PARTNERING

to achieve something greater

RESEARCH
REPORT
2015

ST VINCENT'S
HOSPITAL
MELBOURNE

CONTENTS

Serving SOMETHING GREATER

Seeing SOMETHING GREATER

Striving for SOMETHING GREATER

Message from
THE CHIEF EXECUTIVE OFFICER

St Vincent's Hospital Melbourne is a proud member of the St Vincent's Health Australia group. With the launch of enVision2025, the SVHA Group is united by a single strategy for the first time. In enVision2025 we have the platform to harness the full potential of the group, directing new energy into areas where we can have the greatest impact.

enVision2025 calls on us to serve something greater, see something greater, and strive for something greater every day. As the 2015 St Vincent's Research Report shows, our research teams are leading by example. What they are achieving now is remarkable but we have an even greater opportunity, the opportunity to be exceptional and a leader on the world stage, offering new hope and new life for patients in Victoria and beyond. That's what drives the academic, scientific, and healthcare partners in the Aikenhead Centre or Medical Discovery.

The Aikenhead Centre for Medical Discovery will be Australia's first biomedical engineering research hub integrated with a major hospital, and it will focus on the big chronic diseases of our time. It's an idea that's good for people and good for the economy, with the potential to deliver $4.8 billion in economic benefits in the space of a decade – saving lives, creating jobs, and kickstarting new export opportunities.

The Victorian Government shares our vision and I would like to acknowledge their unwavering support. Health and medical research is a highly collaborative endeavour and we are fortunate to count the Premier, Minister for Health, and Parliamentary Secretary for Medical Research as our partners in this ambitious but eminently achievable vision.

Susan O'Neill
Chief Executive Officer
St Vincent's Hospital Melbourne

Message from
THE DIRECTOR OF RESEARCH

St Vincent's Hospital Melbourne comprises a dynamic team dedicated to providing excellent in health care to our community. Health and medical research is a core component in providing excellent care, both by participating in groundbreaking studies or delivering state-of-the-art care incorporating the latest advances in disease management. This enables our staff and community to become part of the exciting process of determining the best care models now and into the future.

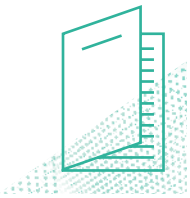
The 2015 St Vincent's Annual Research Report celebrates research teams and collaboration, focusing on the important relationships that facilitate research programs and spark new ideas. Teamwork is essential for enabling research ideas to develop into meaningful advances in clinical care – taking our research from bench to bedside by collaboration between clinicians and researchers.

In 2015 we launched new initiatives to bring this community of excellence closer together, including the ACMD Global Vision speaker series, the inaugural ACMD Research Week Public Lecture, a fortnightly email Research Bulletin, and the Clinical Trials Quality Advisory Committee which provides a forum for professional development and ensures excellence in all research activity. To increase broader public engagement, 2015 also saw the inaugural ACMD Public Lecture featuring a panel discussion titled 'MedTech Innovation in Australia: expensive game or essential industry.'

I am delighted to present the St Vincent's Research Report for 2015. It showcases another fabulous year of innovation, translation and achievement across the many teams, collaborators and partners involved in research at St Vincent's. Please join us in celebrating this collective commitment to excellence in all areas.

Dr Megan Robertson
Director of Research
St Vincent's Hospital Melbourne

RESEARCH
AT A GLANCE



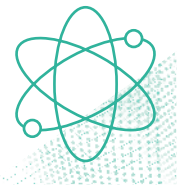
NUMBER OF PUBLICATIONS
773

FUNDING ACTIVE (JAN-DEC 2015)
$10.65M

NUMBER OF PHD STUDENTS
106

OTHER HIGHER DEGREE RESEARCH
67

CONFERRED HDR
36



RESEARCH ENDOWMENT FUNDING (REF)
$760,000

BOOKS PUBLISHED
5

BOOK CHAPTERS PUBLISHED
22

RESEARCH INCOME RECEIVED
$115.25M

NHMRC AND ARC GRANTS (JAN-DEC 2015)
$5.78M

AT THE CENTRE OF DISCOVERY

The Aikenhead Centre for Medical Discovery has been a dream in evolution for the past 10 years, and 2015 has seen significant advances with the Centre moving from concept to concrete as the partners have joined together to push the project forward.

