



**ST VINCENT'S
HOSPITAL**
MELBOURNE

A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

Research Report 2022



Research at a glance

July 2021-June 2022

St Vincent's Hospital Melbourne continued to make a significant contribution to the growth of medical research locally and globally. During the past year our clinician researchers have played a key role in pioneering innovative solutions to help improve the quality of life for patients.



Number of
PhD students
195



Other
Higher Degree
research
114



Published
1415
Journal
articles

26
Book
chapters

2
Books



\$41,007,944.66
Active research income

\$87,850,572
Research Income
received*

*Providers include National Health and Medical Research Council, Australian Research Council, St Vincent's Hospital Melbourne; St Vincent's Research Endowment Fund, universities, and other sources.

Message from the Chief Executive

I am delighted to present the 2022 St Vincent's Hospital Melbourne Research Report, and to celebrate the world-leading research undertaken by our talented teams.

As a leading tertiary academic health service, our research underpins the evidence-based clinical services we provide to all those who need our care.

St Vincent's plays a significant role in contributing to Victoria's capability as a global leader in medical research. Our deep partnerships across academia, healthcare and industry are the foundation on which our success is built.

Here at St Vincent's, our Fitzroy precinct is a growing hub for medical innovation, with the construction of

the new Aikenhead Centre for Medical Discovery (ACMD) well underway.

ACMD is Australia's first collaborative, hospital-based biomedical engineering research facility. With engineers, scientists and clinicians from leading universities, institutes and a tertiary hospital, ACMD helps fast-track clinical-driven medical research so it can benefit patients sooner.

Our collective ambition is for St Vincent's Hospital Melbourne to lead the way in connecting science, health and engineering, to tackle our most complex health challenges.

I want to congratulate our clinician researchers for their continued dedication over the past year, despite all the challenges that



the pandemic has presented.

I hope you enjoy exploring the inspiring showcase of work in this Research Report. Importantly, it is this ambition and the tenacity of our clinicians and researchers that is key to delivering on our Mission to provide excellent and compassionate care to those most in need.

Nicole Tweddle

Message from the Director of Research

Our clinicians and researchers across St Vincent's Hospital Melbourne (SVHM) have continued their impressive research activities throughout the past 12 months, garnering grants and awards and publishing almost 1100 research papers.

Similarly, our community and

patients have contributed to this research activity by participating in a broad range of clinical studies that cover all the clinical specialties and disease areas managed at St Vincent's.

Our clinical trial activity includes studies of new drugs, devices, diagnostic tests and digital health solutions plus novel combination technologies with specialised drug delivery systems, local radiation delivery and immunotherapies.

In 2022, over 1400 studies are currently active across St Vincent's, with around 660 interventional clinical trials. All studies are reviewed and approved by our expert Human Research Ethics Committee and Research Governance Unit before commencing and have ongoing monitoring and reporting throughout their duration.

The commitment of the St Vincent's staff, collaborators and research participants is essential to maintaining our ability to provide the community with the best available care using evidence-based practice to support individual personalised healthcare.

At St Vincent's, we include health and medical research as part of our routine care: our haematology team has over 100 clinical trials active, and over 60% of all their patients are enrolled in a clinical trial.

I would like to congratulate all who have contributed to making our research so dynamic and successful, and I acknowledge their dedication and determination to achieve these wonderful results. I am so proud to be part of this extended team.

Dr Megan Robertson



3D-printed skin

A globally innovative project is exploring the development of a 3D-printed model capable of creating an artificial material that can potentially repair lost or damaged skin in the treatment of cancer, trauma and burns patients.

Led by St Vincent's Hospital Melbourne and RMIT University, in

“ We hope this means it will not only look like skin but feel natural as well and function in the same way”

– Chris Baker

partnership with the University of Melbourne, this research aims to recreate the core three layers of human skin and integrate them into an implantable synthetic skin tissue using autologous cells from a patient.

Part of the process currently being investigated involves manufacturing bio-inks that can be used by a 3D bio-printer to produce an artificial material with similar properties to human skin including collagen and elastin.

