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About AMREP

The Alfred Medical Research and Education Precinct (AMREP) is a vibrant partnership of organisations based at The Alfred hospital campus in Melbourne, integrating biomedical, translational, clinical and public health research with education and healthcare.

Bringing together more than 8,000 leading health professionals, researchers and support staff, the precinct provides a collaborative environment to translate the latest advances in medical research into the best possible clinical care and health outcomes for the community.

Established in 2002, AMREP’s partners include:
- Alfred Health (The Alfred hospital)
- Monash University (Central Clinical School and School of Public Health and Preventive Medicine)
- Baker Heart and Diabetes Institute
- Burnet Institute
- La Trobe University (Alfred Health Clinical School)
- Deakin University.

1 hospital
3 universities
2 medical research institutes
8,000+ health professionals, researchers and support staff including 1,500+ researchers
Training Tomorrow’s Leading Health Professionals

The Alfred is one of Australia’s busiest hospitals, with a comprehensive range of specialist acute health services spanning every specialist medical and surgical discipline other than paediatrics and obstetrics. This provides a rich training environment for tomorrow’s leading health professionals.

The hospital partners with three universities that provide undergraduate and postgraduate training opportunities, including Monash University’s Central Clinical School and School of Public Health and Preventive Medicine, Deakin University and the La Trobe University – Alfred Health Clinical School. The precinct partners also host more than 1,000 postgraduate students.

Translating World-Class Research into Innovative Healthcare

Collectively, there are more than 1,500 health and medical researchers across the precinct. Each AMREP partner contributes to a vibrant research environment that fosters the cross-fertilisation of ideas and expertise to tackle some of the community’s greatest health challenges.

The Alfred acts as a central pillar for research across the precinct, providing a thriving and innovative clinical setting that supports patient-centred research. This powerful link between clinical care and research underpins AMREP’s unique strength in clinical, translational and health services research.

The precinct’s strength in clinical research is also bolstered by Nucleus Network, Australia’s largest facility for commercially sponsored phase 1 clinical trials. The precinct is also renowned for its extensive expertise in public health and health services research, and hosts the nation’s largest concentration of clinical registries pertaining to healthcare and health status.

State-of-the-Art Research Platforms and Clinical Facilities

AMREP is built on a foundation of shared resources. Partners have access to state-of-the-art research platforms and clinical facilities, as well as shared infrastructure and services, such as the AMREP Education Centre, Ian Potter Library and consolidated animal and human research ethics services.

The latest in research techniques and findings is shared through weekly seminar programs, together with Alfred Health Week, an annual research symposium that shares and celebrates the latest research across the precinct.

“The precinct is renowned for its public health and health services research, and hosts the nation’s largest concentration of clinical registries.”
Research Strengths

- Blood Diseases and Cancer
- Cardiovascular Disease
- Diabetes and Obesity
- Epidemiology and Public Health
- Infection and Immunity
- Mental Health and Neuroscience
- Nursing and Allied Health
- Trauma, Critical Care and Perioperative Medicine

Research Themes

- Biomedical Discovery
- Applied Research
- Clinical Research
- Public Health / Health Services Research

Biomedical Discovery
Generation of new knowledge about the human body in health and disease through exploration of fundamental biological mechanisms

Applied Research
Development of new drugs, devices, diagnostics and treatments for ultimate clinical application

Clinical Research
Advancement of medical knowledge by studying people either through direct interaction or collection and use of human biospecimens (e.g. clinical trials)

Public Health Research
Examining the health and prevalence of disease in communities and the associated factors, including the complex link between social, environmental and biological factors, with a view to disease prevention, intervention and treatment

Health Services Research
Examining methods of effective delivery, quality, cost, access to, and outcomes of health services
Conceived in the last century, the collaboration of the AMREP partners remains one of the strongest and most enduring precinct-based health research partnerships in Australia.

The strong research performance of AMREP is reflected in its success in attracting $106 million in research income to the precinct in 2016. Our reputation as a state leader in the areas of Cardiovascular, Public Health and Health Services Research was confirmed in the latest round of National Health and Medical Research Council (NHMRC) funding.

AMREP is well-positioned to create benefit for the community from the Medical Research Future Fund, the first tranche of which was announced in the 2017-2018 federal budget. We are primed to respond to the fund’s focus on translating research into health benefits.

In 2016, the Alfred Research Trusts awarded $2.5 million in competitive grants to researchers across the precinct in areas ranging from technology development in the trauma setting, anaemia in the elderly, respiratory and cardiovascular research, HIV, sexual health, acute myeloid leukaemia and diabetes.

The past year also saw important developments in the precinct’s research platforms, including the establishment of Australia’s first dedicated blood cancer therapeutics centre, made possible by a $1.2 million grant from the Australian Cancer Research Foundation. The flagship centre will collect samples from across the country, and includes a state-of-the-art sequencing platform.

The AMREP campus prides itself on providing an environment for clinician researchers to flourish, and for the third time in five years it was home to the winner of the Commonwealth Health Minister’s Award for Excellence in Health and Medical Research. Alfred Health HIV physician Associate Professor Julian Elliott was the 2017 winner of this prestigious medal.

Among the many other academic awards received by AMREP researchers, Professor Paul Myles, The Alfred’s Director of Anaesthesia and Perioperative Medicine, and his team were awarded the Australian Clinical Trial of the Year, and Professor Rinaldo Bellomo, Co-Director of the Australian and New Zealand Intensive Care Research Centre (ANZIC-RC), was named in the 2016 Thomson Reuters list of Highly Cited Researchers.

Five of our people were recognised by the Order of Australia for their enduring commitment and impact: Professor Jamie Cooper AO, Professor Mark Cooper AO, Emeritus Professor Paul O’Brien AO, Associate Professor Ken Harvey AM and Catherine Beaufort OAM.

As the landscape within which AMREP operates continues to change, I am grateful for the leadership the AMREP Council provides. I look forward to the outcome from the precinct’s current strategic review and its impact on AMREP’s contribution to research, healthcare and the community.
Research Performance

External research funding by source – 2016

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian competitive grants</td>
<td>$57M</td>
</tr>
<tr>
<td>Other public sector research income</td>
<td>$15M</td>
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<tr>
<td>Other competitive research grants</td>
<td>$19M</td>
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<tr>
<td>Industry income</td>
<td>$9M</td>
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<tr>
<td>Other research income</td>
<td>$6M</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$106M</strong></td>
</tr>
</tbody>
</table>

External research funding by research area – 2016

- Epidemiology and Public Health: 37%
- Infection and Immunity: 15%
- Cardiovascular Disease: 12%
- Trauma, Critical Care and Perioperative Medicine: 11%
- Diabetes and Obesity: 10%
- Blood Diseases and Cancer: 8%
- Mental Health and Neuroscience: 2%
- Nursing and Allied Health: 1%
- Other: 4%
2016 funding secured for health and medical research

$20M+ in Philanthropy and Fundraising Revenue + $106M in External Research Funding

NHMRC funding commitments secured by AMREP commencing 2017

$49M Total
60% of NHMRC funding to Victoria for Cardiovascular Medicine & Haematology research went to AMREP
1/3 of NHMRC funding to Victoria for Public Health & Health Services Research went to AMREP

Original research publications by research area – 2016

Students 2016

1,175 Postgraduate Degree Students Enrolled
185 Masters Student Completions
52 PhD / Doctoral Student Completions

Commercial Impact

In past five years:
5 Spin-out Companies
4 Licences, Options & Assignments of Inventions
9 PCT Patent Applications
Medical and Surgical Departments

