



**Alfred  
Research  
Alliance**



New thinking.  
Real impact.



# 21 Research 22 Report



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The Alfred Research Alliance acknowledges the Traditional Owners of the land our precinct resides on, the Bunurong people of the Kulin nation. We pay our respects to their Elders past, present and emerging, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

## Chair's report



Welcome to the Alfred Research Alliance's 2021-22 Annual Research Report. This is the fifth edition of our report, and the third produced since the COVID-19 pandemic began.

**Prof Andrew Way**  
Chair, Alfred Research Alliance

Over the past two and a half years, I have watched with fascination as the global research and health care community has mobilised to meet the challenges of the pandemic at a truly incredible rate. In early 2020, we thought effective vaccines would be years away, but they began rolling out less than a year later. At the same time, new and updated antivirals and other treatments have improved survival rates for the sickest COVID-19 patients and saved thousands of lives around the world.

At its core, this is translational research in action – transforming basic science discoveries into clinical practice to address unmet health needs at both an individual and community level. Although it is not yet over, it is translational research, combined with extensive

collaboration, that has made it possible for us to emerge from the darkest days of the pandemic and indeed to meet the many other health challenges that face us beyond COVID-19.

This type of patient-centred, outcome-focused research is at the heart of everything we do together at the Alfred Research Alliance. In this year's report, we are illuminating the translational research process with an in-depth look at how pioneering discoveries in the laboratory become the treatments, drugs, devices and interventions that are used in our health services every day. See the pathway on page 14, and read how our researchers are using it to address one of Australia's biggest health challenges, stroke, which affects more than 50,000 Australians each year.

Of course, this is just one of several research areas here on the Alfred precinct. Our researchers and clinicians have continued to make world-leading advances across all our key 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, and trauma, critical care and perioperative medicine.

Regardless of the research focus or clinical specialty, none of this can happen without our people – scientists, doctors, nurses, allied health staff, research assistants, professional services staff and all those that work tirelessly to support them. There are more than 8,000 people on our precinct, and every single one has made a significant contribution to improving health outcomes for our community.

This contribution is all the more impressive considering the challenges of the last few years, and I want to take this opportunity to thank each and every member of our community for their outstanding efforts. With our shared commitment to collaboration and innovation, I am confident that the Alfred Research Alliance will continue to be a world leader in translational research and patient-centred health care for many years to come.

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# Who we are

## Executive Officer's report

This year, as in previous years, our Annual Research Report showcases the impressive research achievements of our precinct, from pioneering breakthroughs and world-first studies to prestigious grants and awards.

**Dr Renée Dutton**  
Executive Officer, Alfred Research Alliance



Beyond these quantifiable accomplishments, there are other aspects to the work of the Alfred Research Alliance that are somewhat harder to capture in the pages of a report, but no less important – like our shared values of research excellence, collaboration and cooperation. It is these values that brought our eight member organisations together, and they continue to provide a solid foundation for the world-leading research that happens on our precinct.

As an Alliance, we know that we can make the greatest impact by working together as we translate our research into new and improved diagnoses, treatments and public health strategies. However, 'working together' doesn't simply refer to sharing a bench in a lab or consulting with another clinical team in the hospital – it also means extending our values of collaboration and cooperation to our local, national and international networks.

Starting on page 6, you can read about our precinct's expansion via new university departments and the construction of the Paula Fox Melanoma and Cancer Centre at The Alfred, which will provide state-of-the-art facilities for cancer treatment and research from 2024. This year also saw the international acquisition of two of our members, 360biolabs and Nucleus Network. The headquarters of both organisations remain here and indeed they have each expanded their own local facilities – 360biolabs with new premises on the Alfred precinct and Nucleus Network with a satellite site in Geelong.

Further deepening our community connections, several Alliance partners have continued their focus on gender equity and diversity through initiatives like the Athena SWAN Charter, and formalised their commitment to reconciliation with Reconciliation Action Plans. You can find out more about this on page 8.

In expanding the capabilities of our precinct and finding new ways to engage the diverse communities we work with, we can ensure that our research is constantly evolving and adapting to meet changing health needs – and puts people first, always.

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# What we do

## New thinking, real impact

At the Alfred Research Alliance, our researchers take a clinical unmet need and apply their skills to find a solution for improving health outcomes. Our work covers everything from biomedical discovery in the laboratory to applied research, clinical research, and public health and health services research.

By enabling discoveries to progress from bench to bedside to the broader community, our research forms a complete translational research cycle on one geographically distinct and uniquely interconnected precinct. The overarching aim of this research is to improve diagnosis, treatments, prevention and policy, creating better outcomes for the healthcare system and the wider community.



1

Hospital



3

Universities



2

Medical research institutes



2

Biomedical SMEs



8,000+

Staff & students



1,500+

Researchers



1,300+

Postgraduate students

## Research strengths



Blood diseases and cancer



Cardiovascular disease



Diabetes and obesity



Epidemiology and public health



Infection and immunity



Mental health and neuroscience



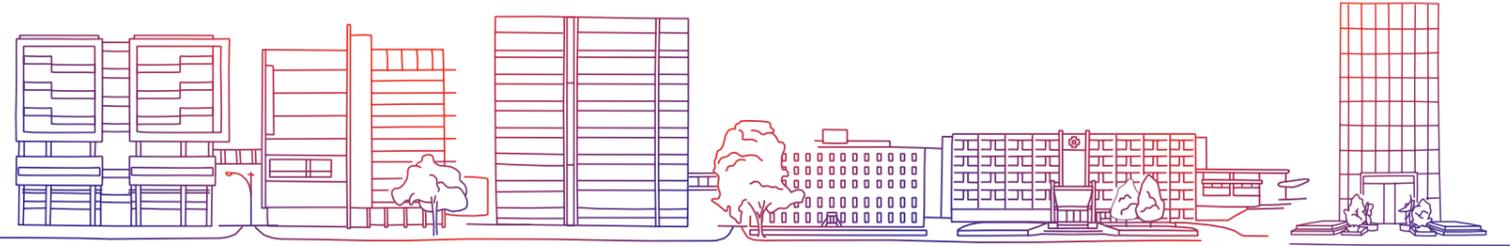
Nursing and allied health



Trauma, critical care and perioperative medicine

# Precinct highlights

A snapshot of our year at the Alfred Research Alliance



## Expanding our reach

From international acquisitions to new university departments and state-of-the-art facilities, the Alliance partners continue to go from strength to strength.

### Going global

This year, two of our members were acquired by overseas investors. 360biolabs was purchased by contract research laboratory BioAgilytix Labs, becoming part of their international network spanning the USA, Germany and Australia. The acquisition was a significant milestone for the Burnet Institute too, who made several hundred million dollars from the sale as the majority owner of 360biolabs.

Fellow Alliance member Nucleus Network was acquired in late 2021 by Blackstone, one of the world's largest private equity firms. This purchase followed the 2019 acquisition of Q-Pharm in Brisbane and Prism in the USA, making Nucleus Network the first and only multi-site Phase I clinical trial organisation with clinics in both Australia and the USA.

### Boosting collaboration

Baker Heart and Diabetes Institute, where Nucleus Network was first established in 2003, has had their own expansion this year, strengthening their research collaborations with La Trobe University with a new department – the Baker Department of Cardiovascular Research, Translation and Implementation. The new department brings together experts in cardiovascular disease, diabetes and public health research, with a focus on translating discoveries into clinical practice.

### New cancer facilities

This year has seen an expansion of our on-site facilities too, with construction commencing on the Paula Fox Melanoma and Cancer Centre at The Alfred. The new building will provide multi-disciplinary cancer care as well as state-of-the-art research and clinical trial facilities. The centre is due to open in early 2024.

+ An artist's impression of the Paula Fox Melanoma and Cancer Centre.



+ The new department brings together experts in cardiovascular disease, diabetes and public health research, with a focus on translating discoveries into clinical practice.

## Sharing our science

As a hub of patient-centred research and health care, our scientists and clinicians use a variety of channels to share our findings with the community.

### Understanding COVID-19

In mid-2021, as the world grappled with the second year of the COVID-19 pandemic and its associated challenges, Burnet Institute launched *How Science Matters*, an eight-part podcast series examining the science of the coronavirus. Co-hosted by former ABC Radio journalist Tracy Parish and Burnet Institute Director and CEO Professor Brendan Crabb AC, the podcast featured leading experts discussing everything from vaccines and modelling to how the pandemic affected maternity care here and overseas.



+ Tracy Parish and Prof Brendan Crabb AC discuss all things COVID-19.

### Thank you for asking

Elsewhere on the precinct, consumers continued to provide invaluable input on a multitude of research projects. In October, Professor Anne Holland delivered Monash Central Clinical School's annual public lecture, "Thank you for asking: Addressing consumer priorities in respiratory medicine research". The virtual address outlined developments in treatments for chronic lung disease and new opportunities to address the research priorities of people with the disease. As treatment models haven't changed much in the last 30 years, this patient-centred approach enables researchers and clinicians to explore new, more personalised ways of delivering treatment.

As Monash Central Clinical School has expanded their Consumer and Researcher Engagement (CARE) program, they have hosted a range of activities to engage and educate consumers on various diseases and conditions from the school's research program. Webinars have covered new developments in multiple myeloma research, a focus on rare diseases for Rare Disease Day and, most recently, a discussion about dementia hosted by the Department of Neuroscience, who joined the CARE program last year.



+ Prof Anne Holland, Monash Central Clinical School

## Celebrating our diversity

### Gender equity

Gender equity has long been a focus of the Alfred precinct, not only in our research but also in the broader systems and structures that support our people.

Five of our members – Baker Heart and Diabetes Institute, Burnet Institute, Deakin University, La Trobe University and Monash University – are proud participants in the Science in Australia Gender Equity (SAGE) Athena Swan program, an international accreditation and awards framework for gender equity, diversity and inclusion. It enables organisations to benchmark their work in this space against an international standard and implement initiatives to meet the criteria for the Athena Swan Bronze Award, which all five members have achieved.