The vision of the ACMD partners is to collaborate in a dedicated hub fusing medicine, engineering, science and industry and to revolutionise how we approach medical solutions to chronic health problems. Together we will bring health solutions more rapidly to the community and build a leading global industry to further support Australia's burgeoning biotech sector.

The Centre will be Australia's first bioengineering facility that is collocated with a tertiary hospital promoting close interaction between researchers and clinicians. It will also house a new education facility to ensure future generations of health workers, scientists, engineers and researchers develop the skills to continue collaboration throughout their professional careers.

Funding for the ACMD is now over 50% secured. Early in 2015, the Victorian State Government confirmed their support for the development allocating $60M in the annual budget towards the build of the new facility to be located on the corner of Nicholson Street and Victoria Parade in Fitzroy on the edge of the Melbourne CBD.

In 2015 work commenced on the ACMD Advanced Biofabrication Centre, which will enable partners to work side by side on exciting projects. The unique coexistence in the clinical hospital setting of cutting edge fabrication technology including state-of-the-art 3D printing capability and specialised multi-disciplinary research teams represents an exciting opportunity for developing and commercialising novel health solutions.

This interim facility will bring together clinicians from St Vincent's with teams from the University of Wollongong Intelligent Polymer Research Institute, RMIT University, Swinburne University and University of Melbourne – all with diverse and complementary skills to ensure a highly creative and productive environment.

The ACMD vision represents more than the building, and collaborations between partners are already producing outstanding results across the St Vincent's campus and at partner institutions through enhanced relationships and closer interactions between researchers from different specialty backgrounds.

Important advances in bone replacement with 3D printed titanium prostheses, total limb reconstruction, deep brain stimulation for management of neurological disorders, and intelligent drug design for cancer therapies have already been achieved, and work is continuing in these and other vital areas.

St Vincent's has an established track record in health and medical research and clinical trials and our clinicians and clinician researchers will inform basic research with expert clinical insights, identification of unmet patient needs and also translate research findings to patients to drive improvements in clinical outcomes to bring the ACMD vision to reality.

This exciting project will continue to grow in 2016, bringing basic, translational and clinical research expertise from St Vincent's Hospital together with five Australian internationally recognised universities and four renowned medical research institutes – all linking with local and international industry partners to build a new future for biotechnology in Melbourne.

$60M

allocated by the Victorian State Government

50%

of funding for ACMD is now secured

Together we will

BRING HEALTH SOLUTIONS MORE RAPIDLY TO THE COMMUNITY AND BUILD A LEADING GLOBAL INDUSTRY TO FURTHER SUPPORT AUSTRALIA'S BURGEONING BIOTECH SECTOR.

RESEARCH
DIRECTORATE REPORT 2015

For more than 120 years, St Vincent's Hospital Melbourne has been providing the highest standards of care driven by our concern for others, especially those in need.

In addition to diagnosing, treating and caring for patients across the entire health spectrum, St Vincent's is a world-leading clinical research hospital.

St Vincent's is part of Australia's largest not-for-profit Catholic health care provider, St Vincent's Health Australia, and research is undertaken in accordance with Catholic ethos and principles.

THE TEAM

The work of the Research Directorate is led by the Director of Research, Dr Megan Robertson. The Research Directorate comprises the Research Facilitation and Research Governance units, the Experimental and Surgical Unit, the Hospital Library Service and the research facilities in the BioResources Centre.

Our role is to:

- Provide leadership to the St Vincent's research community
- Facilitate research through the provision of appropriately coordinated research activities and infrastructure
- Provide advice, assistance and encouragement to all staff wishing to pursue clinical research activities
- Liaise with our associated research institute
- Assist in the establishment of the Aikenhead Centre for Medical Discovery (ACMD).

St Vincent's
HOSPITAL MELBOURNE HAS BEEN PROVIDING THE HIGHEST STANDARD OF CARE DRIVEN BY OUR CONCERN FOR OTHERS.

STRATEGIC PARTNERSHIP

In 2015, the Research Directorate was pleased to announce St Vincent's Hospital Melbourne has begun a new strategic partnership with PAREXEL as one of Australia's first alliance sites.