Anaesthesia and Perioperative Medicine Head: Prof Paul Myles
Allergy Immunology and Respiratory Medicine Head: Prof Robyn O’Hehir AO
Burns (Victorian Adult Burns Service) Head: Dr Heather Cleland
Cardiothoracic Surgery Head: Prof David McGiffin
Cardiovascular Medicine Head: Prof Anthony Dart
Emergency and Trauma Centre Head: Dr De Villiers Smit
Endocrinology and Diabetes Head: Prof Duncan Topliss
Gastroenterology Head: Prof Peter Gibson
General Surgery Head: Prof Jonathan Serpell
Infectious Disease Head: Prof Anton Peleg
Intensive Care and Hyperbaric Medicine Head: Dr Steve McGloughlin
Medical Oncology Head: Prof Max Schwarz
Melanoma (Victorian Melanoma Service) Head: Prof John Kelly
Melbourne Sexual Health Centre Head: Prof Christopher Fairley
Neurosurgery Head: Mr Martin Hunn
Orthopaedic Surgery Head: Assoc Prof Susan Liew
Radiation Oncology Head: Prof Jeremy Millar
Rehabilitation, Aged Care and Community Care Head: Assoc Prof Peter Hunter
Renal Medicine Head: Prof Rowan Walker

Medical Services

Executive Director Medical Services & Chief Medical Officer
Dr Lee Hamley
Anatomical Pathology Head: Prof Catriona McLean
Diagnostic and Interventional Radiology Head: Assoc Prof Dinesh Varma
Nuclear Medicine Head: Dr Kenneth Yap
Pathology Services Head: Prof Hans Schneider
Pharmacy Head: Prof Michael Dooley

Nursing

Executive Director Nursing Services & Chief Nursing Officer Janet Weir Phylland
Foundation Chair in Nursing Prof Tracey Bucknall
Director, Alfred Clinical School Assoc Prof Bill McGuiness

Allied Health

Director Lisa Somerville
Nutrition and Dietetics Head: Assoc Prof Ibolya Nyulaszi
Occupational Therapy Head of Research: Assoc Prof Natasha Lannin
Physiotherapy Head of Research: Prof Anne Holland

Chief Executive Officer Prof Andrew Way
Director of Research Prof Stephen Jane
The Alfred Health

The Alfred is one of three Melbourne hospitals (The Alfred, Caulfield Hospital and Sandringham Hospital) that together constitute the major metropolitan health service Alfred Health.

The Alfred, at the epicentre of AMREP, is a major tertiary referral hospital providing one of the most comprehensive ranges of specialist acute health services in Victoria. The hospital is home to multiple state-wide services such as Victoria's only heart and lung transplant service, the Victorian Adult Burns Service and the Victorian Melanoma Service, as well as having one of Australia's busiest Emergency and Trauma centres and one of the largest and most advanced Intensive Care Units in the region. Patients come to The Alfred for services such as comprehensive cancer care, respiratory medicine, cardiology and cardiovascular services, and in-patient and community psychiatry care.

The Alfred's mission is to discover and deliver the next generation of healthcare through:

> **Research:** Translating medical research into clinical practice
> **Education:** Developing and fostering our staff as a teaching hospital committed to excellence with patients placed at the centre of all that we do
> **Replication:** Striving for new and improved practices and remaining at the forefront of healthcare developments and medical research. Other hospitals in Australia and overseas have followed our lead and adopted our innovative approach.
The Alfred acts as the epicentre of the AMREP partnership, providing the clinical environment for medical, allied health and nursing education, and an expedited pathway for bench-to-bedside research. Clinical research is integral to many Alfred departments and is enhanced both by collaboration between Alfred departments and through long-established relationships between The Alfred and AMREP partners. Many co-appointments of clinician researchers between The Alfred and other AMREP partners strengthen ties across the precinct. Various Alfred departments also contribute to clinical registries managed by the Monash School of Public Health and Preventive Medicine in order to improve evidence-based practice and identify factors that predict prognosis and outcomes of disease.

**Inaugural Tony Charlton Chair of Oncology**

In 2016, The Alfred announced Professor John Zalcberg OAM (Head of Monash School of Public Health and Preventive Medicine’s Cancer Research Program and a Gastrointestinal Oncology Physician) as the inaugural Tony Charlton Chair of Oncology. This Monash / Alfred leadership position will steer The Alfred’s oncology program into the future, cultivating innovative new treatments and transferring research findings into clinical practice.

**Advancing Medical Technology**

A strategic partnership between Alfred Health and the Monash Institute of Medical Engineering (MIME) is enabling the development of leading-edge engineering and IT solutions (including medical devices, diagnostics, surgical tools and digital health) in areas of unmet clinical need. More than $1.3 million in joint funding has been committed by Monash University and Alfred philanthropic sources for this purpose.

“The Alfred has one of Australia’s busiest Emergency and Trauma centres and one of the largest and most advanced Intensive Care Units in the region.”
**Research Highlights 2016-2017**

**PrEPX: Preventing HIV Transmission**
Pre-Exposure Prophylaxis (PrEP) is a medication containing two anti-retrovirals used to reduce the risk of HIV infection. Associate Professor Edwina Wright (Monash and Alfred Department of Infectious Diseases / Burnet Institute) is leading the PrEPX study, which has expanded the provision of PrEP to 3,200 Victorians. The study is sponsored by the Victorian Department of Health and Human Services and co-sponsored by Alfred Health and the Victorian AIDS Council. The study aims to examine the impact of expanding the use of PrEP on the rates of new HIV infections in Victoria with a view to PrEP becoming a routine option for preventing HIV infection.

**World-First Peanut Vaccine Trial**
Human clinical trials of a world-first peanut allergy treatment commenced in Melbourne in 2017. The technology, which is being developed by Australian biotechnology company Aravax, is underpinned by more than 15 years of research led by respiratory physician Professor Robyn O’Hehir and her team at The Alfred and Monash University. The treatment uses new technology that resets the immune system to tolerate peanut without causing an allergic reaction. The trial is being conducted at Nucleus Network at AMREP and CMAX Clinical Research in Adelaide.

**Alfred Trauma Software Saves Lives Abroad**
The Alfred has developed software that provides real-time computer-aided decision support to guide trauma care during the first hour of a patient’s arrival. The Alfred became the first trauma centre in the world to deploy real-time decision-support software as part of routine patient care. Today, the technology is being adapted for use in the United States, India, Saudi Arabia and China. The software, known as Trauma Reception and Resuscitation (TRR), uses algorithms to generate real-time prompts that are triggered by patient physiological signs, diagnoses and clinical interventions.

**Research Themes:**
Applied Research; Clinical Research

**Research Strength:**
Infection and Immunity

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The Alfred acts as a central pillar for research across the precinct, providing a thriving and innovative clinical setting that supports patient-centred research.
Monash Central Clinical School at AMREP

Division of Clinical Sciences
Head: Prof Paul Myles

Department of Anaesthesia and Perioperative Medicine
Head: Prof Paul Myles

Department of Medicine
Head: Prof Stephen Jane

National Trauma Research Institute (NTRI)
Head: Prof Mark Fitzgerald

Department of Surgery
Head: Prof Wendy Brown

Centre for Obesity Research and Education
Head: Prof Wendy Brown

Department of Neuroscience
Head: Prof Terence O’Brien

Department of Allergy, Immunology and Respiratory Medicine
Head: Prof Robyn O’Hehir AO

Department of Diabetes
Head: Prof Mark Cooper AO

Department of Infectious Diseases
Head: Prof Anton Peleg

Department of Gastroenterology
Head: Prof Peter Gibson

Department of Immunology and Pathology
Head: Prof David Tarlinton

Melbourne Sexual Health Centre
Head: Prof Christopher Fairley

Monash Alfred Psychiatry Research Centre
Head: Prof Jayashri Kulkarni

Australian Centre for Blood Diseases
Head: Prof Harshal Nandurkar

Medical Student Education
Head: Assoc Prof Anne Powell
Monash Central Clinical School

Monash University’s Central Clinical School (CCS) is a key Melbourne centre for clinical and biomedical research and education, offering undergraduate and postgraduate study programs.

CCS together with its sister school at AMREP, the School of Public Health and Preventive Medicine, has been affiliated with Alfred Health as a provider of medical teaching for more than 50 years. The reputation and well-equipped research laboratories and facilities of CCS attract elite students, researchers and teachers to the precinct.