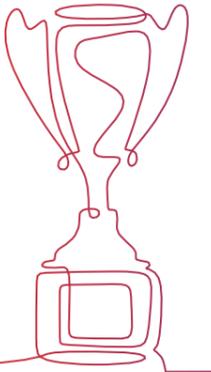
One such initiative is the Baker Heart and Diabetes Institute's prestigious five-year Alice Baker and Eleanor Shaw Gender Equity Fellowship. Named after the pioneering sisters who co-founded the Baker Institute in 1926, the fellowship aims to assist the advancement of women in science while counteracting some of the barriers women face during their scientific careers. This year, Professor Dianna Magliano OAM became the second senior female fellow to be appointed at the Institute since 2020, recognised for her work in identifying global diabetes trends.



+ The Alfred precinct was lit up in purple to celebrate International Women's Day in March.



In March, Alliance members came together to celebrate International Women's Day (IWD). This year's theme was 'Changing Climates: Equality Today for a Sustainable Tomorrow', which was explored in a series of events and seminars on the precinct. On the eve of IWD, the precinct was lit up in purple with messages of thanks for the tireless work of our healthcare workers throughout the COVID-19 pandemic.



### Awards and achievements

The research excellence of the Alliance was recognised with several accolades throughout the year.

#### Australia Day Honours

The Australia Day Honours List recognises the outstanding service and contributions of Australians from all walks of life. In 2022, four Alliance researchers were acknowledged for their contributions to medical and research fields including nursing, public health and neurology. Among those made Members of the Order of Australia (AM) were:

- › **Emeritus Professor Maxine Duke**, Deakin University, for significant service to education, to nursing, and to professional associations.
- › **The Honourable Maxine Morand**, Monash School of Public Health and Preventive Medicine, for significant service to the Parliament of Victoria, and to community health.
- › **Professor Robert Power**, Burnet Institute, for significant service to medicine in the field of international development and research, and to education.
- › **Professor Elsdon Storey**, Monash School of Public Health and Preventive Medicine, for significant service to medicine in the field of neurology, and to professional associations.

+ The Australia Day Honours List recognises the outstanding service and contributions of Australians from all walks of life.

### Closing the gap for our First Nations communities

For years, many of our members have been committed to addressing the significant health disadvantages faced by First Australians, through both their health services and research programs.

This year, Baker Heart and Diabetes Institute and Burnet Institute formalised their commitment to reconciliation with the launch of their first Reconciliation Action Plan (RAP), both endorsed by Reconciliation Australia. The RAPs are designed to embed the principles of reconciliation within participating organisations, and are an important step in building relationships, respect and opportunities for Aboriginal and Torres Strait Islander peoples.

During NAIDOC Week, The Alfred unveiled the Womindjeka Welcome Wall, part of a major redesign of the hospital's main entrance. A collaboration between the Boon Wurrung Foundation and Elders, Alfred Health and Hayball Architects, the space is a celebration of Country and community. Welcome signage was also installed in the 10 most frequently spoken languages, along with accessible wayfinding signage and major inclusive symbols.

The Womindjeka Welcome Wall at The Alfred. +



#### 2021 GSK Award for Research Excellence

The GSK Award for Research Excellence is one of the most esteemed awards for the Australian medical research community. It has been awarded since 1980 to recognise outstanding achievements in medical research with a focus on human health.

- › **Professor Jamie Cooper AO** and **Professor Rinaldo Bellomo AO**, Co-Directors of the Australian and New Zealand Intensive Care Research Centre (part of Monash School of Public Health and Preventive Medicine)

#### 2021 Victorian Premier's Awards for Health and Medical Research

Established in 1995, the Premier's Awards recognise the exceptional contributions and capabilities of Victoria's early-career health and medical researchers.

- › Premier's Award – Health Services Researcher **Dr Rebecca Goldstein**, Monash Centre for Health Research and Implementation (part of Monash School of Public Health and Preventive Medicine)

#### 2021 Victorian Young Tall Poppy Science Award

The prestigious annual Young Tall Poppy Science Awards recognise the achievements of Australia's outstanding young scientific researchers and communicators.

- › **Jane Tiller**, Monash School of Public Health and Preventive Medicine
- › **Associate Professor James Trauer**, Monash School of Public Health and Preventive Medicine

# Research performance

2021 external funding awarded for health and medical research

**\$168M**

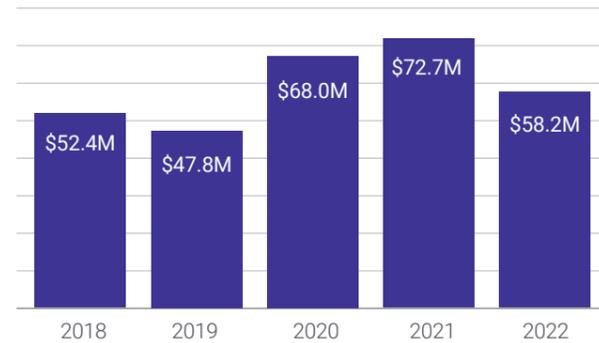
External research funding by funding source – 2021

<b>\$97.5M</b> Australian competitive grants	<b>\$20.2M</b> Other public sector research income
<b>\$35.9M</b> Other competitive research grants	<b>\$10.0M</b> Industry income
<b>\$4.4M</b> Other research income	<b>\$168M</b> <b>Total</b>

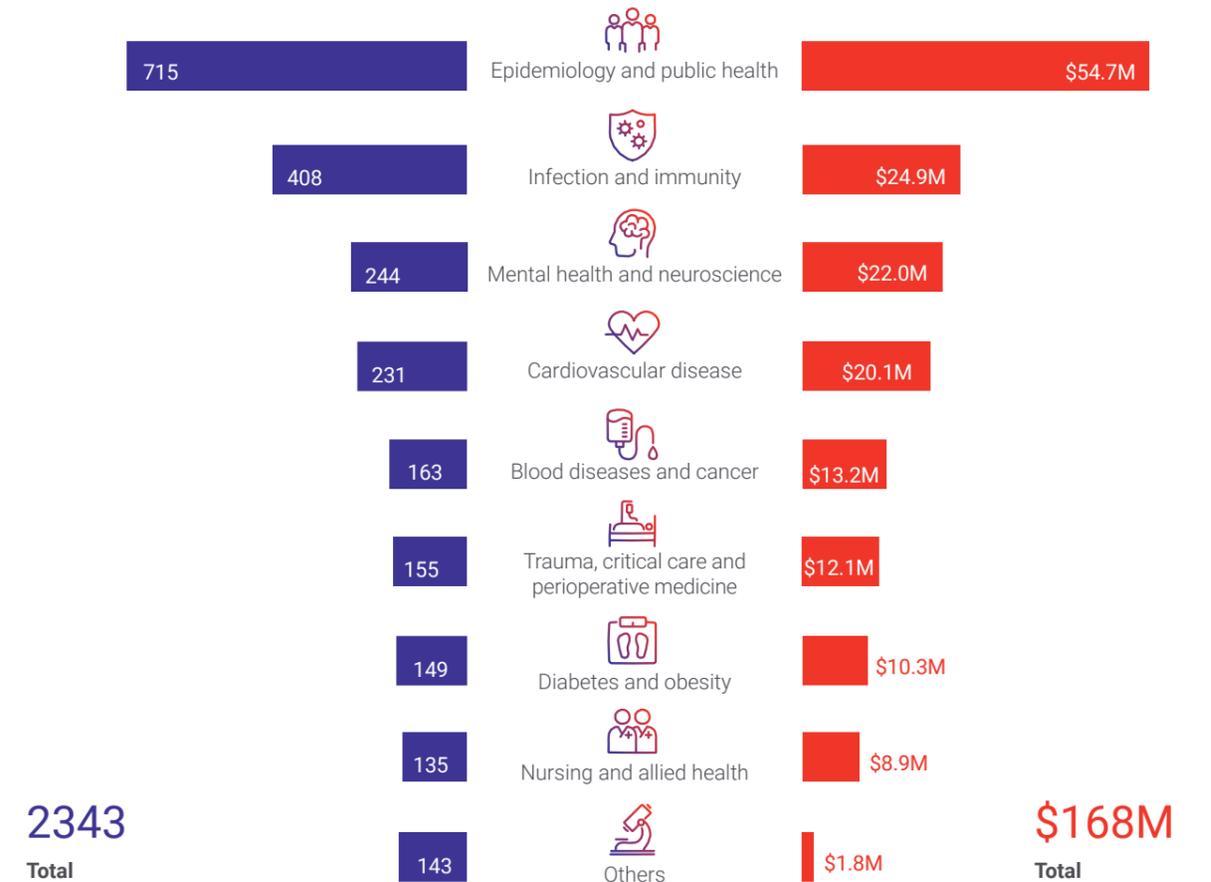
NHMRC funding commitments secured by Alfred Research Alliance commencing in 2022

**\$58.2M**

NHMRC funding commitments directly administered by Alliance members



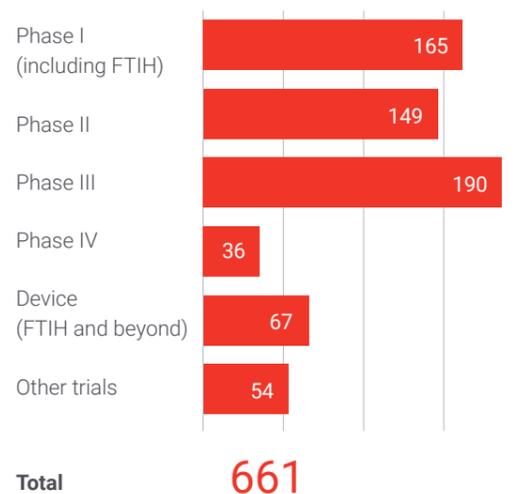
External research publications by research area – 2021



Philanthropy

In addition to the **\$168M in external funding** secured specifically for research, Alliance partners also received **more than \$33.2 million in philanthropy and fundraising revenue** in 2021.