PAREXEL is a leading global biopharmaceutical services organisation, providing a broad range of expertise-based contract research, consulting, medical communications, and technology solutions and services to the worldwide pharmaceutical, biotechnology and medical device industries. Headquartered near Boston, Massachusetts, PAREXEL operates in 81 locations in 51 countries around the world, and has approximately 16,530 employees.

This new partnership in addition to the recently developed partnership with Quintiles, another leading global CRO and the Society of Clinic Research Sites, will increase SVHM participation in leading biopharmaceutical clinical research and offer SVHM patients substantial clinical trial benefits.

St Vincent's Hospital Melbourne was proud to be invited by the NHMRC, alongside 15 other health organisations nationwide, to be a part of an initiative to have quicker and more efficient research governance authorisation. The Good Practice Process for Site Assessment and Authorisation Phases for Clinical Trial Research Governance (the Good Practice Process) aims to streamline the site assessment and authorisation process of clinical trials.

In 2015,

THE RESEARCH DIRECTORATE WAS PLEASED TO ANNOUNCE ST VINCENT'S HOSPITAL MELBOURNE HAS BEGUN A NEW STRATEGIC PARTNERSHIP WITH PAREXEL AS ONE OF AUSTRALIA'S FIRST ALLIANCE SITES.

RESEARCH VALET™ SERVICE

The Research Valet™ aims to assist sponsors and researchers in gaining timely HREC and governance submission and approval. This innovative service is administered through the Research Directorate by the Clinical Trials Business Development Manager, Dr Wade Kruger, and a team of experienced staff.

A key feature of this unique service is close communication between sponsors/researchers and Research Directorate staff at each step of the process. Sponsors or researchers will receive full approval within 30 days of HREC meeting and governance approvals will be targeted at seven days after submission of required documentation.

The service provides researchers a smooth start up with a highly competitive timeline on gaining ethics approval, providing St Vincent's a competitive edge on the global market for clinical trials.

Since implementing the service in early 2015, a strong uptake from all stakeholders has been noted. Sponsors and CROs have taken a keen interest in the service and are willing to invest a small fee for a guaranteed timeline. Research groups see benefits from the service as their clinical trial coordinators can focus on recruiting patients. Even those with dedicated ethic submission specialists have viewed the research valet service as a useful resource in times when extra support is needed to complete a timely ethics submission.

The Research Valet™ service model has been presented at national and international forums with researchers and sponsors across Australia and overseas expressing interest in this innovative process.

NHMRC FUNDING SUCCESS

St Vincent's Hospital Melbourne and its campus partners were very successful in National Health and Medical Research Council funding announced in October 2015.

St Vincent's researchers secured $5.78 million in 2015, which will contribute to research here on campus with the aim of driving innovation that will lead to medical breakthroughs.

Taking into account funding secured by our collaborators, who together make up the Aikenhead Centre for Medical Discovery (ACMD), over $33 million was injected into the Eastern Hill precinct.

Among those who were successful was research scientist A/Prof Lis Evered, who was awarded an NHMRC-ARC Dementia Research Development Fellowship – an honour that reflects her international standing and ongoing contribution in perioperative cognitive research.

This significant achievement provides both a salary component and a research project component for four years, totalling over $470,000, allowing A/Prof Evered to continue her work predicting perioperative cognitive disorders in the elderly.

MELBOURNE PROFESSOR SWIMMING WITH SHARKS

In an international Shark Tank to fund innovative ideas for anti-epileptic drug or device trials, Professor Mark Cook has trounced teams of researchers from prestigious American universities such as MIT with only a PowerPoint presentation by his side.

Run by the Epilepsy Foundation of America, the Shark Tank pitches experts against each other in a public forum, where they argue the merits of their research ideas.

'It was a David and Goliath battle,' Prof Cook said. 'Some of the others had highly produced video graphics. I had a PowerPoint!'

The best ideas were chosen for funding via live voting by conference attendees and a panel of judges ('sharks') representing physicians, scientists, industry investors and people with epilepsy. Each vote was worth US$25,000.

The competition ran in two rounds – each team had five minutes to present their research idea to the forum, another five minutes to answer questions, and were then invited back to give a one-sentence pitch.