Research Strengths

CCS has developed into a hub for translational research and medicine, covering a breadth of disciplines reflected throughout the School’s departments and specialist centres. Multidisciplinary research is encouraged, leading to a highly collaborative research environment with networks spanning across AMREP, as well as nationally and internationally. Its close links to healthcare providers allow CCS to rapidly progress research towards health outcomes and improved patient care.

Medical Education and Undergraduate Science

CCS coordinates the teaching of Monash University’s medical students at the Monash-affiliated teaching hospitals of Alfred Health, Cabrini Health Australia and Peninsula Health. An extensive lecture and tutorial program is presented by senior clinicians, and students have access to the latest in research and development advances in medicine. The CCS undergraduate teaching program in immunology and human pathology facilitates recruitment of students into a substantial Honours cohort.

Graduate Research

Graduate research students benefit from two recently launched initiatives: the translational research-themed PhD, run through Monash University’s clinical schools, and the accelerated milestone PhD for medical education students. The translational research-themed PhD delivers the skills needed to bring research from bench-to-bedside. Students enjoy access to experts who are part of Monash University’s rich network of industry, clinical and research partnerships, as well as high-quality data sources and research platforms.

“ The Monash Central Clinical School is a hub for translational research and medicine, with world leaders in biomedical and clinical research.”
Perioperative Medicine: Clinical Trial of the Year

The Australian and New Zealand College of Anaesthetists Clinical Trials Network (ANZCA CTN) investigators, led by Professor Paul Myles (Head of The Alfred and Monash CCS Department of Anaesthesia and Perioperative Medicine), coordinated two multi-centre clinical trials exploring the risks associated with aspirin and the anti-bleeding agent tranexamic acid (TXA) in cardiac surgery patients.

Groundbreaking results of these trials, encompassing more than 4,600 participants in 31 hospitals across seven countries, have been published in The New England Journal of Medicine (2016 and 2017) and collectively recognised by the Australian Clinical Trials Alliance as the 2017 Trial of the Year.

The aspirin study found that patients who take aspirin before heart surgery are at no greater risk of bleeding or complications, meaning that aspirin need not be stopped prior to surgery. The global TXA study showed that TXA reduces the risk of serious bleeding complications in cardiac surgical patients by 40%, resulting in fewer blood transfusions and emergency re-operations. The findings mean that most heart surgery patients can be treated with TXA at a higher dose than previously thought to be safe.

New Blood Cancer Research Centre

A substantial body of research spearheaded by the clinician researchers Associate Professor Andrew Wei and Professor Andrew Spencer from The Alfred and CCS’s Australian Centre for Blood Diseases has led to a $1.2 million grant from the Australian Cancer Research Foundation (ACRF) to establish Australia’s first dedicated blood cancer therapeutics centre. The Alfred / Monash Blood Cancer Therapeutics Centre will equip researchers with the latest technology to explore the variable responses to treatments among patient groups and to develop better treatments, particularly for those who do not respond to existing therapies.

Research Theme: Applied Research
Research Strength: Blood Diseases and Cancer

“Heart surgery patients worldwide stand to benefit from results of groundbreaking international clinical trials led by AMREP clinician researcher Prof Paul Myles.”

Prof Paul Myles, Head of Department of Anaesthesia and Perioperative Medicine
Monash School of Public Health and Preventive Medicine at AMREP

Health Services
Head: Prof Peter Cameron

Health Services Research
Head: Assoc Prof Anna Barker

Registry Sciences Unit
Head: Dr Susannah Ahern

Transfusion Research
Head: Assoc Prof Erica Wood

Prostate Cancer Registry
Head: Assoc Prof Sue Evans

Bariatric Surgery Registry
Head: Prof Wendy Brown

Monash Ageing Research Centre
Head: Prof Barbara Workman

Australian Breast Device Registry
Head: Dr Ingrid Hopper

Social Sciences
Head: Prof Jane Fisher

Jean Hailes Research
Head: Prof Jane Fisher

Michael Kirby Centre
Head: Assoc Prof Bebe Loff

Health Services Management
Head: Prof Just Stoelwinder

Gambling and Social Determinants
Head: Dr Charles Livingstone

Director of Teaching and Learning
Head: Assoc Prof Dragan Ilic

Postgraduate Courses
Head: Prof Flavia Cicuttini

Undergraduate Courses
Head: Dr Basia Diug

Medical Education Research and Quality
Head: Assoc Prof Dragan Ilic

Aspree
Head: Assoc Prof Robyn Woods

Clinical Epidemiology
Head: Prof Danny Liew

CCRE Therapeutics
Co-Heads: Prof Chris Reid / Prof Danny Liew

Musculoskeletal Epidemiology
Head: Prof Flavia Cicuttini

Infectious Disease Epidemiology
Co-Heads: Prof Karin Leder / Prof Allen Cheng

Women’s Health Research Program
Head: Prof Susan Davis

Behavioural Science Prevention Unit
Head: Assoc Prof Ben Smith

Research Methodology
Head: Prof Andrew Forbes

Biostatistics
Head: Prof Andrew Forbes

Epidemiology Modelling
Head: Dr James Trauer (Acting Head)

Cochrane Australia
Co-Heads: Prof Sally Greene / Steve McDonald

Critical Care Research
Head: Prof Jamie Cooper AO

Intensive Care
Head: Prof Jamie Cooper AO

ANZCA Research
Head: Prof Paul Myles

Pre-hospital, Emergency and Trauma
Head: Prof Belinda Gabbe

Staree
Head: Prof Sophia Zoungas

Occupational and Environmental Health
Head: Prof Malcolm Sim

Monash Centre for Occupational and Environmental Health
Head: Prof Malcolm Sim

Australian Centre for Human Health Risk Assessment
Head: Prof Brian Priestly

Aviation Medicine
Head: Assoc Prof David Newman

Hazelwood Health Study
Head: Prof Michael Abramson

Cancer Research
Head: Prof John Zalcberg OAM

Australian Clinical Trials Alliance
Head: Prof John Zalcberg OAM

Research Coordinator
Prof Susan Davis

Research Governance
Prof Sophia Zoungas
Monash School of Public Health and Preventive Medicine

Monash University’s School of Public Health and Preventive Medicine (SPHPM) is both research intensive and a leader in public health-oriented education.

The school’s flagship study program is the Master of Public Health. This is complemented by a suite of other postgraduate degrees, undergraduate courses and short courses. The school is an ideal choice for those wishing to learn from or collaborate with key opinion leaders in the Australian public health scene, and attracts students and researchers from across the globe.

Research Strengths
SPHPM academics have broad expertise in applied clinical and public health research, with many staff having co-appointments with The Alfred. Core strengths in epidemiology, biostatistics and data management support extensive research programs aimed at reducing suffering, preventing illness and improving quality of life. In 2016, SPHPM secured $40 million of funding to support its diverse research program.

The School manages 30 clinical registries, making it Australia’s largest manager of these biobanks and databanks. These are a significant source of benchmarking information for clinical care nationally and provide a wealth of data for public health researchers.

Education
SPHPM has responsibility for teaching units across a range of undergraduate courses, as well as running Honours programs for health science and medical students. Postgraduate study is offered at Graduate Diploma, Graduate Certificate and Masters level, and students may also enrol for a PhD via the Monash Doctoral Program. The School also offers a regular program of short courses for public health professionals wishing to enhance their skills or knowledge in public health research, aviation medicine, statistics and ethics.

“...The Monash School of Public Health and Preventive Medicine is an ideal choice for those wishing to learn from or collaborate with key opinion leaders in the Australian public health scene, and attracts students and researchers from across the globe.”
Researchers collect samples from an ASPREE participant.
World’s Largest Falls Prevention Study

Patient falls in acute hospitals is a major and increasing source of harm to patients globally. SPHPM researchers Associate Professor Anna Barker and Renata Morello’s review of a falls prevention program called 6-PACK was published in the British Medical Journal in early 2016. Twenty-four wards across six Australian hospitals were randomly assigned to provide the 6-PACK program or standard care models.