Clinical trials in 2021



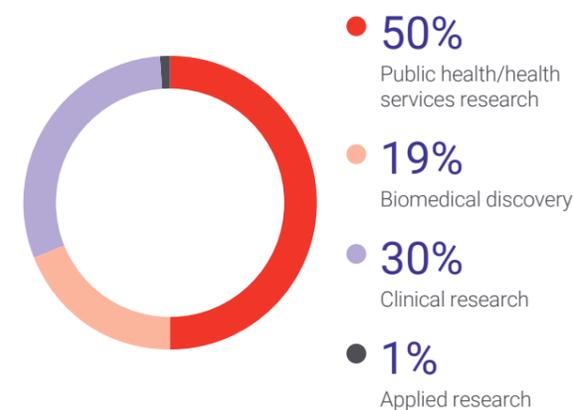
Students 2021

<b>1358</b> Postgraduate degree students	<b>184</b> Masters student completions	<b>60</b> PhD/doctoral student completions
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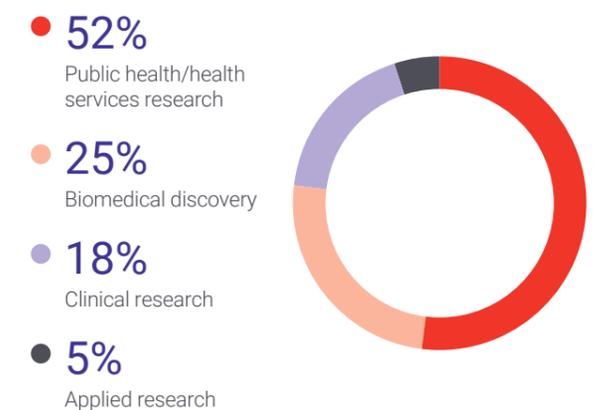
Commercial impact

<b>10</b> Provisional patent applications	<b>22</b> PCT patent applications	<b>31</b> National phase entry
<b>3</b> Patents granted	<b>1</b> Patent licensed	

Original research articles by research theme – 2021



External research funding by research theme – 2021



# Our members

The Alfred Research Alliance brings together eight independent and diverse organisations to create a community of excellence for research and education.

## AlfredHealth

Alfred Health is a state-wide health service comprising The Alfred, Caulfield and Sandringham Hospitals, along with a large network of community programs and 14 services across Victoria.

The Alfred is one of Australia's busiest hospitals, providing the most comprehensive range of adult specialist medical and surgical services in Victoria. The hospital is also a major tertiary referral teaching hospital with a commitment to research excellence and training for medical, nursing and allied health staff.

The Alfred sits at the epicentre of the Alfred Research Alliance, keeping our work patient-centred and outcome driven. Co-location on this site, together with close and cooperative relationships with other members, provides the opportunity for vital collaboration between Alfred Health's health practitioners and clinical researchers and our partner universities and medical research institutes.



Monash Medicine, Nursing and Health Sciences is a research-focused faculty within one of the world's top universities. It is a leading provider of education for doctors, nurses and allied health professionals in Australia.

Two of the university's largest schools are located at the Alfred precinct within the Sub-Faculty of Translational Medicine and Public Health. Monash Central Clinical School is a major centre for clinical and biomedical research and education, with a focus on translational research including preclinical studies and early phase clinical trials of new treatments for human diseases. Monash Public Health and Preventive Medicine is a world leader in public health, clinical and applied research and education, including large-scale late phase clinical trials, clinical registries, population studies and health services research.

Our membership of the Alfred Research Alliance aligns with our objective of research translation through collaboration with fellow researchers and clinical partners. As part of the Alliance, we can seamlessly integrate our research expertise with that of the other members, promoting excellence in healthcare.



The Baker Heart and Diabetes Institute is an independent, not-for-profit medical research facility with a proud history of discovery dating back to 1926.

The Institute's research is focused on the prevention, diagnosis and treatment of cardiovascular disease, diabetes and other related health disorders. This includes addressing the profound health disadvantage experienced by Aboriginal Australians, with a research facility in Alice Springs.

The Baker Institute's work extends from the laboratory to widescale community studies and intervention programs. The Institute also runs a range of specialist clinics, including cardiovascular and diabetes clinics.

The breadth of clinical and research expertise ensures that the Institute is well placed to advance understanding of the genetic and environmental determinants of disease, and to translate scientific findings into new approaches to prevention, treatment and care.

Our values of excellence, integrity and innovation are strengthened through collaboration with our fellow members of the Alfred Research Alliance.



Burnet Institute is an independent, not-for-profit medical research and public health organisation that believes in equity through better health.

By linking discovery-oriented and implementation research with public health action, Burnet makes a tangible and sustainable impact on health in both developed and developing countries.

The Institute's major thematic programs — Maternal, Child and Adolescent Health, Disease Elimination, Behaviours and Health Risks, and Health Security — underpin innovative multidisciplinary responses to diseases of global significance and solving complex health issues. Burnet has particular expertise in HIV and AIDS, hepatitis viruses, malaria, tuberculosis, influenza and emerging infectious diseases including COVID-19.

Our membership of the Alfred Research Alliance is aligned with our mission: to achieve better health for vulnerable people in Australia and internationally by accelerating the translation of research, discovery and evidence into sustainable health solutions.



Deakin University's School of Nursing and Midwifery and Alfred Health Nursing Services have a long-established research and education partnership.

Through that partnership, staff at the Deakin Centre for Quality and Patient Safety Research are able to conduct high-quality research programs in the areas of patient safety, health services evaluation and knowledge translation.

This allows us to make a substantive contribution to scientific knowledge, clinical nursing practice and the quality of patient care. As well as research training, Deakin undergraduate and postgraduate students also complete clinical placements here for their nursing, allied health and health science degrees.

Our membership of the Alfred Research Alliance supports our objectives of improving patient and organisational outcomes through high quality research, strengthening research training and support for nursing staff, and facilitating the integration of research evidence into clinical practice.



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

The broad objectives of the school are to provide national and international research leadership, conduct clinical research that makes a difference to patient outcomes, and promote interdisciplinary and inter-institutional collaboration in healthcare delivery and research. We provide a centre of excellence for education in nursing and are leaders in implementation science — the uptake of research evidence into clinical practice.

These objectives underpin our membership of the Alfred Research Alliance, allowing us to collaborate closely with our partners on this site and contribute academic leadership in nursing and allied health research and education.



Nucleus Network is Australia's largest Phase 1 clinical research organisation and the only Phase 1 specialist globally with facilities in the USA and Australia. Since our establishment in 2004, Nucleus Network has conducted well over 1000 Phase 1 clinical trials for biotechnology and pharmaceutical companies from across the globe, including China, Europe, Japan, South Korea, Taiwan and the USA.

Our Australian Phase 1 facilities are in Melbourne and Brisbane, and our USA Phase 1 facility is in Minneapolis, Minnesota. Combined, our clinics offer more than 200 beds. All three clinics are strategically co-located within leading medical, research and biotech precincts: The Alfred hospital in Melbourne, the Royal Brisbane and Women's Hospital in Brisbane, and Medical Alley in Minnesota.

These precincts provide Nucleus Network with unique access to highly specialised ancillary services for the conduct of complex Phase 1 clinical trials. From specialist pharmacodynamic equipment for first-in-human studies in Melbourne, purpose-built infrastructure for high volume biosimilar studies in Brisbane, and onsite dialysis capabilities for complicated renal studies in Minneapolis, Nucleus Network has the experience to conduct the most complex early phase clinical trials.

Together with our clients, we are fulfilling our purpose of "Advancing medicine, improving lives".



360biolabs, a BioAgilytix company, is the leading and most comprehensive specialty laboratory in the Australia and New Zealand region focused on supporting pharmaceutical and biotech partners in all phases of drug development.

Recently joining the global BioAgilytix team and now with laboratory locations in North Carolina's Research Triangle Park; Cambridge, Massachusetts; San Diego, California; Hamburg, Germany; plus Melbourne and Brisbane, BioAgilytix provides large and small molecule PK, immunogenicity, biomarkers, flow cytometry, virology and cell-based assay services supporting the development and release testing of therapeutics across a number of industries and disease states.

360biolabs and the global BioAgilytix laboratories offer assay development, validation and sample analysis under ISO/IEC 17025, ISO 15189, GLP and GCP, GMP quality control testing (i.e. product release testing, stability testing, etc in USA labs) and diagnostic testing services at its CLIA-certified, CAP-accredited Boston laboratory.