“ We hope this means it will not only look like skin but feel natural as well and function in the same way,” says Associate Professor Chris Baker (left), Director of Dermatology at St Vincent's who is jointly leading the project with Robert Kapsa (below), Professor of Biofabrication and Tissue Engineering at RMIT University.

The collaborative project is being developed through the Aikenhead Centre for Medical Discovery (ACMD).





Advancing breast cancer screening

A research study exploring the use of artificial intelligence (AI) to analyse mammograms has earned the Clinical Director of St Vincent's BreastScreen the top accolade as Innovator of the Year at the 2022 Women in AI Awards Australia and New Zealand.

Adjunct Associate Professor Helen Frazer (above) claimed the prestigious award, along with winning the Health Category, for research she is leading that aims to improve the accuracy of breast cancer screening.

The new AI-based models being investigated hope to better detect cancer, lower unnecessary recalls to assessment and improve timeliness, efficiency and participation in the breast-screening program.

In particular, the research will look at using AI models to predict the risk of breast cancer, reduce the chance of interval cancers and recalls for women subsequently determined not to have cancer and enable personalisation of the screening program.

Earlier this year, the project moved from working in cancer-enriched data to testing AI algorithms in retrospective studies, and soon in prospective studies, in real-world breast-screening populations.

"This is a really important requirement for testing artificial intelligence solutions for wider use and implementation in a healthcare setting," explains Dr Frazer.

The project, known as BRAIx, is being jointly developed by St Vincent's Hospital Melbourne, St Vincent's Institute of Medical Research, BreastScreen Victoria, University of Melbourne and the Australian Institute of Machine Learning at the University of Adelaide, in partnership with the Aikenhead Centre for Medical Discovery (ACMD).

ACMD Research Week

ACMD Research Week is an annual event that celebrates research activity across St Vincent's Hospital Melbourne and the partners of the Aikenhead Centre for Medical Discovery (ACMD).

This year's theme was Precision Medicine and how it benefits different areas of healthcare.

Dr Melissa Moore (below), an oncologist at St Vincent's who specialises in lung cancer, says tumour gene testing – a form of precision medicine – is helping to open up new and more personalised

options for patients. Along with Dr Moore, other keynote speakers for the Precision Medicine session were Professor Magdalena Plebanski from RMIT University, Erwin Estigarribia from Intervenn Biosciences, and Professor Michael Kamm from St Vincent's Gastroenterology.

Tailoring cancer care

Today, precision medicine is being used to pinpoint cancerous biomarkers (biological molecules such as proteins or genes that are produced by or dysregulated in the

tumour). These biomarkers can help to predict the body's response to a specific treatment.

Precision medicine research is a key focus at St Vincent's, which is currently one of the sites involved in the ASPIRATION trial. Led by the Thoracic Oncology Group Australasia (TOGA), this trial is investigating the clinical impact of comprehensive tumour gene profiling in metastatic lung cancer patients.

"Through the ASPIRATION trial, participants will have their tumour tested for about 500 different gene mutations, which means we have an even greater chance of being able to pick up things that are very rare and may then potentially be able to match that patient to another clinical trial that can look for improved treatment," Dr Moore says.



In session

There were many events held during ACMD Research Week that addressed areas of current focus including presentations on COVID-19, Allied Health's take on Personalised Nutrition in Healthcare, Research and Healthcare Policy and Barriers to Translational Science.

Chaired by ABC Radio National host, Dr Norman Swan, the public discussion on the Impact of Climate Change on Healthcare was very well-received. This virtual discussion was also joined by an esteemed panel of medical experts – Dr Tim Read, Associate Professor Forbes McGain, Professor Nancy Baxter, Dr Monique Ryan and Dr John Van Der Kallen.

End-of-life intervention

A National Health and Medical Research Council (NHMRC) grant has been awarded to Professor Peter Hudson (below), Director of St Vincent's Hospital Melbourne's Centre for Palliative Care, to undertake research to improve end-of-life care.