The team found that despite evidence of good compliance among nursing staff, the program did not translate into a reduction in the number of falls or injuries sustained. The results raise questions about expenditure of staffing resources on ineffective interventions and highlight the urgent need for evidence-based solutions.

Healthy Ageing

SPHPM is working towards improving health outcomes for Australians through large-scale disease prevention studies, such as ASPREE (ASpirin in Reducing Events in the Elderly), SPHPM’s flagship clinical trial assessing the benefits of daily low-dose aspirin in the elderly, and a pilot clinical quality registry to improve clinical care for dementia. National Health and Medical Research Council (NHMRC) funding secured by SPHPM for 2017 included a $4.8 million Project Grant to complete the ASPREE study and a $1.7 million Boosting Dementia Research Grant towards the pilot dementia registry.

Research Themes:
- Clinical Research;
- Public Health / Health Services Research

Research Strengths:
- Epidemiology and Public Health;
- Mental Health and Neuroscience

Undiagnosed Menopause

In 2016, Professor Susan Davis, Director of SPHPM’s Women’s Health Research Program, was awarded the North American Menopause Society’s Best Paper of the Year Award for her cross-sectional study of Australian women. The study involved 2,020 women aged 40 to 65 years living in Australia between October 2012 and March 2014. The research revealed a high prevalence of untreated menopausal symptoms with potentially significant impacts on the quality of life of women.

Research Theme:
- Public Health / Health Services

Research Strength:
- Epidemiology and Public Health

Research Theme:
- Public Health / Health Services

Research Strength:
- Epidemiology and Public Health;
- Mental Health and Neuroscience

Prof Susan Davis, Director of the Women’s Health Research Program, Monash School of Public Health and Preventive Medicine
Programs

Hypertension and Cardiac Disease
Head: Prof David Kaye

Physical Activity
Co-Heads: Assoc Prof André La Gerche / Prof Bronwyn Kingwell

Obesity and Diabetes
Head: Assoc Prof Peter Meikle

Bioinformatics
Co-Heads: Assoc Prof Peter Meikle / Dr Anna Calkin / Dr Brian Drew

Atherothrombosis
Head: Prof Karlheinz Peter

Diabetes Complications
Head: Prof Jonathan Shaw

Domains

Basic
Head: Prof Julie McMullen

Cardiac Hypertrophy
Head: Assoc Prof Julie McMullen

Lipid Metabolism and Cardiometabolic Disease
Head: Dr Anna Calkin

Molecular Metabolism and Ageing
Head: Dr Brian Drew

Experimental Cardiology
Head: Assoc Prof Xiao-Jun Du

Muscle Research Therapeutics
Head: Dr Paul Gregorevic

System Genomics
Head: Assoc Prof Michael Inouye

Haematopoiesis and Leukocyte Biology
Head: Assoc Prof Andrew Murphy

Heart Failure Pharmacology
Head: Assoc Prof Rebecca Ritchie

Translational
Head: Prof Bronwyn Kingwell

Heart Failure Research
Head: Prof David Kaye

Vascular Biology and Atherothrombosis
Head: Prof Alex Bobik

Human Neurotransmitters
Head: Prof Murray Esler

Neuropharmacology
Head: Prof Geoff Head

Metabolic and Vascular Physiology
Head: Prof Bronwyn Kingwell

Metabolomics
Head: Assoc Prof Peter Meikle

Atherothrombosis and Vascular
Head: Prof Karlheinz Peter

Lipoproteins and Atherosclerosis
Head: Prof Dmitri Sviridov

Clinical
Head: Prof Graeme Maguire

Health Services
Head: Prof Graeme Maguire

Healthy Hearts
Head: Prof Graeme Maguire

Diabetes Clinics
Head: Assoc Prof Neale Cohen

Sports Cardiology
Head: Assoc Prof André La Gerche

Clinical Electrophysiology
Head: Prof Peter Kistler

Imaging Research
Head: Prof Tom Marwick

Allied Health and Education Services
Head: Sonia Middleton

Population Health
Head (Acting): Prof Jonathan Shaw

Clinical Diabetes
Head: Prof Jonathan Shaw

Preclinical Disease and Prevention
Head: Assoc Prof Melinda Carrington

Physical Activity
Head: Prof David Dunstan

Diabetes and Population Health
Head: Assoc Prof Dianna Magliano

Behavioural Epidemiology
Head: Prof Neville Owen

Aboriginal Health
Head: Prof Sandra Eades

Aboriginal Health
Head: Prof Sandra Eades

Infection and Chronic Disease
Head: Dr Lloyd Einsiedel
Baker Heart and Diabetes Institute

Baker Heart and Diabetes Institute is an independent medical research institute that has been pioneering advances in cardiovascular and diabetes research for more than 90 years.

The Institute’s work extends from laboratory-based research to clinical trials and large-scale national and international community health studies.

The Institute’s mission is to reduce death and disability from cardiovascular disease, diabetes and related disorders. More than 3.7 million Australians are affected by cardiovascular disease and about 1.2 million are affected by diabetes. The Institute’s focus is on translating research findings into new approaches to prevention, treatment and care.

The Institute’s scientific laboratories and specialist clinics located at AMREP are complemented by a research facility in Alice Springs, which is part of the national Aboriginal Health program dedicated to addressing the significant health disadvantage in Aboriginal communities.

Research Strengths

The organisation is structured around five research domains (Basic, Translational, Clinical, Population Health and Aboriginal Health) and five research programs in key areas of strategic importance and research strength that facilitate collaboration across these domains.

The Five Programs

- **Physical Activity:** Explores the impact of exercise on cardiovascular disease management from prevention to treatment of advanced disease
- **Diabetes Complications:** Aims to identify novel predictors of a broad range of advanced complications of diabetes
- **Obesity and Diabetes:** Investigates strategies to elucidate and combat the metabolic underpinnings of chronic disease
- **Atherothrombosis:** Examines how to identify and treat blockages in the vascular system that can lead to heart attack and stroke
- **Hypertension and Cardiac Disease:** Investigates how to reverse chronic heart disease and prevent structural damage to the heart from hypertension, heart disease and associated rhythm disturbances.

In 2017, the Institute welcomed Associate Professor Melinda Carrington and Associate Professor Michael Inouye and their teams, who will respectively strengthen the Institute’s research activities in the areas of disease prevention and bioinformatics, and systems genomics.

“The Baker Institute’s mission is to reduce death and disability from cardiovascular disease, diabetes and related disorders.”

**Director**
Prof Tom Marwick
baker.edu.au
Research Highlights 2016-2017

**Lipidomic Technologies and Markers of Disease Risk**

Type 2 diabetes represents a growing health burden globally, while cardiovascular disease is a major complication of type 2 diabetes and the leading cause of death worldwide. The increasing incidence of type 2 diabetes is placing pressure on healthcare systems, and managing the risk of cardiovascular disease in those with type 2 diabetes is a major concern. New approaches are required to effectively target limited health resources to those people with type 2 diabetes at highest risk of cardiovascular disease.

Researchers from Associate Professor Peter Meikle’s Metabolomics Laboratory highlighted the potential of plasma lipid species as biomarkers, some of which demonstrate an improvement over traditional risk factors, in the prediction of cardiovascular events. Findings published in a paper in *Circulation* in November 2016, demonstrate how recent developments in lipidomic technologies are enabling the assessment of hundreds of lipid species as potential markers for disease risk.

**Research Theme:** Applied Research

**Research Strengths:**
- Cardiovascular Disease
- Diabetes and Obesity

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**Implantable Device for Untreatable Heart Condition**

Heart failure with preserved ejection fraction (HFpEF) is a common form of heart failure, characterised by increased left atrial pressure, especially during exertion. No treatment has been shown to improve symptoms or prognosis of HFpEF.

An international multi-centre study, led at the Baker by Head of the Heart Failure Research Laboratory Professor David Kaye, assessed a mechanical approach to reducing left arterial pressure as an effective treatment for this type of heart failure. The study, published in *The Lancet* in March 2016, showed that implantation of an inter-atrial shunt device was feasible and safe, reduced left atrial pressure during exercise, and could be a new strategy for treating this form of heart failure.