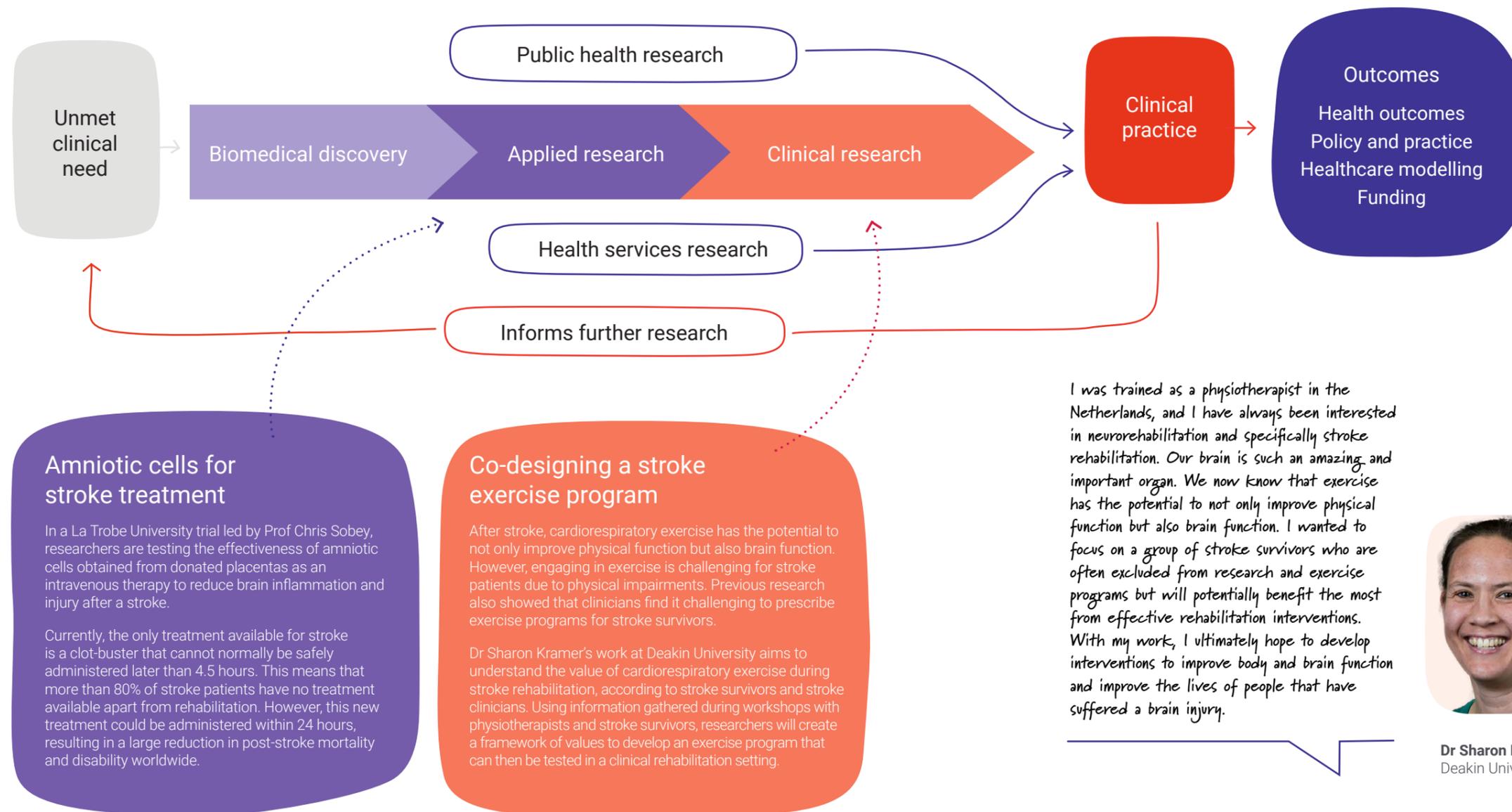
A team of highly experienced scientific and QA professionals ensures high-quality science, data integrity and regulatory compliance through all phases of clinical development. 360biolabs and the global BioAgilytix team is a trusted partner to many top global pharmaceutical and biotech companies.

# Translational research: from discovery to practice

The Alfred Research Alliance is a world leader in translational research, which is the process of turning ground-breaking discoveries in the lab into evidence-based clinical practice.

In turn, what we learn in our hospital and health services helps to inform future research, so we can continue to meet the changing needs of our community and improve health outcomes for all.

Here, we can see how two researchers at different stages of the translational research pathway are helping to address stroke, which affects more than 50,000 Australians each year and is a leading cause of death and disability. From basic research to clinical trials and allied health interventions, our research will help to identify new options for treatment and prevention of stroke, reducing the burden of this disease for future generations.



## Amniotic cells for stroke treatment

In a La Trobe University trial led by Prof Chris Sobey, researchers are testing the effectiveness of amniotic cells obtained from donated placentas as an intravenous therapy to reduce brain inflammation and injury after a stroke.

Currently, the only treatment available for stroke is a clot-buster that cannot normally be safely administered later than 4.5 hours. This means that more than 80% of stroke patients have no treatment available apart from rehabilitation. However, this new treatment could be administered within 24 hours, resulting in a large reduction in post-stroke mortality and disability worldwide.

## Co-designing a stroke exercise program

After stroke, cardiorespiratory exercise has the potential to not only improve physical function but also brain function. However, engaging in exercise is challenging for stroke patients due to physical impairments. Previous research also showed that clinicians find it challenging to prescribe exercise programs for stroke survivors.

Dr Sharon Kramer's work at Deakin University aims to understand the value of cardiorespiratory exercise during stroke rehabilitation, according to stroke survivors and stroke clinicians. Using information gathered during workshops with physiotherapists and stroke survivors, researchers will create a framework of values to develop an exercise program that can then be tested in a clinical rehabilitation setting.

My research background is in cardiovascular health and disease, and my initial focus was on how brain arteries work and how during chronic cardiovascular comorbidities they are impacted by and contribute to stroke. This led to a need to better understand the mechanisms of brain injury after a stroke, and then to seek new types of therapies that could be given to target the form of injury. If our trials in humans are successful, we will have developed only the second type of therapy that can assist stroke patients.



**Prof Chris Sobey**  
La Trobe University

I was trained as a physiotherapist in the Netherlands, and I have always been interested in neurorehabilitation and specifically stroke rehabilitation. Our brain is such an amazing and important organ. We now know that exercise has the potential to not only improve physical function but also brain function. I wanted to focus on a group of stroke survivors who are often excluded from research and exercise programs but will potentially benefit the most from effective rehabilitation interventions. With my work, I ultimately hope to develop interventions to improve body and brain function and improve the lives of people that have suffered a brain injury.



**Dr Sharon Kramer**  
Deakin University

## The translational research pathway

### Biomedical discovery

Generation of new knowledge about health and disease through understanding fundamental biological processes.

### Applied research

Development of new drugs, devices, diagnostics and treatments for clinical application.

### Public health research

Examination of health and prevalence of disease in communities and the link between social, environmental and biological factors to facilitate development of interventions to promote health and prevent disease.

### Health services research

Examination of methods of effective health care service delivery, quality and cost. It also includes the examination of access to and outcomes of health services.

### Clinical research

Determination of the safety and effectiveness of a treatment, diagnostic, device or medicines for human use to support human health. It is patient-oriented research and includes clinical trials.

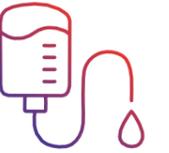
### Clinical practice

Application of research findings including new drugs, diagnostics, treatments, systems and practices in the clinical environment.



Find out more about each of these stroke projects in our Research Highlights, starting on **page 16**.

# Blood diseases and cancer



## State-of-the-art 3D imaging offers better outcomes for melanoma patients



A new multi-million-dollar 3D body scanning imaging facility at The Alfred will improve early diagnosis and management of melanoma, as well as providing an invaluable platform for research into the condition.

Funded by the Australian Cancer Research Foundation (ACRF), the centre is one of 15 such facilities they have opened around Australia as part of their Australian Centre of Excellence in Melanoma Imaging and Diagnosis (ACEMID) program.

Early detection is crucial for melanoma but no standardised diagnosis pathway exists. Using state-of-the-art imaging, the Vectra machines create a 3D avatar to undertake full body mapping, allowing researchers to investigate and track moles and skin spots over time.

The ACEMID team plans to create a national database of up to 100,000 patient images. These scans will then be analysed to help develop a skin cancer and melanoma algorithm using artificial intelligence, which will be a game-changer for detection and management going forward.

Multiple clinical trials have already commenced using the new technology. Many of them are being managed by A/Prof Victoria Mar from Monash University's School of Public Health and Preventive Medicine, who is the ACEMID Victorian Clinical Lead and Director of the Victorian Melanoma Service at The Alfred.

The new Vectra machines at The Alfred create a 3D avatar of the body to track moles and skin spots over time.



## Trials give new hope for those with hard-to-treat cancers

AlfredHealth

Two international studies looking at whether tightly controlled, ultra-high doses of radiation can help people live longer are underway at The Alfred. The Alfred has enrolled multiple patients and is the only site in Australia currently giving patients access to these trials.

In the SABR-COMET 3 and SABR-COMET 10 trials, The Alfred's radiation oncology team is using the Stereotactic Ablative Body Radiotherapy (SABR) technique to target metastatic cancer. Hard-to-treat lesions that spread from the original cancer site to other organs such as the brain, lungs or liver can be difficult to remove with surgery without risking damage to healthy tissue, even when they are isolated. With SABR, patients with up to 10 lesions can now have these lesions effectively removed.

SABR is delivered on a modern linear accelerator with additional technology, meaning these types of tumours can be specifically targeted while avoiding major and potentially fatal side effects for patients. The trials will shed light on whether treating metastatic cancer in this way would improve quality of life and extend the lifespan of patients.

Both SABR-COMET 3 and SABR-COMET 10 are phase III trials run out of Canada. They will definitively build on the original SABR-COMET phase II trial that found SABR improved survival and maintained quality of life for patients with up to five metastatic lesions.

## Controlling cell maturation could improve leukaemia outcomes



A promising approach to the treatment of acute myeloid leukaemia (AML) has been discovered by researchers at the Australian Centre for Blood Diseases, part of Monash University's Central Clinical School.

AML is a type of cancer that affects immature progenitor cells living in bone marrow, which haven't yet differentiated into a specialised white blood cell type. In a study published in *Nature Communications*, the research team were able to show that AML cells in mice can mature into multiple myeloid lineages and, depending what type they become, will influence disease outcomes.

Neutrophils, which make up most of our white blood cells and lead the body's immune response, don't contribute to residual disease, whereas another type of white blood cells, eosinophils, live longer and are resistant to therapy. In the mouse model, the researchers were able to restrict therapy-induced leukaemia maturation to the neutrophil lineage, which not only reduced relapse rates but could result in cure.

Their results suggest that differentiation therapies that encourage the progenitor cells to become neutrophils rather than eosinophils, or targeted eradication of therapy-resistant mature AML cells, may improve health outcomes.

# Cardiovascular disease



## Reducing stress could help in management of atrial fibrillation



Researchers from the Baker Heart and Diabetes Institute and Alfred Health have found that stress reduction may prove effective in managing atrial fibrillation, the most common irregular heart rhythm.