Professor Cook, the Director of Neurology at St Vincent's Hospital Melbourne, and the Chair of Medicine at Melbourne University, is one of Australia's most eminent neurologists, with an international reputation for epilepsy research.

'Two-hundred thousand dollars was up for grabs,' he said, 'I am pretty sure I sealed it with my final sentence – it was roughly $6,000 per word.'

Prof Cook's pitch was sharp and pithy: 'Our project can do everything these others can, but we really need the money.'

Prof Cook heads a team of 10 which has developed a device which can be inserted under the skin behind the ear, to detect and potentially prevent epileptic seizures. The pitch was to fund clinical trials of the device.

More than 60 million people worldwide have epilepsy, 400,000 of them in Australia.

MARVELLOUS MELBURNIAN!

Professor Peter Choong, St Vincent's Chair of Surgery, has been recognised by the City of Melbourne, winning a prestigious Melbourne Award. In a glittering ceremony at the Melbourne Town Hall, Prof Choong accepted the award on behalf of his colleagues at St Vincent's and described it as recognition of the excellent work done in the health industry in Victoria.

In selecting Prof Choong for the award, the judges said that Melbourne's international reputation as a centre of excellence in biomedical technology, innovation, and research was significantly enhanced last year, when Prof Choong masterminded the world-first 3D heel implant.

A titanium heel invented, developed an implanted in Melbourne with the assistance of Anatomics and CSIRO replaced the cancerous bone of a Victorian builder, who otherwise would have needed amputation.

While the 3D heel has captured the public imagination, Prof Choong's quest for better patient care is ongoing. With a range of research partners, he is pursuing advances in limb robotics, cartilage regeneration, a handheld stem cell printing device, just-in-time patient-specific implants, and tissue engineering for muscle and nerves.

With the growing problem of arthritis in the community, cutting lives short, and absorbing 10 per cent of healthcare expenditure, Prof Choong has established a team of Melbourne researchers to study the impact of joint replacement on arthritis sufferers. They have created a joint replacement database to underpin evidence-based research. The database is of such high standard that it's recognised internationally for the quality of the information being generated. It is leading to research on the sustainability of surgery as a way to treat arthritis.

Professor Choong
ACCEPTED THE AWARD ON BEHALF OF HIS COLLEAGUES AT ST VINCENT'S.

Right: (from left) Lord Mayor Robert Doyle, Prof Peter Choong and Deputy lord Mayor Susan Riley.

ACMD RESEARCH WEEK 2015 – A CELEBRATION OF SCIENCE AND RESEARCH

The St Vincent's campus was abuzz in August 2015, with research rightly at the centre, during ACMD Research Week.

The State Minister for Health, the Hon. Jill Hennessy MLA, officially launched proceedings, viewing the posters on display and speaking with researchers about their work.

A highlight of the week was the public debate, which featured the Hon. Frank McGuire MLA Parliamentary Secretary for Medical Research, Laureate Professor Peter Doherty AC, Professor Graham Brown AM, Foundation Director of the Nossal Institute for Global Health and Dr Andrew Cuthbertson, CSO and Director of R&D at CSL.

St Vincent's Institute's Dr Jibran Wali was awarded the prestigious TJ Martin Medal for his work on beta cells in the pancreas.

Other events included half day seminars for researchers on media and communications, and intellectual property and commercialisation, which were both well received.

ACMD AWARD WINNERS

TJ Martin Medal

Dr Jibran Wali

Senior Investigator Oral Presentations

The Professor Anthony D'Apice Award for Best senior Investigator Oral Presentation:
A/Prof Robyn Langham
and Kate Robson

Finalists:
Ms Nella Fisicaro
Ms Penny Chapman
Ms Stephanie Fry

Junior Investigator Oral Presentations

Award for Best Junior Investigator Oral Presentation:
Mr Prerak Trivedi

Finalists:
Dr Siddharth Sood
Ms Madeline Nicholson

The inaugural
ACMD PUBLIC LECTURE FILLED THE CHAMBERLIN LECTURE THEATRE TO CAPACITY FOR OUR PANEL DISCUSSION "MEDTECH INNOVATION IN AUSTRALIA: EXPENSIVE GAME OR ESSENTIAL INDUSTRY?".