**Research Theme:** Clinical Research

**Research Strength:**
- Cardiovascular Disease

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“The Institute’s work extends from laboratory-based research to clinical trials and large-scale national and international community health studies.”

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Prof David Kaye, Head of the Baker’s Heart Failure Research Laboratory, led a study showing that a novel inter-atrial shunt device could be the first effective strategy for treating a common form of heart failure, HFpEF.
Assoc Prof Xiao-Jun Du (R), Head of Baker Heart and Diabetes Institute’s Experimental Cardiology Group with a student (L)
Programs

Maternal and Child Health
Director: Dr Elissa Kennedy

Disease Elimination
Director: Prof Heidi Drummer

Behaviours and Health Risks
Director: Prof Paul Dietze

Health Security (Expansion Program)
Director: Dr Ben Coghlan

Healthy Ageing (Expansion Program)
Director: Prof Suzanne Crowe AM

Working Groups

Anderson / Garcia Group
Global Health Diagnostics

Beeson Group
Malarial Immunity & Vaccines

Crowe Group
International Clinical Research

Drummer / Poumbourios Group
Viral Entry & Vaccines

Fowkes Group
Malaria & Infectious Disease Immunology

Gilson / Crabb Group
Malaria Virulence & Drug Discovery

Gugasyan Group
Diagnostic Markers in Chronic Immune Disorders

Hogarth Group
Inflammation, Cancer & Infection

Jaworowski Group
Infection, Inflammation & Innate Immunity

Palmer Group
Immunometabolism in HIV & Inflammatory Diseases

Richards Group
Malaria and Tropical Diseases

Robinson Group
Vector-Borne Diseases & Tropical Public Health

Tachedjian Group
HIV, Retroviruses and Antivirals

Tannock Group
Influenza

Wright Group
Strategies for HIV Prevention / Management of Acute & Chronic HIV Infection

Director
Prof Brendan Crabb AC

Deputy Directors
Prof Margaret Hellard (Programs)
Prof James Beeson (People)
Assoc Prof David Anderson (Partnerships)
Burnet Institute

The Burnet Institute brings together a highly diverse group of medical researchers, public health professionals and international development experts to help solve significant global health problems.

Burnet is unique in Australia as the only medical research institute to have dual accreditation with the National Health and Medical Research Council (NHMRC) and as a Non-Government Organisation with the Australian Department of Foreign Affairs and Trade. In addition to its presence at AMREP, the Institute has offices and representatives in Myanmar, Papua New Guinea (PNG) and Lao PDR, and significant program activities across Asia, the Pacific and eastern Africa.

Burnet launched a new strategic plan – Burnet 2020 – in October 2016, which describes the Institute’s vision of “equity through better health”, and its mission of “achieving better health for vulnerable communities in Australia and internationally through accelerating the translation of research, discovery and evidence into sustainable health solutions”.

Research Strengths

Central to maximising its breadth of expertise, the Institute has also restructured to form a ‘new Burnet’, built around key programs:

- Maternal and Child Health
- Disease Elimination (HIV, malaria, hepatitis viruses and tuberculosis)
- Behaviours and Health Risk
- Healthy Ageing
- Health Security.

Activities are led by teams of laboratory-based researchers, public health practitioners and international development experts, bringing a broad perspective to each area. The new structure is building a stronger translational and commercialisation capacity, especially in the areas of rapid diagnostics, vaccines and new drug discovery.

The capacity to translate research findings into tangible products for vulnerable communities is critical to the Institute’s success. This has been significantly enhanced through the establishment of 360biolabs, supporting the development of new vaccines, therapies and diagnostics, and through rapid diagnostic test development facilities in China at Nanjing BioPoint Diagnostics. Both companies are generating significant commercial interest and contributing to Burnet’s strategy of growing business development opportunities.
Women wait at an antenatal clinic in East New Britain Province, Papua New Guinea.
Research Highlights 2016-2017

Healthy Mothers, Healthy Babies
By the end of 2016, more than 500 women had been enrolled in the first phase of the Healthy Mothers, Healthy Babies program in PNG, more than 400 of whom followed through to the delivery of their baby. Preliminary data analyses have revealed alarmingly high rates of serious preventable health conditions such as anaemia, malnutrition, malaria and genital tract infections among East New Britain Province’s mothers and babies.

Research Themes:
Public Health / Health Services Research
Research Strengths:
Epidemiology and Public Health

Anti-Malarial Medicines
Malaria, which kills almost half a million people a year, has become resistant to almost all current drugs, necessitating drug combinations for efficacy. To combat resistance, Burnet has developed novel anti-malarial drugs with two different mechanisms of action. It is improving the efficiency of these new drugs to develop them as future medicines. In addition, the Home Management of Malaria project in East New Britain, PNG has seen community-based staff bring new rapid diagnostic tests and modern anti-malarial medicines to families in rural villages to fast-track diagnosis and treatment.

Research Themes:
Public Health / Health Services Research
Research Strengths:
Epidemiology and Public Health

Managing Tuberculosis
The Institute expanded its reach in PNG through new partnerships and through a presence in new provinces, including the Autonomous Region of Bougainville. Burnet responded to the major tuberculosis (TB) outbreak in Western Province with a TB peer counselling team for TB patients, and the Institute continues to support the PNG Government through the RID-TB project to address both drug-sensitive and drug-resistant TB.

Research Themes:
Public Health / Health Services Research
Research Strengths:
Infection and Immunity; Epidemiology and Public Health

HIV and Drug Resistance
Drug-resistant HIV threatens to thwart achieving the target of eliminating AIDS by 2030. Burnet previously reported that ‘silent’ mutations altering the genetic code (but not the amino acid composition) of the key HIV drug target could raise the ‘fitness’ of drug-resistant virus. It found that the prevalence of these mutations decreased in drug-treated individuals from 1997-2014, but increased in drug-naive individuals. This suggests that drug-resistant HIV harbouring silent mutations has the potential to be transmitted and to persist in treatment-naive individuals.

Research Theme:
Clinical Research
Research Strengths:
Infection and Immunity; Epidemiology and Public Health
La Trobe Alfred Clinical School

La Trobe University’s Clinical School at Alfred Health integrates research, teaching and clinical practice in allied health and nursing.

The broad objectives of the Clinical School are to:

> Provide national and international research leadership in allied health and nursing
> Conduct clinical research that makes a difference to patient outcomes
> Promote interdisciplinary and inter-institutional collaboration in healthcare delivery and research
> Provide a centre of excellence for undergraduate and postgraduate education in nursing and allied health
> Lead the translation of best evidence into clinical practice.

La Trobe Nursing and Allied Health undergraduates undertake placements at The Alfred, with nursing students attending the Clinical School for part of year two and all of year three of a Bachelor of Nursing degree.

Under the leadership of professorial staff in Physiotherapy (Professor Anne Holland), Occupational Therapy (Associate Professor Natasha Lannin) and Nursing (Associate Professor Bill McGuiness), the La Trobe Clinical School provides allied health and nursing clinicians with Honours and postgraduate research opportunities and supervision on-site at Alfred Health.

Research Strengths

Research programs include:

> **Rehabilitation for Chronic Lung Disease**: Professor Anne Holland leads a research program that aims to optimise health and wellbeing for people with cardiorespiratory disease, including new models for pulmonary rehabilitation.

> **Neurological Rehabilitation**: Associate Professor Natasha Lannin’s research program is focussed on neurological rehabilitation as a means to improve quality of life.

> **Time-Critical Interventions**: Associate Professor Bill McGuiness leads a research program that aims to optimise the delivery of time-critical interventions in acute care, including new methods for preventing and treating pressure injuries and for facilitating wound healing.

“The La Trobe Alfred Clinical School translates evidence gathered from allied health and nursing research studies into best clinical practice.”
A Novel Home-Based Pulmonary Rehabilitation Program

Pulmonary rehabilitation programs result in significantly improved quality of life and reduced hospitalisation for people with chronic lung disease; however, availability is restricted to less than 10% of those who would benefit across the world.