While there is still much work to be done in defining the link between stress and cardiovascular disease, psychological stress is recognised as a contributing factor in initiating and heightening atrial fibrillation. In a review published in *JACC: Clinical Electrophysiology*, the researchers, led by Prof Peter Kistler, highlight potential mechanisms linking stress and atrial fibrillation, and the possible use of stress reduction, like yoga and meditation, in its management.

The researchers examined studies on the role of stress in this disorder, as well as modifying traditional atrial fibrillation risk factors such as diet, alcohol consumption and exercise. The review also focused on the bidirectional nature of the atrial fibrillation and stress relationship, looking at the role of acute and chronic stress in inducing atrial fibrillation and how stress physiologically changes the heart.

It is estimated more than 500,000 people in Australia suffer from atrial fibrillation, which can lead to blood clots in the heart. People with atrial fibrillation are at increased risk of stroke, heart failure and other heart-related complications, as well as anxiety, depression and suicidal ideation.

## \$6m donation to advance world-first stroke trials



Clinical trials of a pioneering approach to treating stroke have been accelerated thanks to a significant donation from The Beluga Foundation to La Trobe University.

The world-first research, led by La Trobe University in collaboration with the Hudson Institute of Medical Research and Monash Health, was first published in 2018 and found that injecting human amniotic cells can significantly reduce brain injury and aid recovery after stroke.

The Beluga Foundation has donated \$6 million towards advancing the next phase of human trials, following an initial donation of \$1 million in 2018 which enabled phase I safety trials to be conducted at Monash Health.

The donation will enable large-scale production of the amniotic cells, using technology developed by the Hudson Institute, at Q-Gen Cell Therapeutics, a manufacturing facility at the QIMR Berghofer Medical Research Institute in Brisbane. In phase II of the human trials, the team will administer these cells to 78 stroke patients across 10 sites in Australia.

This is a significant step forward in the treatment of stroke, which is among the top five leading causes of death in Australia and can also cause severe disability. More than 50,000 Australians have a stroke each year.

## Important insights on COVID-associated blood clots in people with inherited thrombotic conditions



New information is emerging on the occurrence of COVID-associated blood clots in people with inherited thrombotic conditions such as the common Factor V Leiden, which impacts about in one in every 20 or 25 people in Australia.

A paper published in *Circulation* by researchers from the Baker Heart and Diabetes Institute highlights that genetic thrombotic conditions, including the Factor V Leiden mutation, are indeed associated with a higher risk of COVID-19 venous thromboembolism, a blood clot that starts in the vein.

Researchers and haematologists at Alfred Health, Dr Hannah Stevens and A/Prof James McFadyen, believe the identification of novel risk factors, such as genetic thrombophilias, may help to classify patients with a higher risk of developing COVID-19 associated blood clots.

The researchers studied a large cohort from the UK Biobank of more than 13,712 individuals aged 45-69 years who tested positive to COVID-19 between January 2020 and May 2021. COVID-19 venous thromboembolism (VTE) was identified in 197 cases and there were 890 deaths from COVID-19, with COVID-19 VTE associated with higher COVID-19 deaths.

## Getting people back to work after a stroke



An MRFF grant of nearly \$1 million will help researchers from Monash University and La Trobe University investigate new ways of improving health outcomes and getting people back to work after a stroke.

Prof Natasha Lannin from Monash University and A/Prof Dana Wong from La Trobe University are collaborating on a new implementation trial evaluating models of vocational rehabilitation support post-stroke.

While the overall incidence of stroke has been dropping, rates in people of working age have been increasing. In 2020, it's estimated that more than 10,000 Australians of working age experienced their first stroke. Returning to work is a priority for these patients, but they are unable to do so without specialist rehabilitation, which is currently not available in Australia.

To address this, the researchers will conduct a study to test two evidence-based vocational rehabilitation models. The findings from the study will then underpin development of a detailed translation strategy that can be used to support changes in clinical practice.

The \$999,056 grant was part of the federal government's Cardiovascular Health Mission, a \$220 million research fund focused on improving heart health and reducing stroke in Australia.

# Cardiovascular disease



## Can an app reduce hospital readmissions for heart failure?



In collaboration with the Connected Health NHMRC Centre of Research Excellence in Digital Technology to Improve Chronic Disease Outcomes, researchers from La Trobe University are exploring how technology-enabled health care can be used for patients with heart disease.

The team, led by Prof Brian Oldenburg, the Alfred ARCH Director, has also received an MRFF grant with industry partner Cardihub to develop a new technology for heart failure patients and their practitioners to reduce rehospitalisation.

In a study published in *European Heart Journal – Digital Health*, the researchers from the Baker Heart and Diabetes Institute – including doctoral student George Zisis – have also investigated

whether an avatar-based app could improve outcomes by enhancing heart failure knowledge and improving patient quality of life and self-care behaviour.

The researchers ran a randomised controlled trial of 200 patients admitted to hospital for acute decompensated heart failure. While younger patients or those with a higher education level were more likely to use the app, several patients did not complete the program or engage with the app at all, highlighting the barriers to participation for critically ill and elderly patients.

However, artificial intelligence holds much promise as a means of delivering health care both in hospital and at home, not only for heart disease but for a range of chronic conditions.

## World-first study opens up treatment options for heart failure



Researchers from Alfred Health and the Baker Heart and Diabetes Institute have undertaken a world-first study to find out whether a treatment for heart arrhythmia can also benefit patients with heart failure.

Heart failure with preserved ejection fraction (HFpEF) is a form of heart failure where the heart contracts normally but doesn't relax fully in between contractions. Due to the abnormal heart relaxation, pressure increases in the lungs and patients feel breathless, especially on exertion.

HFpEF frequently co-exists with atrial fibrillation (AF), the most common heart rhythm disturbance, and this is associated with worse prognosis compared to either condition alone. Unfortunately, there are few therapies which have proven beneficial in HFpEF.

However, earlier studies have suggested that a minimally invasive procedure to treat AF, known as catheter ablation, can help improve symptoms and outcomes in those with HFpEF and AF.

In their randomised study, the Alfred and Baker researchers compared catheter ablation versus usual medical treatment in patients with HFpEF and AF. The study showed that patients who underwent AF ablation had reduced levels of pressure in the lungs and were able to exercise more, with significant improvements in their quality of life. Impressively, catheter ablation and restoration of normal heart rhythm also resulted in the reversal of HFpEF diagnosis in 50 per cent of patients.

The project is led by A/Prof Liang Han Ling, Prof David M Kaye, A/Prof Andre La Gerche, Prof Jonathan M Kalman and Prof Peter M Kistler.

# Diabetes and obesity



## \$4.8 million grant to help identify and prevent diabetes complications



The Baker Heart and Diabetes Institute is leading a pivotal \$4.8 million study to help the more than one million Australians with type 2 diabetes and up to 500,000 people who are estimated to have silent, undiagnosed diabetes.

Led by Prof Jonathan Shaw and Prof Dianna Magliano, the researchers secured the grant in June 2021 to fill a very important gap in our understanding of diabetes complications. These range from the more common complications like eye and kidney disease, to lesser-known ones such as heart failure, dementia and some cancers.

The PREDICT study, funded over five years through the NHMRC 2020 Clinical Trials and Cohort Studies scheme,

is looking at the progression of diabetes complications in more than 3000 people with type 2 diabetes over the next decade.

The study, which is already underway and will now be extended, aims to determine improved ways of identifying which people with diabetes will develop its devastating complications so they can access treatment and support sooner.

The largely Victorian-based study involves Northern Health and Western Health – which have high community rates of type 2 diabetes – along with Monash University, La Trobe University, Deakin University, the Centre for Eye Research Australia (CERA), UNSW and The University of Melbourne.

## Study could inform treatment and prevent heart attacks in people with diabetes



A study by researchers at the Baker Heart and Diabetes Institute and Monash University could help inform treatment and prevent serious events like a heart attack or death in diabetic patients at high risk of serious cardiovascular events.

The links between diabetes and cardiovascular disease are clear. This latest study shows, for the first time, the potential of the SGLT2 inhibitor, dapagliflozin, to stabilise vulnerable plaque in patients with diabetes to prevent plaque rupture and a heart attack.

This preclinical study is led by the Baker Institute's Dr Yung-Chih Chen and Prof Karlheinz Peter and Monash University's Prof Karin Jandeleit-Dahm. Published in the *Journal of the American Heart Association*, it provides further rationale for the use of dapagliflozin, the first of this novel class of glucose-lowering drugs to be made available in Australia.

Diabetes is known to accelerate atherosclerosis (the build-up of fats in the artery) and increase plaque instability, which can lead to plaque rupture and heart attack. As a result, accelerated coronary artery disease in diabetic patients has become the leading cause of premature mortality and increased morbidity worldwide.

While further clinical trials are needed to test the efficacy of this medication in stabilising plaque, the results provide a potential avenue for new therapies to treat diabetes-accelerated atherosclerosis.



Prof Karlheinz Peter and colleague in the lab. Image credit: Anna Carliile.



# Epidemiology and public health



## Online network expands access to sexual and reproductive health care



Monash researchers have launched the Australian Contraception and Abortion Primary Care Practitioner Support (AusCAPPS) Network, an online community of practice that helps primary care providers deliver long-acting reversible contraception and medical abortion services.

Long-acting reversible contraception, such as intrauterine devices and implants, is the most effective form of contraception. However, uptake by Australian women remains very low despite guidelines recommending increased use, and there has been little utilisation of practice nurses and pharmacists to support its uptake.

It has also proven challenging to expand the number of primary care practitioners

willing to provide medical abortion to end an early pregnancy up to nine weeks, which is a more accessible and less invasive option than surgical termination. Very few GPs provide these services and there remains great inequity in access to medical abortion, particularly for young women and those in rural and remote communities.

The AusCAPPS Network aims to address these issues by providing GPs, practice nurses and community pharmacists with the support they need to offer these services. It was developed in partnership with key stakeholders in women's health from government, professional, family planning and industry groups. Since launching in July 2021, the network has grown to more than 1000 members.