The grant has enabled the Centre for Palliative Care, in collaboration with The University of Melbourne, to adapt and extend existing overseas research for an Australian context.

The project, FOCUSau, aims to assist patients with advanced cancer and their primary carers improve their emotional wellbeing and quality of life through an innovative digital intervention program.

"Traditionally, interventions and strategies that aim to improve quality of life have focused on the patient or their carer separately. This project is novel as it targets the patient and their primary support person together," says Prof Hudson.

Prof Hudson has also been involved in co-coordinating a European Union-funded trial incorporating six countries that is looking to adapt the US interventions for a local context. The European trial is currently in its second year.

Tony Burgess Medal awarded for liver cancer study

Ground-breaking research aimed at improving the screening and diagnosis of liver cancer earned St Vincent's Hospital Melbourne gastroenterologist, Associate Professor Jessica Howell (right), the inaugural Tony Burgess Medal from the VCCC Alliance.

The research led by A/Prof Howell has advanced the diagnostic screening tools in liver cancer, which in turn has impacted liver cancer prevention, diagnosis, treatment and care.

A/Prof Howell heads up a multidisciplinary research program that has contributed to the invention of two world-first, rapid point-of-care tests for liver inflammation and cirrhosis.

Collaborating with St Vincent's Pathology, her team has developed Australia's first scalable, low-cost population-level liver screening program via routine blood tests that also links to care for cirrhosis.

"Liver cancer has a very low survival rate and disproportionately affects marginalised people. As a hepatologist, I see the impact of liver cancer on the lives of my patients and their families every week. This drives me to search for new ways to improve equitable outcomes for people with liver cancer," says A/Prof Howell.

Through this project, A/Prof Howell's work has resulted in two patents, a clinical trial in Ethiopia, a National Health and Medical



"Liver cancer has a very low survival rate and disproportionately affects marginalised people"

– Jessica Howell

Research Council Ideas grant, as well as Federal Minister commendation in 2020, and a Victorian Medical Research Acceleration Fund grant in 2021. It has also influenced national and international guidelines and Australian policies.



Artificial pancreas hope

More than 270,000 Australians currently live with diabetes and kidney disease. Some of them will progress to advanced stages and require dialysis.

Professor David O'Neal (right), Senior Endocrinologist at St Vincent's Hospital Melbourne, is leading research that hopes to show an artificial pancreas can significantly improve health outcomes in people living with Type 1 diabetes and advanced kidney disease.

Managing glucose levels in people with advanced kidney disease can be challenging. When a person's kidney function is impaired it makes it harder to control glucose levels.

"Even the different types of dialysis can have different impacts on blood glucose levels," Prof O'Neal says.

A Closed Loop system, often referred to as an artificial pancreas,

continuously monitors a person's glucose levels and then provides rapid-acting insulin to keep those levels within the target range.



"We think this could be the flexible and responsive insulin delivery system that makes it easier for a person to manage their glucose levels and improve their quality of life," says Prof O'Neal.

The project is one of the first underway through the Australian Centre for Accelerating Diabetes Innovations, which has affiliated centres located at three major Victorian hospitals including one based at St Vincent's Fitzroy campus.

In May this year, Prof O'Neal was presented the Diabetes Australia Millennium Award – Type 1 Diabetes. The prestigious national award included \$150,000 funding towards the project.

Research Endowment Fund

As a strong advocate of medical research, St Vincent's Hospital Melbourne established the Research Endowment Fund program (REF) in the early 2000s to raise the profile of research by supporting projects that have a clinical application, or potential clinical significance and, in particular, research collaborations.

Under this competitive funding program, St Vincent's provides up to \$770,000 for over 40 research projects led by our researchers each year.

The REF program also provides funding preference to early-career researchers, and the seeding of projects with the potential to form larger external grant applications.

2022 TJ Martin Award

Research investigating the impact of incorporating multidisciplinary clinicians in treatment for functional gastrointestinal disorders has earned Dr Chamara Basnayake (right) the TJ Martin Medal for 2022.