A study led by Professor Anne Holland demonstrated that a novel method of delivering pulmonary rehabilitation directly into the home (the HomeBase model) was equally effective as a traditional centre-based program, with similar costs and much higher completion rates. Importantly, those who completed pulmonary rehabilitation were 56% less likely to be hospitalised in the following 12 months.

This study, published in Thorax in 2016, was nominated by the American College of Physicians as one of the most influential 2016 publications in respiratory medicine, and the paper was highlighted in the Annals of Internal Medicine annual update of the most important internal medicine papers of 2016. Alfred Health has adopted the HomeBase model into standard clinical care.

Research Theme:
Health Services Research

Research Strengths:
Nursing and Allied Health; Epidemiology and Public Health

Knowledge Translation Research: Acquired Brain Injury Service

In 2016, the Acquired Brain Injury (ABI) Rehabilitation Service, based at Alfred Health’s Caulfield Hospital, partnered with La Trobe University researcher Associate Professor Natasha Lannin to embed evidence-based practice in the everyday rehabilitation of adults with significant brain injury.

The research team delivered a multifaceted program of knowledge translation, including education, skills training, point-of-care access to clinical practice guidelines, qualitative focus groups with both clinicians and patients, and fortnightly audits with feedback on adherence to clinical practice guideline recommendations in the area of stroke and ABI.

In the first-ever sustained knowledge translation project in ABI rehabilitation, Alfred Health staff significantly increased in clinical adherence to guideline recommendations. These findings support the use of audit and feedback as a behaviour change strategy within rehabilitation.

La Trobe researcher Prof Anne Holland’s study of a novel method of delivering pulmonary rehabilitation directly into the home was nominated by the American College of Physicians as one of the most influential studies in respiratory medicine in 2016.

Research Theme:
Health Services Research

Research Strengths:
Nursing and Allied Health; Trauma, Critical Care and Perioperative Medicine

Dr Narelle Cox, Cardiorespiratory Physiotherapist, with a patient in a pulmonary rehabilitation trial
Deakin University

Deakin University’s School of Nursing and Midwifery and Alfred Health Nursing Services expanded their long-established research and education partnership in 2013 with the appointment of Professor Tracey Bucknall as the Foundation Chair in Nursing at Alfred Health.

Under the leadership of Professor Bucknall, staff at the Deakin Centre for Quality and Patient Safety Research / Alfred Health Partnership conduct high-quality research that makes a substantive contribution to scientific knowledge, clinical nursing practice and the quality of patient care.

Strategic objectives include:

> Conducting high-quality research that improves patient and organisational outcomes
> Strengthening research training and support for nursing staff within Alfred Health
> Facilitating the integration of research evidence into clinical practice
> Developing partnerships between consumers, staff and researchers to strengthen research, education and health service delivery.

Deakin University also has undergraduate and postgraduate coursework students completing clinical placements in their nursing, allied health and health science degrees across numerous departments at Alfred Health.

Research Strengths

Research programs include:

> **Patient Safety:** This program focusses on high-risk areas for the health service, including recognition and management of deterioration in hospitalised patients, pressure injury prevention, medication management and clinical communication. The research program makes a substantive contribution to evaluating Alfred Health services and testing interventions to improve the quality of care and patient safety.

> **Knowledge Translation:** This program uses an integrated knowledge translation approach to ensure that clinicians use the best available evidence in their practice to promote a safe and quality system. In understanding problem areas of the service, researchers, administrators and clinicians work together to implement new evidence and de-implement out-of-date practices.

Research programs are linked closely with the National Safety and Quality Health Service (NSQHS) Standards. Centre staff include research fellows and assistants, research students and interdisciplinary research associates. Active international and national research collaborations are a strength of the program.

“ The Deakin Centre for Quality and Patient Safety Research helps evaluate Alfred Health services and test interventions to improve the quality of care and patient safety.”
Patient Perspectives: Responses to Medical Emergencies
In some circumstances, hospital systems fail to meet a patient’s expectation of safe care, with episodes of missed warning signs potentially resulting in admission to intensive care, death or severe disability.
Professor Tracey Bucknall led an international study into patients’ and families’ perceptions and roles in detecting and communicating a patient’s deteriorating status, and the impact on prevention of serious adverse events in both public and private health systems. Unique insights into patient and family member interpretations of events preceding and during medical emergencies have been incorporated into recommendations to improve health service planning and delivery. Narratives derived from patients and families will be used in medical and nursing education to develop clinical reasoning skills in detecting and managing deteriorating patients.

Engaging Patients During Transitions of Care
The Australian Commission on Safety and Quality in Health Care awarded funding to Professor Tracey Bucknall and colleagues to review and report on tools and strategies that facilitate the engagement of patients in communication during transitions of healthcare. 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.
Guiding principles and recommendations for the Commission were developed to raise awareness of patient engagement, stimulate discussion and inform decision-making at all levels of the health and education sectors. Recommendations from this study have been incorporated into national policy and advice for health services.

“Deakin-led research studies investigating patients’ perspectives during medical emergencies and transitions of care are positively impacting health service planning and delivery.”

Research Theme:
Health Services Research

Research Strengths:
Nursing and Allied Health;
Trauma, Critical care and Perioperative Medicine

Research Theme:
Health Services Research

Research Strengths:
Nursing and Allied Health;
Trauma, Critical care and Perioperative Medicine
Nucleus Network

Nucleus Network, Australia’s largest phase 1 clinical trials facility, is located within the AMREP premises. Established in 2003 through a Science Technology and Innovation Grant, Nucleus Network became a wholly owned subsidiary of Baker Heart and Diabetes Institute in 2006. The company has an international reputation for excellence and is the preferred Australian provider for large-scale, phase 1 healthy volunteer and first-in-human clinical trials. In addition, the company’s AMREP location allows strong collaborative links with hospital-based investigators and clinical researchers. Nucleus Network’s status as a subsidiary of the Baker Institute also allows it to re-invest earnings into Australia’s medical research sector.

Nucleus Network conducts approximately 50 phase 1 clinical trials per year, with about 20-25 of these being first-in-human. This is a critical step in ensuring the safety and efficacy of new therapeutics headed for the marketplace and important for bringing new medicines to the community. The company services global pharmaceutical and biotechnology companies (80% biotech; 20% pharma), with the majority of customers based in the US (76%) and others spread throughout Asia, Europe and Australia. In 2017, the facility expanded its capacity to 80 beds and added an internal pharmacy with a view to expanding the customer base, particularly in China and South Korea.

The senior management team of Nucleus Network brings together professionals who have diverse experience working in the clinical trials industry in Europe and the US. Overall, the company employs more than 100 permanent and 80 casual staff. The company’s trials experience includes:

- Bioequivalence / bioavailability
- Biosimilars, cytochromes P450, genotype metabolism
- Drug-drug interactions
- Ethnopharmacology
- First-in-human / pharmacokinetic / pharmacodynamics
- Food interaction
- TQTc monitoring
- Vaccines.
360biolabs

360biolabs is a contract service organisation providing speciality expertise and laboratory services in the development of new therapeutics, vaccines and diagnostics in a quality-assured environment based within laboratories at the Burnet Institute. The company has particular expertise in virology, immunology and analytical chemistry, with broad assay capabilities. These capabilities include assays and biomarker endpoints for clinical trials and preclinical studies in a range of therapeutic areas including infectious diseases, inflammation and oncology. Clients range from small biotechs to large multinational pharmaceutical companies.

360biolabs is an accredited facility with systems that comply with strict regulatory and industry standards, offering:

- ISO / IEC 17025 and ISO / IEC 15189 accreditation in accordance with the requirements of the OECD Principles of Good Laboratory Practice
- ICH / FDA / EMA compliant assay validation process
- Industry standard studies and reports to support global regulatory submissions
- World-class facilities including BSL-2 and BSL-3 laboratories secured with continuity fail-safes.