## Collaboration to address P. vivax malaria in Papua New Guinea



Burnet Institute is partnering with the PNG National Department of Health and PNG Institute of Medical Research on a new malaria program in Papua New Guinea.

Led by Prof Leanne Robinson, the program will determine the feasibility and cost-effectiveness of improved case management for *Plasmodium vivax* (*P. vivax*), the most prevalent form of recurring malaria and a risk to an estimated 2.5 billion people worldwide.

The work is part of the Partnership for Vivax Elimination (PAVE) with Menzies School of Health Research, Medicines for Malaria Venture and PATH to progress treatments for relapse prevention and support malaria-endemic countries in developing and implementing new strategies to eliminate *P. vivax* malaria.

*P. vivax* presents a major challenge to eliminate because it can survive in a person's liver even after successful blood-stage treatment, leading to relapses and contributing to transmission.

Tackling *P. vivax* by treating both the blood- and liver-stage of the infection – known as the radical cure – is essential to achieve World Health Organization 2030 targets to reduce the incidence of malaria globally by at least 90 per cent and eliminate malaria transmission in 35 countries.

Prof Leanne Robinson from Burnet Institute is leading a new malaria program in Papua New Guinea.



## Death rates among people with type 2 diabetes declining in several countries



People with type 2 diabetes are living longer, with a new study suggesting that health management strategies developed in recent decades may be working.

A global study of 16 high-income countries, led by Prof Dianna Magliano OAM and Prof Jonathan Shaw at the Baker Heart and Diabetes Institute, showed that death rates for people with type 2 diabetes are declining. The strongest declines were seen in Asia – Hong Kong, South Korea, Taiwan and Singapore.

The study, published in *The Lancet Diabetes and Endocrinology*, also showed that the life expectancy gap between people with diabetes and those without the disease is narrowing in about half

of the jurisdictions that were assessed, including Singapore, USA, Canada, Denmark and Hong Kong.

The study examined 21 million deaths in people with diagnosed diabetes in 16 high-income countries from 1995 to 2016. The findings followed a global study published in 2021, also led by Prof Magliano and Prof Shaw, which showed annual rates of new cases of adults diagnosed with type 2 diabetes are stable or falling in many high-income countries.

The researchers believe the results from both studies are reason for cautious optimism, but that further increases to life expectancy would require continued improvement in the prevention and management of diabetes.

## Hepatitis C project expands with new campaign and partnerships



EC Australia is a national collaborative partnership led by Burnet Institute with the goal of eliminating hepatitis C as a public health threat in Australia by 2030.

In 2022, EC Australia commenced the rollout of the 'It's Your Right' health promotion campaign in all states and territories to promote hepatitis C testing and treatment to people who inject drugs. They also partnered with Bulgarr Ngaru Medical Aboriginal Corporation and the Australasian Society for HIV, Viral Hepatitis and Sexual Health Medicine (ASHM) to increase access to hepatitis C testing and treatment in Aboriginal communities in Northern NSW.

Partnerships such as these are key to EC Australia's targeted, cohesive approach

to hepatitis C testing and treatment among people who inject drugs, people in prison, and Aboriginal and Torres Strait Islander people.

Alongside their partners, including Alfred Health and Monash University, the Burnet team is working to reduce the incidence and prevalence of hepatitis C through health promotion awareness and innovative delivery of workforce development activities and health services, as well as implementation research, evaluation and surveillance.

Priority areas for further advocacy include increasing support for peer workers and expanding hepatitis C elimination efforts in prisons with the National Prisons Hepatitis Network.

## A helping hand for Victorians over 50 living with HIV



Social connections and support for people over 50 living with HIV.



Your guide to living and ageing well with HIV.



Four decades after the first official report of HIV/AIDS, Burnet Institute is helping to address inequalities in access to essential services with a project that provides support and resources to people in Victoria living with HIV who are over the age of 50.

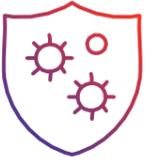
Well Beyond 50 brings together a wide range of resources providing social support, health information and personal stories from people living with HIV in an online hub that allows people to connect more readily.

The initiative is a partnership with Living Positive Victoria (LPV), Thorne Harbour Health and Alfred Health, with

collaboration from Bolton Clarke and Positive Women Victoria. With a growing recognition of the changing age profile among people living with HIV, there's a need to extend programs and services to people living with HIV who are over 50 and may not be as connected as some of their younger peers.

Well Beyond 50 caters for people who may have been living with HIV for many years, people who are newly diagnosed, and smaller populations such as women living with HIV. The long-term goal is to broaden the scope of Well Beyond 50 to provide information on research into HIV and ageing, social connectedness, mental health and other important issues.

# Infection and immunity



## Burnet Institute partnering with Moderna to develop novel mRNA vaccines



Prof Heidi Drummer is one of the lead investigators on a new vaccine partnership between Burnet Institute and Moderna.



Burnet Institute is partnering with world-leading mRNA vaccine manufacturer Moderna to develop novel mRNA vaccines for a range of emerging and neglected infectious diseases aimed at improving the health of communities globally.

The COVID-19 pandemic has underlined the important role of mRNA vaccines, and the need for innovative scientific thinking to tackle other high-burden infectious diseases, including malaria. The mosquito-borne disease is responsible for the death of half a million people – mostly children – each year.

Under the agreement, Moderna will provide expertise in designing mRNA vaccines for Burnet's validated novel candidates in malaria, SARS-CoV-2 and hepatitis C. Burnet's Vaccine Initiative (BVI) will provide vaccine antigens

to be modified and optimised by Moderna and returned to the Institute as mRNA candidates ready to test in preclinical models. Should the results prove promising, Moderna will consider extending the partnership to help progress these candidates through clinical trials.

The BVI encompasses the work of lead investigators Prof Heidi Drummer, Prof James Beeson, Dr Andy Poubourios and their teams. It builds on more than 20 years of research and development of a unique portfolio of carefully selected, evidence-based and rationally engineered antigens designed to generate broad immunity known to be protective in humans.



## Antiviral favipiravir shows no benefit for patients with COVID-19

AlfredHealth



New research from Alfred Health and Monash University had found no benefit from the antiviral medication favipiravir in managing early symptomatic COVID-19, despite its continued use in some countries.

The research, led by A/Prof James McMahon, found the use of favipiravir does not improve the time to virological cure or clinical outcomes, with no evidence of an antiviral effect when treating early symptomatic COVID-19 infection.

Antivirals are likely to have the highest benefit if administered early in the course of COVID-19. However, the study found that favipiravir showed no benefit over placebo in clearing the virus, disease progression or symptom resolution.

Favipiravir has been authorised as a treatment for COVID-19 in countries such as Japan, Russia, Serbia, Turkey, India and Thailand under emergency provisions and is still available in many of these countries in generic formulations.

The COVID-19 pandemic has seen the widespread use of many therapeutics where no benefit has been proven or before clinical trials have demonstrated improved clinical outcomes. This trial demonstrates the importance of performing controlled studies to inform clinicians and COVID-19 programs about the true effectiveness of potential treatments.

## Gut microbiota could reveal how patients will respond to cancer treatment



A collaborative study published in *Nature Medicine* has revealed specific gut microbiota signatures that may indicate whether the body is going to have a negative response to cancer immunotherapy treatments.

Researchers from Monash University studied a group of patients who were being treated for advanced melanoma with immune checkpoint blockade (ICB) – the main immunotherapy drugs currently used to treat cancer – to identify biomarkers of response and toxicity.

They found that higher levels of the bacterium *Bacteroides intestinalis* in the gut were associated with a greater likelihood of developing moderate to severe treatment-related side effects. Gut toxicity, typically presenting as inflammatory diarrhoea, was associated with high levels of an inflammatory protein in the gut wall.

To determine whether this side effect could be overcome, the researchers used mouse models to study the effects of the arthritis drug anakinra, which works by blocking the action of this particular protein. Encouragingly, mice receiving anakinra developed less gut inflammation following immunotherapy, without compromising the effectiveness of the treatment.

The study also found that other bacteria, including *Parabacteroides distasonis*, were associated with better responses to treatment. Furthermore, subtle differences identified in immune cell populations in the blood could be useful as markers of toxicity, and point towards new ways of manipulating the immune system to reduce the risk of side effects.

# Mental health and neuroscience



## New drug shows promise for Alzheimer's disease and dementia



A Monash University-led study has found a promising new treatment for patients with behavioural variant frontotemporal dementia (bvFTD), resulting in a stabilising of escalating behavioural issues and a reversal of brain shrinkage due to the disease.

The clinical trial, led by Dr Lucy Vivash, is the second one to show that the drug sodium selenate may help to slow cognitive decline and neurodegenerative damage that is the hallmark of Alzheimer's disease and dementia.

bvFTD is the second-most common form of dementia in people under 60 and can occur in people as young as 35. It is characterised by behavioural disturbances and personality changes, and can be highly disruptive and

distressing for both patients and their families. There are no treatments or cures for bvFTD and typical survival is five to seven years from diagnosis.

The Monash phase I trial, the only one in Australia targeting this type of bvFTD and one of a handful worldwide, showed that sodium selenate is safe and well-tolerated in patients with bvFTD over a period of 12 months. The majority of patients receiving sodium selenate showed no worsening of their cognitive or behavioural symptoms, and reduced rates of brain atrophy over the trial period.

The research group is now conducting a larger study at hospitals across Australia and New Zealand to further test whether this drug is beneficial for patients with bvFTD.

## Breakthrough finding connects irregular heartbeats and epilepsy



A trial led by researchers at Alfred Health and Monash University, in collaboration with the Royal Melbourne Hospital, has found that people with chronic drug-resistant epilepsy have a high incidence of irregular heartbeats that can lead to cardiac arrest, providing a new pathway for preventive treatment.

The breakthrough finding suggests there is a link between irregular cardiac arrhythmia and the incidence of premature mortality including Sudden Unexpected Death in Epilepsy (SUDEP), previously thought to be irrelevant.