Now in its 17th year, the medal is presented to the author of the best PhD study by a St Vincent's Hospital Melbourne researcher over the past 12 months, as chosen by a panel of independent judges.

Titled Multidisciplinary care of

functional gastrointestinal disorders, the doctoral study found that patients with functional gastrointestinal disorders who saw a team of clinicians would fare better than those who only saw a gastroenterologist – the typical treatment pathway, until now.

As a result of the research, St Vincent's has established a permanent clinic in the hospital. Patients referred to the clinic initially see a gastroenterologist, who can engage relevant allied health disciplines based on need.

The research also gained worldwide recognition after being presented the Ray Clouse Award for the world's best publication in functional gut disorders.





Cancer crusader

Nadia Ranieri (above) leads the Oncology Clinical Trials Program at St Vincent's Hospital Melbourne.

Her outstanding work in this area saw Nadia awarded the 2022 Breast Cancer Trials Study Coordinator.

Breast Cancer Trials is a world-leading breast cancer research organisation focused on finding new and improved treatments and prevention strategies for people affected by this disease.

Nadia has worked at St Vincent's for more than 25 years and has dedicated her career to clinical trials to help forge change in practices and improve lifestyles for people living with cancer.

Currently there are 65 oncology trials underway at St Vincent's, with a further 12 new trials set to open by the end of the year.



65 Oncology
clinical trials underway

Therapeutic intervention study gains MRFF grant

A study led by St Vincent's Hospital Melbourne and University of Melbourne's Psychae Institute is investigating the use of dimethyltryptamine-assisted psychological therapy in people with alcohol use disorder and depression.

One of the chief investigators and Director of St Vincent's Department of Addiction Medicine, Associate Professor Yvonne Bonomo (right), says this important research hopes to show that the different type of treatment could lead to reduced alcohol dependence and improved mood.

The study received just over \$1.97 million through the Victorian Government's 2021 Medical Research Future Fund towards the main clinical trial.

A safety trial with healthy volunteers was launched in 2022 to explore dose tolerability, the process and the best setting for the trial, participant experiences and suitable therapists, ahead of the main trial planned for 2023.

The treatment being explored involves a three-part process where each patient is assigned two therapists.

"During Phase 1, the patient will meet with a psychotherapist and work through why this treatment may be appropriate and what to expect, followed by Phase 2, where the patient is admitted for treatment. This phase includes taking the medication and experiencing the



effects, which could last up to several hours," A/Prof Bonomo says.

The final post-session integration phase involves the patient working with the therapist to understand the experience and gain insights that will help them with positive change.

"What we hope to show is that the process, not just taking the medication, will help change people's perspective on their health and the challenges they have experienced, and enable them to move on and make positive adjustments to their lives. It's an opportunity that we hope will help some of our patients for whom current treatments haven't been successful," says A/Prof Bonomo.



Research to forge change

More than 1400 clinical research studies, including 660 interventional clinical trials, are currently underway at St Vincent's Hospital Melbourne, investigating innovative practices and procedures.

Last year St Vincent's Hospital Melbourne researchers, together with their collaborating project partners, published 1100 scientific articles in national and international health and medical research journals in a significant

contribution towards improving healthcare throughout our communities.

At St Vincent's our translational research explores a broad spectrum of medical areas. Among them, allied health, cancer and epilepsy.

Improving patient outcomes after lower limb salvage surgery

Allied Health research outputs have continued to grow this year through a range of studies including one focused on understanding and improving the experience of people undergoing lower limb salvage surgery for malignant bone tumours.

Dr Sophie Heywood (above) and her colleagues from St Vincent's Physiotherapy Department Musculoskeletal team aim to translate their research findings into improved outcomes for patients, following what is often a highly challenging surgical and rehabilitation journey.

Their recently published systematic review, which formed part of this work, explored functional outcomes in people undergoing lower limb salvage

Taking a frontline approach

Research focused on a ground-breaking treatment for multiple myeloma is currently underway at St Vincent’s Hospital Melbourne through a global study investigating how Car-T cells could potentially be used to develop an operational cure.

