a for the treatment of chronic HCV infection. *J Hepatol* 2014;61(6):1238-46. [IF: 10.401]

Maller JJ, Thomson RH, Rosenfeld JV, Anderson R, Daskalakis ZJ, Fitzgerald PB. Occipital bending in depression. *Brain* 2014;137(Pt 6):1830-7. [IF: 10.226]

REVIEWS

Kahn SE, Cooper ME, Del Prato S. Pathophysiology and treatment of type 2 diabetes: perspectives on the past, present, and future. *Lancet* 2014;383(9922):1068-83. [IF: 39.207]

Maartens G, Celum C, Lewin SR. HIV infection: epidemiology, pathogenesis, treatment, and prevention. *Lancet* 2014;384(9939):258-71. [IF: 39.207]

Kingwell BA, Chapman MJ, Kontush A, Miller NE. HDL-targeted therapies: progress, failures and future. *Nat Rev Drug Discov* 2014;13(6):445-64. [IF: 37.231]

Gerondakis S, Fulford TS, Messina NL, Grumont RJ. NF- κ B control of T cell development. *Nat Immunol* 2014;15(1):15-25. [IF: 24.973]

Cuzick J, Thorat MA, Andriole G, Brawley OW, Brown PH, Culig Z, Eeles RA, Ford LG, Hamdy FC, Holmberg L, Illic D, Key TJ, La Vecchia C, Lilja H, Marberger M, Meyskens FL, Minasian LM, Parker C, Parnes HL, Perner S, Rittenhouse H, Schalken J, Schmid HP, Schmitz-Dräger BJ, Schröder FH, Stenzl A, Tombal B, Wilt TJ, Wolk A. Prevention and early detection of prostate cancer. *Lancet Oncol* 2014;15(11):e484-92. [IF: 24.725]

Goire N, Lahra MM, Chen M, Donovan B, Fairley CK, Guy R, Kaldor J, Regan D, Ward J, Nissen MD, Sloots TP, Whitley DM. Molecular approaches to enhance surveillance of gonococcal antimicrobial resistance. *Nat Rev Microbiol* 2014;12(3):223-9. [IF: 23.317]

Hadjistavropoulos T, Herr K, Prkachin KM, Craig KD, Gibson SJ, Lukas A, Smith JH. Pain assessment in elderly adults with dementia. *Lancet Neurol* 2014;13(12):1216-27. [IF: 21.823]

Kammoun HL, Febbraio MA. Come on BAIBA light my fire. *Cell Metab* 2014;19(1):1-2. [IF: 16.747]

Farrell M, Buchbinder R, Hall W. Should doctors prescribe

cannabinoids? *Br Med J* 2014;348:g2737. [IF: 16.378]

Leong KT, Walton A, Krum H. Renal sympathetic denervation for the treatment of refractory hypertension. *Annu Rev Med* 2014;65:349-65. [IF: 15.478]

Damman K, Tang WH, Felker GM, Lassus J, Zannad F, Krum H, McMurray JJ. Current evidence on treatment of patients with chronic systolic heart failure and renal insufficiency: practical considerations from published data. *J Am Coll Cardiol* 2014;63(9):853-71. [IF: 15.343]

Esler M. Renal denervation for hypertension: observations and predictions of a founder. *Eur Heart J* 2014;35(18):1178-85. [IF: 14.723]

Glasziou PP, Chalmers I, Green S, Michie S. Intervention synthesis: a missing link between a systematic review and practical treatment(s). *PLoS Med* 2014;11(8):e1001690. [IF: 14]

Lancaster GI, Febbraio MA. The immunomodulating role of exercise in metabolic disease. *Trends Immunol* 2014;35(6):262-9. [IF: 12.031]

Westerterp M, Bochem AE, Yvan-Charvet L, Murphy AJ, Wang N, Tall AR. ATP-binding cassette transporters, atherosclerosis, and inflammation. *Circ Res* 2014;114(1):157-70. [IF: 11.089]

Moylan S, Berk M, Dean OM, Samuni Y, Williams LJ, O'Neil A, Hayley AC, Pasco JA, Anderson G, Jacka FN, Maes M. Oxidative & nitrosative stress in depression: why so much stress? *Neurosci Biobehav Rev* 2014;45:46-62. [IF: 10.284]

Cicuttini FM, Wluka AE. Osteoarthritis: Is OA a mechanical or systemic disease? *Nat Rev Rheumatol* 2014;10(9):515-6. [IF: 10.252]

Vincent FB, Morand EF, Schneider P, Mackay F. The BAFF/APRIL system in SLE pathogenesis. *Nat Rev Rheumatol* 2014;10(6):365-73. [IF: 10.252]

Krum H. Decade in review--heart failure: 10 Years of progress in HF research--what have we learned? *Nat Rev Cardiol* 2014;11(11):631-3. [IF: 10.154]

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