Led by Dr Shobi Sivathamboo from the Monash Central Clinical School's Department of Neuroscience and Alfred Health's Department of Neurology, the researchers used implantable

cardiac monitors with 31 patients over a 12-month period to assess the link between epilepsy and the heart.

The researchers detected a high incidence of a repeating pattern of cardiac arrhythmia called ventricular tachycardia, which can lead to ventricular fibrillation – a life-threatening arrhythmia – and cardiac arrest. As a result of the trial, three participants received potentially life-saving treatment.

Patients with epilepsy are at an increased risk of premature death from cardiovascular disease (CVD) but the link between epilepsy and CVD is not clear. This novel finding may be a contributing factor associated with the incidence of premature mortality including SUDEP.

## From the frontline: Healthcare workers share their COVID-19 experiences



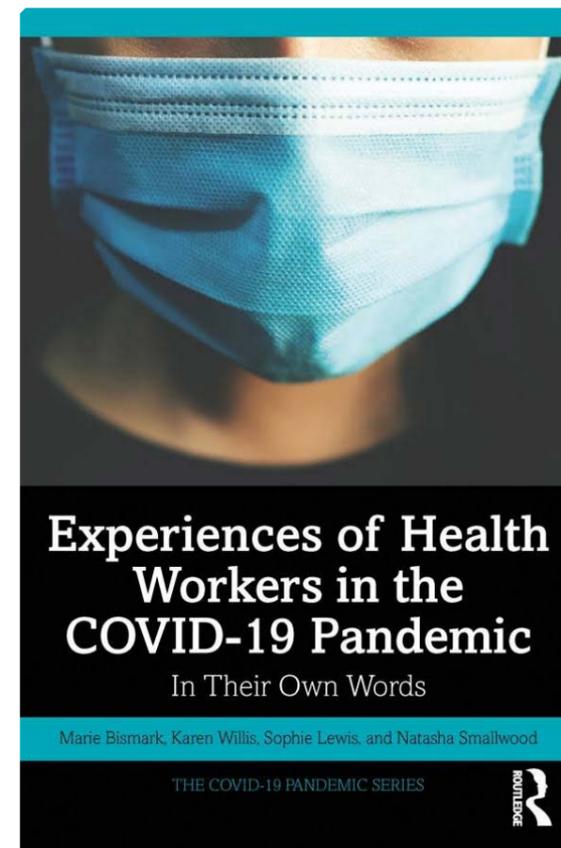
A Monash University survey of healthcare workers during the COVID-19 pandemic has become the largest of its kind globally and inspired the publication of a book.

The COVID-19 pandemic took a significant psychological and physical toll on frontline healthcare workers, especially in its early stages before vaccines and reliable treatments were readily available. Across Australia and the world, frontline workers experienced high rates of burnout, depression and even thoughts of suicide and self-harm. They were confronted by large numbers of dying patients who were unable to see their loved ones, and workplace challenges such as staff illness and PPE shortages.

A/Prof Natasha Smallwood from Monash's Central Clinical School decided to collate the experiences of Australia's healthcare workers in a survey, which also provided them with the opportunity to tell their stories in their own words.

The initial survey of nearly 10,000 frontline workers was conducted between August and October 2020, during the second wave of the pandemic in Australia. Participants ranged from aged care nurses to hospital cleaners and intensive care specialists.

The survey went on to become the world's largest multi-professional study of its kind, with the first-person experiences documented in a book, *Experiences of Health Workers in the COVID-19 Pandemic*, co-authored by A/Prof Smallwood with Prof Marie Bismark, Prof Karen Willis and Dr Sophie Lewis.



+ Australian healthcare workers share their stories of life on the frontline during a global pandemic.



+ Dr Shobi Sivathamboo from Monash University is exploring the links between epilepsy and irregular heartbeats.

# Nursing and allied health



## Co-designing a cardiorespiratory exercise program for stroke survivors



Researchers from Deakin University are aiming to enhance rehabilitation options for stroke survivors with a new exercise program.

The Australian stroke management guidelines recommend aerobic exercise for stroke rehabilitation as it improves walking and reduces disability after stroke. However, aerobic exercise is not always part of standard stroke rehabilitation practice and stroke survivors who are unable to walk independently are often excluded from exercise programs.

The Deakin University project, led by Dr Sharon Kramer in collaboration with researchers from Alfred Health and Monash University, explores the perceptions of stroke survivors who are unable to walk and stroke clinicians about the importance of aerobic exercise during rehabilitation.

So far, the researchers have interviewed 15 clinicians and 12 stroke survivors. This qualitative data will inform the development of an aerobic exercise training program, co-designed by a working group comprising clinicians, stroke survivors and researchers, which will be tested in a pilot study in an in-patient stroke rehabilitation setting.

## Major grant to support new model of care for isolated patients



The number of hospitalised patients in isolation has significantly increased during the COVID-19 pandemic.

Researchers from Deakin University and Alfred Health, led by Prof Tracey Bucknall, have received funding to support a program of research including the Victorian Nurses and Midwives Trust Major Grant valued at \$100,000 to conduct a co-designed project with patients, families, nurses and infection control experts to identify the specific interventions required to improve care of these patients in isolation.

The latest phase of this program builds on an initial systematic review that highlighted a lack of high-quality evidence for effective interventions to mitigate or prevent adverse effects associated with isolation.

Following the review, researchers conducted focus groups with 58 nursing, medical, allied health and non-clinical support services staff working with patients in isolation and interviews with 20 family members. They reported that isolating patients and restricting visitors resulted in good pandemic management, but perceived it came at considerable cost to staff and consumers, affecting communication, standards of patient care and the mental health of patients, families and staff.

The research team is now interviewing patients in isolation about their experiences, as well as assessing their cognition, physical activity, loneliness, nutrition and quality of life. From here, patients, family members and clinicians will develop a new model of care which will be piloted in a clinical study.

## The role of communication and decision-making in sentinel events



Communication and decision-making processes were the focus of a recent Deakin University study, which examined the role they played in sentinel events in acute hospitals.

According to Safer Care Victoria, sentinel events are broadly defined as wholly preventable adverse patient safety events that result in serious harm or death to individuals. The Deakin study, led by Dr Robin Digby, provides new understanding of the factors which contribute to missed or incorrect diagnosis of life-threatening health issues.

Dr Digby and her team reviewed evidence of events in coronial inquest transcripts of patients who died in acute hospitals after unexpected deterioration.

They discovered that communication problems commonly contributed to diagnostic error, and that cognitive biases such as confirmation bias and anchoring can affect clinician decision-making.

The researchers found that increasing the involvement of patients and families in diagnosis and management would improve clinician understanding and accuracy. Junior staff must also be adequately prepared, supported and supervised in decision-making.

Recommendations from this research will be disseminated to hospital clinical governance committees, Safer Care Victoria and the Australian Commission on Safety and Quality in Health Care (ACSQHC).

## How student appraisals are used in nurse education programs



A qualitative study led by Rachel Cross in the School of Nursing and Midwifery at La Trobe University has sought to understand more about the role of the clinical placement appraisal process in nurse education.

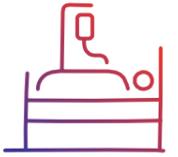
Across the world, undergraduate nursing students complete clinical appraisals as part of the practical component of their university programs. However, little is known about the impact of such appraisals upon student learning.

In this study, evidence was obtained from key industry stakeholders including nursing students, clinical hospital nurse educators and university staff.

Three external factors were found to influence the appraisal assessment and student learning in clinical placements: the model of support offered, the assessment tool and role expectations.

The researchers found that clinical placements are integral to a student's learning as they progress from undergraduate education into professional registration, but there are ways to promote better student outcomes. Orientation programs for both students and clinical assessors would help to facilitate positive learning experiences, along with formal training for assessors in assessment and feedback.

# Trauma, critical care and perioperative medicine



## Trends and risk factors affecting the use of blood thinners in ICUs



Venous thromboembolism (VTE), also known as blood clots in the veins, is the most common preventable cause of hospital death, and is a top priority for patient safety.

Despite guidelines recommending that VTE can be safely and effectively reduced by anticoagulants (blood thinners), they are significantly underutilised in critically ill patients. Researchers from Deakin University, Alfred Health, Monash University and the Baker Heart and Diabetes Institute examined trends and risk factors for omission of anticoagulants within the first 24 hours after admission in intensive care units (ICUs).

The research team, led by Dr Berhe Sahle from Deakin University, analysed data from more than 1.4 million ICU admissions between 2009 and 2020 from the Australian New Zealand Intensive Care Society Adult Patient Database.

They found that omission of anticoagulants within the first 24 hours after admission in ICU has declined by 70.8 per cent between 2009 and 2020. They also identified potential targets for further reducing omission of VTE prophylaxis, including a documented process for monitoring VTE prophylaxis and having a medical lead for coordinating quality of ICU care.

## Landmark COVID-19 trial named 'Trial of the Year'



An international COVID-19 trial led by Monash University's School of Public Health and Preventive Medicine has won the prestigious Australian Clinical Trials Alliance 'Trial of the Year' Award.

The Randomised, Embedded, Multi-factorial, Adaptive Platform Trial for Community-Acquired Pneumonia (REMAP-CAP) study was developed in 2015 as part of the chief investigators' pandemic preparedness planning.

Initial funding permitted the design and preparation of a trial that would launch once a major respiratory pandemic event began. After the onset of COVID-19 in early 2020, the REMAP-CAP trial was quickly rolled out around the world.

The trial has used a complex, innovative study design that enables the rapid comparison of multiple drug treatments simultaneously. It has investigated numerous drug therapies for critically ill COVID patients and had a significant impact on treatment globally. Investigations have included world-first studies of the effectiveness of IL-6 inhibitors tocilizumab and sarilumab, and blood thinning agents in non-critically ill hospital patients. The trial has also identified the effectiveness of corticosteroids, as well as the ineffectiveness of hyped treatments including convalescent plasma.

The impact of the trial has been far-reaching, with its findings incorporated into the national and global (WHO) guidelines and published in prestigious medical journals. The UK's Chief Medical Officers identified REMAP-CAP as one of three key COVID-19 trials that determined their national response.