“360biolabs: Cutting-edge thinking and technology to support the development of therapeutics, vaccines and diagnostics.”
Platform Technologies

AMREP Flow Cytometry Core Facility: AMREPFlow
AMREP Flow is a state-of-the-art cell sorting and cell analysis laboratory, catering for the research community based at AMREP and broader Melbourne. The facility has capacity for animal and human cell sorting in a PC2 environment, as well as infectious sample sorting in a dedicated PC3 environment. The facility is equipped with three cell sorting platforms, nine cell analysis platforms and an imaging flow cytometer that is unique to Melbourne.
Contact geza.paukovics@burnet.edu.au or visit amrepflow.org.au

Collaborative Partners
Monash University
Burnet Institute
Baker Heart and Diabetes Institute
Alfred Health

Monash Micro Imaging at AMREP (MMI@AMREP)
MMI@AMREP manages core imaging resources within the Baker Heart and Diabetes Institute, Monash Central Clinical School and the Burnet Institute. Resources include three confocal and several conventional fluorescence microscopes within PC2 laboratories and a dedicated deconvolution microscope within a PC3 laboratory. Recently added super resolution technologies allow imaging beyond the capability of conventional microscopes.
Contact stephen.cody@monash.edu or visit platforms.monash.edu/mmi

Collaborative Partners
Monash University
Burnet Institute
Baker Heart and Diabetes Institute

In vivo Imaging
A new state-of-the-art, purpose-built animal imaging facility for use by AMREP researchers will open in early 2018. The facility will include a new 9.4T MRI scanner capable of a range of imaging, including brain, abdominal, cardiovascular, muscular and articular. The facility will also house the existing Bioscan NanoPET-CT, capable of high-resolution, high-efficiency PET and X-Ray CT scanning, and the FLECT. Future plans include the addition of a magnetic particle imaging (MPI) scanner. The new facility is in addition to existing IVIS Lumina XR Series III equipment, which can be used for multi-modal fluorescent, bioluminescent and X-ray imaging in vivo.

Collaborative Partners
Monash University
Baker Heart and Diabetes Institute

Genomics Capability
The new Australian Cancer Research Foundation Blood Cancer Therapeutics Centre includes state-of-the-art sequencing facilities, including: Illumina NextSeq 500 and MiSeq Next Generation Sequencer; Bio-Rad QX200 ddPCR system with AutoDG and ddSeq (single cell) capability; Covaris M220; MultiNA Fragment Analysis (Shimadzu); EpMotion liquid handler; microarray analysis using the Affymetrix GeneChip System 3000Dx v.2; and Intellicyt iQue high content screener. Access to the equipment is through collaboration and/or cost recovery.
Contact andrew.wei@monash.edu

Collaborative Partners
Monash University
Baker Heart and Diabetes Institute

Monash Histology at AMREP
A node of the Monash histology platform has been set up at AMREP, offering both a professional histology service as well as access to equipment for do-it-yourself (DIY) histology for AMREP and external researchers. Equipment includes a dissection and cassetting area, tissue processor, paraffin embedding units, microtomes, H&E staining and a cryostat for frozen sectioning.
Visit platforms.monash.edu/histology

Collaborative Partners
Monash University
Baker Heart and Diabetes Institute

The Monash Central Clinical School provides next-generation sequencing expertise and training on a collaborative basis, including experimental design, sample preparation (transcriptome, whole genome and epigenome profiling), single-cell transcriptome (Drop Seq) sample preparation, sequencing and basic bioinformatics. Equipment includes a DolomiteBio platform (Drop-Seq) and Illumina MiSeq and Oxford Nanopore MinION sequencing systems.
Contact mark.ziemann@monash.edu
Baker Clinical Research Domain
The Clinical Research Domain focuses on imaging and other diagnostic tools to better understand disease development and treatment, clinical trials and health services research. The Domain incorporates the Baker Institute’s clinical services, including specialised heart, diabetes, lung, eye and weight reduction clinics, as well as a range of allied health and health education services. Equipment includes state-of-the-art MRI, transthoracic and stress echocardiography and body composition (DEXA) scanning. The MRI scanner is capable of detailed morphologic and functional cardiac imaging, including the ability to acquire real-time data during exercise. Research and investigational services include ECG, Holter and ambulatory BP monitoring, ankle:brachial indices and cardiopulmonary exercise testing, as well as the Alfred Centre clinical research facilities comprising a clinical and research gymnasium and dedicated clinical research rooms.

Contact graeme.maguire@baker.edu.au or deb.dean@baker.edu.au

Mouse Cardiology Platform
The Experimental Cardiology Laboratory at the Baker Institute has established facilities and techniques specialising in mouse microsurgery and cardiac physiology, enabling scientists to conduct mouse echocardiography (non-invasive), micromanometry (invasive hemodynamic assessment) and microsurgery to induce heart disease. The platform allows scientists to closely determine cardiac function of specific genes in basal and diseased conditions and to trial new therapies of cardiovascular and metabolic disease.

Contact xiao-jun.du@baker.edu.au or julie.mcmullen@baker.edu.au

Mouse Metabolic Phenotyping / Bioenergetics Facility
The Mouse Metabolic Phenotyping Facility enables high-quality metabolic and physiologic phenotyping of rodents to study animal models of obesity, diabetes, cardiovascular disease and other metabolic diseases. The Bioenergetics Facility equipment allows the measurement of mitochondrial and glycolytic functionality, the two main energy pathways of the cell.

Contact darren.henstridge@baker.edu.au

Metabolomics Platform
The Metabolomics Laboratory uses state-of-the-art tandem mass spectrometry to obtain metabolic profiles (primarily lipids and fats) from cell and animal models, in addition to clinically relevant human samples. The platform has developed a targeted lipidomics approach that enables quantification of more than 600 lipid species across 25 lipid classes and subclasses. The analysis is performed by liquid chromatography tandem mass spectrometry.

Contact peter.meikle@baker.edu.au

Recombinant Viral Vectors Platform
This platform specialises in the production and purification of custom viral vectors based on adeno-associated virus (AAV) and lentivirus designs. Typical vector preparations consist of recombinant AAV vectors at purified, concentrated yields of 1E+12vg - 1E+13vg scale, and LV vectors typically of 1E+9vg or greater.

Contact paul.gregorevic@baker.edu.au

> Assoc Prof André La Gerche, Head of Sports Cardiology Laboratory, Baker Clinical Research Domain, with an athlete undergoing cardiac magnetic resonance imaging
Global Health Diagnostics Laboratory

The diagnostic development team in Burnet’s Global Health Diagnostics Laboratory focuses on the development of prototype rapid, point-of-care tests for infectious diseases and other priority global health conditions. The team’s innovations have enabled the development of products for diagnosis of infections (hepatitis E, active syphilis), measurement of CD4 T-cells, and plasma separation for HIV viral load, which have been successfully out-licensed for manufacture.

More recently, the laboratory has had a primary focus on collaborative research and development with Burnet’s spin-off company, Nanjing BioPoint Diagnostics. The laboratory works with organisations to assist them in the development of novel rapid point-of-care diagnostics, either as fee-for-service contract work, or as collaborative projects in areas of interest for the Institute.

Contact david.anderson@burnet.edu.au

Antiviral Testing Facility

The Burnet Antiviral Testing Facility has the capacity to evaluate chemical agents for inhibitory activity against HIV and herpes simplex (HSV) type 1 and 2 viruses in cell culture assays. This enables the development of new molecules that may lead to better treatments and/or prophylactics for these chronic infections. All work undertaken by the facility uses principles outlined in the FDA guidelines for Antiviral Product Development.

Contact gilda.tachedjian@burnet.edu.au

PhenoSeq

The principal obstacle to the anti-HIV drug maraviroc from being more widely used is that the pre-treatment in silico tests to determine virus susceptibility to maraviroc have been developed primarily for HIV subtype B strains, which account for only 10% of infections worldwide. The Burnet has developed PhenoSeq, a suite of highly accurate in silico tests for all of the major HIV subtypes, which together account for 95% of HIV-1 infections worldwide.