In recent years, immune therapy has significantly changed the landscape and outlook for patients with multiple myeloma, which still remains an incurable disease.

St Vincent’s is one of five hospitals from across Australia, the US and Europe involved in this clinical study that is examining the use of Car-T cells for upfront treatment. The research is trialling cutting-edge technology that

engages a patient’s own immune system to fight their cancer cells as the modified T cells are actually a trigger to a wider process within the immune system that leads to the outcome.

“Currently, all immune therapies are being utilised in heavily pre-treated patients and even though they are effective, they are not optimally placed because the immune system in these patients is not conducive to mounting an anti-myeloma response,” says Prof Quach (right).

The therapy investigated through this study uses a frontline approach where the patient’s immune system is healthy and not impacted by prior chemotherapy.



“Through this study, we hope to show greater opportunity for an operational cure – something that has never been a possibility,” says Prof Quach.



walk more slowly and are more likely to rely on a gait aid compared to those who have surgery at the hip,” says Dr Heywood. “Those undergoing knee or ankle surgery are faster and more independent with their gait.”

The project, which is being undertaken in collaboration with leading qualitative researchers from Monash University, involved interviews with people who have undergone this type of surgery to better understand their experience, including the difficulties and enablers in physical function and rehabilitation.

The early findings, which include themes of communication, walking as a key outcome and psychological challenges, were presented in a joint Victorian Comprehensive Cancer Centre Alliance and Australia and New Zealand Sarcoma Association seminar earlier this year.

surgery for sarcoma. It identified that walking speed increases as the site of surgery moves more distally. “Following pelvic surgery, people

Allied Health: Year in focus

Over 2021-22 St Vincent’s Hospital Melbourne’s Allied Health researchers have published 24 journal articles and 2 book chapters, presented at national and international conferences and received \$237,000 in research funding. Projects are ongoing across all specialities including Speech Therapy, Podiatry, Social Work, Occupational Therapy, Physiotherapy, Prosthetics & Orthotics and Nutrition, with collaborations across multiple partners. Research ranges from systematic reviews to cohort and randomised controlled trials, all with a focus on translating findings to best-practice patient care.

Epilepsy data linkage studies

Associate Professor Wendyl D'Souza (below), Deputy Director of Neurology at St Vincent's Hospital Melbourne, is the leader of a study that has found epilepsy patients who deteriorate in their medication use have an increased chance of death compared to those who do not.

In presenting the study findings at the European Epilepsy Congress in Switzerland this year, A/Prof D'Souza says the results show that patients who start off taking their medications well, but slowly deteriorate, have an eight times increased risk of dying within three years.

"It was a surprising and very robust finding," A/Prof D'Souza says.

The big data linkage study anonymously tracked 1400 epilepsy outpatients from St Vincent's over a six-year period. National health services, prescription and mortality data was sourced to determine how regularly these patients took their medication and the impact it had on their lifespan.

"This research looks at whether people are taking their medications consistently and what level of use may be unsafe. What we found was about 50 per cent didn't take their medicines well, but only the 25 per cent who started well and subsequently deteriorated had an increased chance of death," A/Prof D'Souza says.

It is hoped this research of patient medication-taking behaviour will lead to developing new techniques to help monitor, and alert patients to better manage their treatment habits.

In a separate, but thematically-linked study, A/Prof D'Souza explains how big data research can be used to identify patients with psychologically-based seizure-like behaviour, who have an increased risk of death that is similar to people with epilepsy.

This particular piece of research explores why this may be happening and what are the risks for this group of patients.

The study highlights that patients with psychologically-based

seizure-like events have four times more disease labels, particularly psychiatric and pain-related, than people with epilepsy and these conditions are the key contributing factors to their increased risk of death.

These research findings were also presented at this year's European Epilepsy Congress and the Australian and New Zealand Association of Neurologists in Melbourne, which was held in May.



Biotech firm's bold move

St Vincent's strength as a global leader in medical research and innovation has expanded with the launch of another research facility at the hospital's Fitzroy campus.