Researchers from the Monash-led REMAP-CAP study accept the ACTA 'Trial of the Year' award.



## The hunt for alternative pain relief in the management of heart attacks



An Alfred researcher is investigating alternative pain relief options for people experiencing ischaemic heart pain, after it was discovered that the traditionally used opioids may be interfering with other important drugs.

Opioids have been used for more than 50 years as pain relief for patients experiencing this type of heart pain, which is caused by a blockage of blood supply to the heart and, in its most severe form, can lead to heart attacks and heart failure.

However, recent research has revealed that these opioids are in fact likely to interact with another class of drugs, oral P2Y12 inhibitors, which are a cornerstone of treatment for heart attacks because of their ability to break down life-threatening blood clots. In slowing down the stomach's natural forward movement, the opioids could be impairing gastric absorption of the inhibitors and in turn delaying their anti-clotting actions.

PhD candidate and Alfred Health cardiologist Dr Himawan Fernando, supervised by A/Prof Dion Stub from Monash School of Public Health and Preventive Medicine/Alfred Health and Prof Karlheinz Peter from Baker Heart and Diabetes Institute, is now investigating alternative options that avoid this interaction while still offering effective pain relief.



Dr Himawan Fernando from Alfred Health is looking for new pain relief options that manage heart pain and avoid interactions with other drugs.



## The importance of clinical pharmacists in reducing hospital medication errors



Errors in hospital medication charts are commonly encountered across specialities and in different stages of the patients' journey, and have been associated with morbidity and mortality. Researchers from Alfred Health sought to evaluate whether including clinical pharmacists in Emergency Department (ED) resuscitation teams and the use of a partnered pharmacist medication charting (PPMC) model led to better delivery of care and a reduction in these errors.

In their study, the research team tested the intervention in a number of different settings. Firstly, they investigated medication management plans for people discharged after an inpatient stay in a general medical unit. Following this, they compared patients before and after the intervention in seven public hospitals in Victoria, as well as in rural and regional health services.

In the ED, clinical pharmacist involvement was evaluated in a before-after study on patients presenting to a major metropolitan hospital after stroke and sepsis. This was followed by a randomised controlled trial of pharmacist involvement in trauma response teams.

The researchers found that pharmacists were able to significantly reduce the rate of medication errors and improve performance at several key points in the patients' journey, including on admission from the ED, in discharge summaries, and by participating in resuscitation of patients with stroke, sepsis and trauma in the ED.

# Platform technologies

Our important platform technologies offer researchers the opportunity to undertake critical biomedical and clinical research in the pursuit of new health interventions.

Often, platform technologies are housed in dedicated facilities and require skilled staff to operate and maintain them. The resource-intensive nature of establishing platform infrastructure paves the way for supporting a collaborative and open access ethos in the research community, and the Alfred Research Alliance is no exception.

At the Alliance, there are many platforms that offer access to world-leading facilities and services to advance innovation. A brief outline of the platform technologies is below.

**ARAFLOWCore** facility is Monash's state-of-the-art cell sorting and analysis laboratory. It has PC2 capability for animal and human cell sorting, as well as a dedicated PC3 environment for infectious sample sorting.

**Monash Histology Platform at Alfred Precinct** is a node of the Monash Histology Platform offering a professional histology service, as well as equipment access for do-it-yourself histology.

**Monash Micro Imaging at the Alfred Precinct** manages core imaging resources including confocal, conventional fluorescence and deconvolution microscopy on site. Super resolution technologies are also available.

**Genomics Capability** through Monash University and Alfred Health offers state-of-the-art sequencing capability with a wide range of sequencing applications and instrumentation, including a NovaSeq 6000.

**Metabolomics Platform** at the Baker Heart and Diabetes Institute uses liquid chromatography-tandem mass spectrometry techniques to obtain metabolic profiles (primarily lipids and fats) from cell and animal models and clinically relevant human samples.

**Monash's ARA Preclinical Imaging Facility** is a purpose-built preclinical imaging facility in collaboration with the Baker Institute, housing a 9.4T MRI scanner with cryocool technology, a NanoPET-CT system and a world-first magnetic particle imaging (MPI) scanner.

**Clinical Research Domain** at the Baker Institute offers a range of imaging and diagnostic tools including MRI, transthoracic and stress echocardiography, and body composition (DEXA) scanning. Other research and investigational services are also available.

**Antiviral Testing Facility** at Burnet Institute has the capacity to evaluate chemical agents for inhibitory activity against HIV and herpes simplex (HSV) type 1 and 2 viruses in cell culture, enabling development of better treatments or prophylactics.

**Preclinical Cardiology Microsurgery and Imaging Platform (PCMIP)** at the Baker Institute provides advice, design support and technical services to preclinical cardiology researchers through their purpose-built facilities, highly reproducible techniques and expertise.

**Burnet Diagnostics Initiative** was established in February 2021 to translate existing and new technologies to practical health solutions and products. Bringing research and diagnostics capability together provides a unique opportunity to help solve challenging health problems.

**Preclinical Metabolic Phenotyping/Bioenergetics Facility** at the Baker Institute enables high-quality metabolic and physiologic phenotyping to study models of obesity, diabetes, cardiovascular disease and other metabolic diseases.

**Optima** suite of tools at Burnet Institute helps decision-makers choose the best public health investments through mathematical models of disease transmission and progression integrated with an economic analysis framework and mathematical optimisation and mathematical optimisation.

**The Monash Outcomes Research and health Economics (MORE)** develops epidemiological and economic models to evaluate impacts of ill health and benefits of interventions, translating measures of efficacy into measures of effectiveness and cost effectiveness.

To find out more about any of the above platform technologies and who to contact, go to [alfredresearchalliance.org.au/resources/platform-technologies](https://alfredresearchalliance.org.au/resources/platform-technologies).

# Bioinformatics and biostatistics

Bioinformatics and biostatistics use computer technology to collect and analyse different types of biological datasets, from genetic codes to large population datasets. Both Monash University and the Baker Heart and Diabetes Institute provide important bioinformatics and biostatistical support for researchers at the Alfred Research Alliance.



For more on the Alliance's bioinformatics capabilities, visit [alfredresearchalliance.org.au/resources/bioinformatics-and-biostatistics/](https://alfredresearchalliance.org.au/resources/bioinformatics-and-biostatistics/)

**Monash Bioinformatics Platform at the Alfred Research Alliance** networks bioinformaticians working at Monash University and its affiliates. Offering bioinformatics tools and computing resources for data analysis, visualisation and exploration, the platform supports a diverse range of research projects.

**Bioinformatics Program at the Baker Institute** builds its capacity through internal and external collaboration, support and training. The program offers data analysis and cross-omic integration for a range of different technologies including genomics, epigenomics and more, using a diverse set of analytical techniques.

**Biostatistics Consulting Platform (BCP)** at the Monash School of Public Health and Preventive Medicine provides high-quality biostatistical support to Alfred precinct-based researchers from Monash and Alfred Health. BCP biostatisticians help with experimental design, statistical analysis, and advice on methods and software.

# Clinical registries and biobanks

The Alfred Research Alliance is home to the largest concentration of clinical registries in Australia. The precinct also houses biospecimens, samples and other datasets that provide important resources for researchers.



For more information on the Alliance's clinical registries and biobanks, head to [alfredresearchalliance.org.au/resources/clinical-registries/](https://alfredresearchalliance.org.au/resources/clinical-registries/).

**Monash clinical registries** at the School of Public Health and Preventive Medicine maintains 40+ clinical registries (databases that systematically collect health information on people who have been treated or diagnosed with a certain illness) to benchmark outcomes, report on quality of care and monitor safety of new drugs, devices and surgical procedures.

**AusDiab** is coordinated by the Baker Heart and Diabetes Institute and is the largest Australian longitudinal population-based study designed to examine the natural history of diabetes, heart disease and kidney disease in Australians over 25 years of age.

**The ASPREE Healthy Ageing Biobank** at Monash University houses biospecimens from Australian participants of the NIH/NHMRC-funded ASPirin in Reducing Events in the Elderly clinical trial. Together with clinical data from the participants, they are a unique resource for genetic and biomarker discoveries in older Australians.

**Victorian HIV Blood and Tissue Storage Bank** and clinical database is a state-wide Victorian HIV Service at The Alfred and Burnet Institute, storing serum samples from HIV viral load tests for patients managed at The Alfred. The biobank currently holds nearly 70,000 samples linked with clinical information from almost 5000 HIV patients.

# Ethics at the Alliance

The Alfred Research Alliance members are committed to maintaining the highest standards of ethics and compliance in all research endeavours.

We work closely together to ensure that current standards are applied consistently across the precinct and that the relevant legislation, regulations, guidelines and codes of practice for all ethical research conduct are actively met at every level.

Shared resources also help our member organisations to navigate ethics approval processes in an efficient and streamlined manner, which enables us to get research underway sooner.

## Human research ethics

The Alfred Hospital Ethics Committee is a NHMRC-registered and certified Human Research Ethics Committee, which undertakes ethical review of human research for all Alliance members 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.

## Animal ethics

The Alfred Research Alliance Animal Ethics Committees (AECs) undertake the ethical review of proposals for the use and breeding of animals for scientific purposes for Alliance-based organisations.

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 Alfred Research Alliance Office, which also coordinates post-approval monitoring of research projects and annual reporting to state government on behalf of Alliance members licensed for the use of animals for scientific purposes.

## Dealings with genetically modified organisms

The Monash University Biosafety Committee, via the Monash Research Office, administers compliance with regulations covering genetically modified organisms for Alfred Health, Baker Heart and Diabetes Institute and Burnet Institute, as well as Monash University.



Visit [alfredresearchalliance.org.au/research/research-ethics-and-compliance](https://alfredresearchalliance.org.au/research/research-ethics-and-compliance) to find out more about ethics across the precinct.

## Alfred Research Alliance

[alfredresearchalliance.org.au](https://alfredresearchalliance.org.au)

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