Contact paul.gorry@burnet.edu.au

OPTIMA

Optima is a sophisticated tool to help decision-makers choose the best public health investments in areas such as tuberculosis, HIV, nutrition and maternal and child health. Developed by the Optima Consortium for Decision Science, in partnership with the World Bank, the Optima software is open-access and available via a web-based interface. It consists of a mathematical model of disease transmission and progression integrated with an economic analysis framework and a formal mathematical optimisation routine.

The Optima structure is highly flexible and can accommodate public health programs and sub-populations that are country specific. The tools have been used by more than 40 countries across Eastern Europe, Asia, South America and Africa to guide resource allocation towards the most cost-effective mix of programs and to assist with national strategic and operational planning.

Further information: optimamodel.com/about.html
Bioinformatics and Biostatistics

Biostatistics Consulting Platform

The Biostatistics Consulting Platform (BCP), located within the Monash School of Public Health and Preventive Medicine, provides high-quality biostatistical support to AMREP-based Monash researchers and researchers at The Alfred. BCP biostatisticians can provide consulting and collaborative assistance with:

- Design of experiments, clinical trials and other studies, including sample size calculations and the development of proposals and protocols
- Statistical analysis, statistical analysis plans and reporting of results
- Biostatistical appraisal of protocols and manuscripts
- Research into new or specialised biostatistical methods
- Statistical software advice and guidance.

BCP biostatisticians have experience with a wide range of statistical methods and specialist software.

Visit monash.edu/medicine/sphpm/depts-centres-units/biostats-consulting

Collaborative Partners

Monash University
Alfred Health

Monash Bioinformatics Platform at AMREP

Monash Central Clinical School (CCS) appointed Dr Nick Wong in June 2017 to liaise between CCS, The Alfred and the main Monash bioinformatics platform team located at Clayton. Dr Wong offers advice, consultancy and training around genomic analysis with next-generation sequencing (NGS) and nucleic acid (RNA / DNA) platforms to Monash and Alfred Health staff. This includes access to computing infrastructure for data analysis, bringing together the existing bioinformatics expertise on the precinct and coordinating specialty seminars and training workshops.

Contact nick.wong@monash.edu

Collaborative Partners

Monash University
Alfred Health

Baker Bioinformatics Program

The Baker Bioinformatics Program aims to build bioinformatics capacity through collaboration (internal and external), support and training. Capabilities include the analysis of data from diverse technologies, including genomics, epigenomics, transcriptomics, proteomics, metabolomics and metagenomics / microbiota, and the cross-omic integration thereof. A diverse set of analytical techniques are employed, including statistical analysis, machine learning, network analysis and high-dimensional data visualisation, as well as the design of computational algorithms. This enables the identification of genetic variants, genes and other biomolecular / organismal entities that differ between conditions, as well as the use of these differences to make disease predictions, infer pathogenesis and identify targets for intervention.

Contact michael.inouye@baker.edu.au
Clinical Registries and Biobanks

Monash Clinical Registries
Monash School of Public Health and Preventive Medicine is the largest manager of clinical registries in Australia, with about 30 registries. Data is used to benchmark quality of care and monitor outcomes, providing insights into variance among service providers as well as drug, device and procedural safety. The School manages state-wide, national and Australia/New Zealand registries.

Diseases, conditions and clinical procedures captured in the registries include:
- Trauma, transfusions and blood disorders
- Cardiac and thoracic surgery
- Bariatric surgery
- Rheumatology
- Spine and orthopaedic trauma
- Burns
- Cardiovascular conditions
- Kidney diseases
- Various cancers, including lung, gastrointestinal, prostate, lymphoma, myeloma
- Cystic fibrosis
- Breast devices.

To discuss establishing a new registry, contact Med-ClinicalRegistries@monash.edu

Visit monash.edu/medicine/sphpm/registries

The Healthy Ageing Biobank – ASPREE
The Monash Public Health Biorepository houses biospecimens from a diverse range of studies undertaken by researchers from the Monash School of Public Health and Preventive Medicine, including blood and urine specimens collected from Australian participants of the US National Institutes of Health (NIH) / National Health and Medical Research Council (NHMRC)-funded ASPREE (ASPirin in Reducing Events in the Elderly) clinical trial.

ASPREE is an international double-blinded, randomised placebo-controlled trial examining the effect of daily low-dose aspirin on the prevention of dementia, cardiovascular disease, depression and some cancers in more than 19,000 healthy older adults. Biospecimens from ASPREE participants constitute The Healthy Ageing Biobank, and, together with clinical data from the participants, represent a unique global resource for genetic and biomarker discoveries in older Australians. The biorepository also houses tumour tissue samples collected from ACES (ASPREE Cancer Endpoints Study), an ASPREE sub-study designed to look at the effect on cancer of taking aspirin.

Visit aspree.org/aus/sub-studies/ive-been-everywhere-the-aspree-biobus-story
AusDiab

Coordinated by Baker Heart and Diabetes Institute, the AusDiab study is the largest Australian longitudinal population-based study examining the natural history of diabetes, pre-diabetes, heart disease and kidney disease in Australians over 25 years of age. The baseline study of 11,247 participants provided benchmark national data on the prevalence of diabetes, obesity, hypertension and kidney disease in Australia. Five-year and 12-year follow-ups of the participants have also been completed. Two AusDiab sister studies have examined the impact of diabetes and other non-communicable diseases among the Australian urban Indigenous population (the DRUID study), and a rural Victorian population (the Crossroads study).

Researchers and potential collaborators wishing to access the AusDiab datasets or biological samples are able to do so via a completing a data access form.

Visit baker.edu.au/impact/ausdiab

Victorian HIV Blood and Tissue Storage Bank

Established in the 1990s, the Victorian HIV Blood and Tissue Storage Bank is an initiative of the state-wide Victorian HIV Service at The Alfred and the Burnet Institute. It has prospectively stored leftover serum samples from requested HIV viral load tests for patients managed at The Alfred. The biobank holds nearly 60,000 samples linked with relevant clinical information from just less than 5,000 HIV patients. The biobank is available as a research tool for AMREP researchers as well as the wider research community.

Contact j.roney@alfred.org.au or jennifer.hoy@monash.edu

Collaborative Partners
Burnet Institute
Alfred Health
Monash University
Other AMREP Facilities and Services

Ian Potter Library and AMREP Education Centre

The Ian Potter Library provides an integrated library and information service to staff and students of AMREP. The library organises its information resources to support patient care, educational training and research activities of the institutions across the precinct.

The AMREP Education Centre is a unique conference, workshop and seminar venue with a range of meeting and seminar rooms, including the 200-seat AMREP Lecture Theatre with state-of-the-art technology. The AMREP Lecture Theatre and rooms are available to both AMREP partners and external clients.


Human Research Ethics

The Alfred Hospital Ethics Committee is a National Health and Medical Research Council (NHMRC)-registered and certified Human Research Ethics Committee, which undertakes ethical review of human research for all AMREP partners and can also review applications for any site participating in the Victorian or National ‘single ethical review’ (or ‘streamlined’) scheme. The Ethics Committee is supported by two sub-committees: the Research Review Committee, which undertakes a preliminary specialised scientific / medical and safety review of drug, device and risky interventions; and the General Ethical Issues Sub-committee, which considers more general ethical issues (including but not restricted to human research) of relevance to Alfred Health and the wider community.

Visit alfredhealth.org.au/research/ethics-research-governance

Animal Ethics

The AMREP Animal Ethics Committees (AECs) undertake the ethical review of proposals for the use and breeding of animals for scientific purposes for AMREP-based institutions. There are two AECs in operation, each meeting on a monthly basis, resulting in the ethical review of proposals on a fortnightly basis. The AECs are supported by the AMREP AEC Secretariat, which also coordinates post-approval monitoring of research projects and annual reporting to state government on behalf of AMREP institutions licensed for the use of animals for scientific purposes.

Visit amrepaec.baker.edu.au