Led by global biotech company InterVenn BioSciences, the new clinical and informatics laboratory has allowed the firm to work closely with Australian RNA researchers on developing new therapeutics for cancer detection using its artificial intelligence (AI) platform.

InterVenn's AI platform identifies patient-specific cancer biomarkers and uses those to develop liquid biopsy tests to both detect cancer and determine how well each patient will respond to available treatments, with non-invasive, next-generation precision medicine in ovarian and non-small cell lung cancer and metastatic melanoma.

InterVenn's presence in Melbourne provides an opportunity for the company to partner with universities, local research institutes and health services with capabilities in data sciences, informatics and AI to develop new products and support clinical trials.



Centre for excellence

Work is progressing on the new Aikenhead Centre for Medical Discovery (ACMD) – Australia's first collaborative, hospital-based biomedical engineering research facility.

Building approval for the 11 storey state-of-the-art centre, co-located at St Vincent's Hospital Melbourne, was announced earlier this year and demolition of the hospital's former Aikenhead Wing – once used as accommodation for trainee nurses – started soon after in preparation for the site to be transformed into the new home of ACMD.

ACMD brings together engineers, scientists and clinicians from leading universities, institutes and a tertiary hospital to tackle complex medical challenges and seek solutions through cutting-edge research.

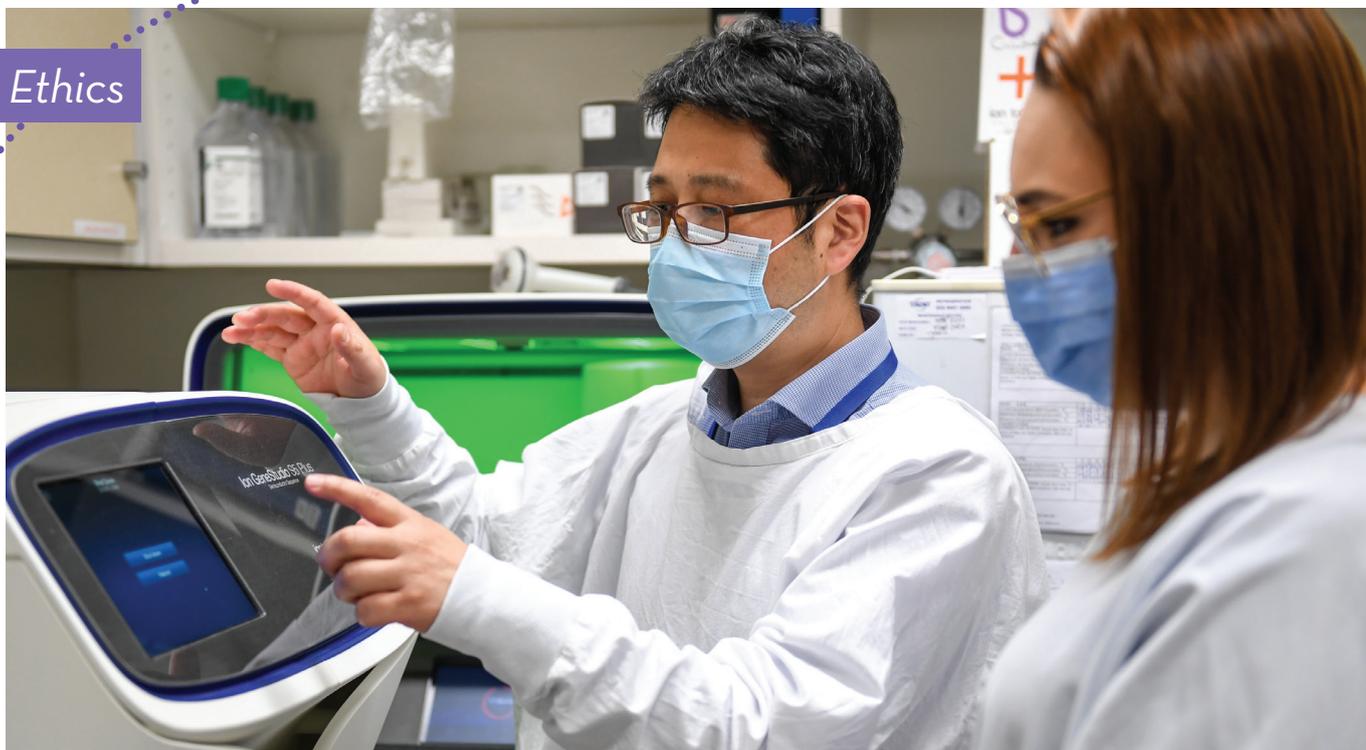
The new purpose-built centre will allow the translational research done through ACMD to grow at pace. It will incorporate specialised

3D-printing laboratories, a human kinetics lab, insulated rooms for the development of sensitive hearing and vision technologies, as well as engineering workshops to produce medical device prototypes and robotics that can be used to fast-track clinical trials.

The design also features an education centre to nurture future medical, nursing, allied health and biomedical researchers, innovators and leaders.

Construction is scheduled to start in January 2023 and is expected to be completed in late 2024.

ACMD is a collaboration of nine partner organisations – St Vincent's Hospital Melbourne, St Vincent's Institute of Medical Research, the Bionics Institute, the Centre for Eye Research Australia, University of Melbourne, RMIT University, Swinburne University of Technology, Australian Catholic University and the University of Wollongong Australia.



Putting the people first

The Human Research Ethics Committee (HREC) reviews research proposals that involve human participants to ensure they meet ethical standards and guidelines.

There are about 200 HRECs established in various research organisations across Australia. St Vincent’s Hospital Melbourne’s HREC meets every two weeks and is the only public hospital nationally that meets this regularly.

The high meeting frequency and strategic capability enables St Vincent’s researchers and industry partners to submit their ethics

application for timely approval and rapid study start-up.

SVHM’s HREC is fully constituted and operates in accordance with the National Statement on Ethical Conduct in Human Research. It is credentialed for National Mutual Acceptance across Australia, except in the Northern Territory.

SVHM’s HREC team has deep experience and expertise in biomedical engineering, medical and diagnostic devices, drug therapeutics, regenerative medicine, and digital health, including

experience in Phase I and First-in-Human studies.

“The St Vincent’s HREC committee is an independent review body and plays an important part in ensuring participants safety and rights are protected, whilst also encouraging good medical research,” says Dr Wendy Stevens, Deputy Chair at SVHM’s HREC.

During the 2021/2022 financial year, SVHM’s HREC reviewed and approved 228 research submissions.

“This year, there has been a growth in new applications which probably reflects increased clinical trials and research activities after COVID-19,” Dr Stevens says.

228
research
submissions

Navigating research submissions

To improve support for researchers and partner organisations, St Vincent’s Hospital Melbourne’s Research Directorate offers a Research Valet® Service. This service includes full HREC submission preparation by

senior Valet Officers with a combined experience of more than 30 years.

A key benefit of the service is the close communication between sponsors/researchers and the Valet team throughout the submission and

approval process which enables a smooth start-up with a benchmark of less than 30 days to gain ethics approval. This approach gives St Vincent’s a competitive edge on the global market for clinical trials.

Research Valet[®]



ST VINCENT'S
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A FACILITY OF ST VINCENT'S HEALTH AUSTRALIA

Your lead site solution

Single point access
for all regulatory advice
for Australia

Speedy start-up time
for Australian clinical trials
(Phase I-IV) including
drugs, devices, GMO cell
therapies and AI/Machine
Learning studies

Ethics outcomes within 30 days
of committee meeting (Phase II-IV)

Start-up to full study
management options

Ethics approval from single
HREC for all Australian states
(except Northern Territory)

St Vincent's Hospital Melbourne
is not required to be a
participating site

Post approval management
services that facilitate all
post-approval project
submission and ongoing
ethics management

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St Vincent's Health Australia acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the lands and waters where we live and work. We respect their historical and continuing spiritual connections to country and community and pay our respects to their Elders past, present and emerging. As a health and aged care ministry, we commit ourselves to the ongoing journey of Reconciliation.