Top: Dr Megan Roberson, left, with the Hon. Frank McGuire, Parliamentary Secretary for Medical Research and the Hon. Jill Hennessy, Minister for Health.

ACMD GLOBAL VISION SERIES

Sir Paul Nurse, Nobel Laureate and one of the world's leading medical researchers, visited St Vincent's in March 2015 to share his insights on establishing a new research facility.

Nurse described the strategies he employed to convince existing institutes to merge into The Francis Crick Institute, which is due to open in 2016, with Nurse as Director. It's an amalgamation of six of the most successful UK research institutes including the Medical Research Council, Cancer Research UK, Wellcome Trust, UCL, Imperial and Kings Colleges London.

It took about eight years for Nurse to turn his dream to reality. Sir Paul's dream was to create a medical research facility which would harness the strength of existing and often competing research institutes, into one location where young scientists would be nurtured as they built a career, where experienced researchers would be at the forefront of their disciplines, and their ground-breaking results would lead to innovative medical treatments.

There are clear similarities between this, and the aims of the Aikenhead Centre for Medical Discovery (ACMD), and the partners from the ACMD were keen to hear how he did it.

'There will be 1400 researchers in the building,' Sir Paul says. 'There'll be 10 laboratories, and they'll be set up in a 'village', with a mix of disciplines.'

The ACMD Global Vision Speaker Series has broadened engagement with industry including pharma and biotech companies and collaborative research partners whilst providing great insights into other collaborative networks nationally and internationally.

Presenters in 2015 included Sir Paul Nurse from the Crick Institute in London, Dr John Collins from CIMIT in Boston, Professor Stephen Simpson from the Charles Perkins Institute in Sydney and Professor Karen Reynolds from the Medical Device Research Institute in Adelaide.

From left: Prof Stephen Smith, Dean of Medicine at University of Melbourne, Dr Megan Robertson, Director of Research and Sir Paul Nurse.

TWO ST VINCENT'S RESEARCH PROJECTS WIN AWARDS

There was fierce competition for the 2015 BUPA Health Awards, with almost 600 projects vying for selection. Just five research projects were chosen to share in $1.6 million dollars.

Two of the five research award recipients are based at St Vincent's Hospital in Fitzroy.

Dr Trish Peel's research project aims to reduce the time patients stay in hospital after they've had a hip or knee replacement. The STEP trial (St Vincent's Early-mobilisation Pathway) will compare patients who have standard post-surgery care, with patients who have an early mobilisation plan. The intensive program will include additional interventions, such as intensive physiotherapy to get the patients moving earlier after surgery.

The cost to hospitals for each hip or knee replacement is approximately $22,000. If the STEP trial is successful, it will result in significant healthcare savings for the hospital, but the real benefit will be for the patients. While less time in hospital is a bonus for patients, it's also likely to lead to fewer complications, and hospital re-admissions.

Cardiovascular disease is the biggest killer in Australia, and was responsible for nearly 44,000 deaths in 2012. It is also the most expensive disease treated nationally, accounting for eleven percent of direct healthcare costs.

A study led by Associate Professor Vijaya Sundararajan will look at clinical decision-making and the appropriate use of coronary artery angiograms. An angiogram is used to diagnose narrowing of the arteries supplying oxygen to the heart.

Existing data shows that angiograms are potentially under-used in patients who've had a heart attack, and over-used for patients with stable angina. The research is hoping to understand how clinicians currently decide when to use an angiogram, with the aim of changing these outcomes. The research could not only result in lower health costs, but more importantly, could save many lives.

RESEARCH OPENING THE DOOR FOR PRISONERS

A prestigious fellowship will allow a St Vincent's researcher to build on the body of research for one of society's most marginalised patient cohorts.

Dr Joseph Doyle is one of the recipients of this year's Gilead Fellowship which supports research projects in relation to HIV and chronic viral hepatitis studies.

Dr Doyle's project will comprehensively assess the burden of hepatitis C in Victorian prisons, including incidence, prevalence and re-infection. Dr Doyle also plans to establish a sustainable system for ongoing monitoring.

The study is important in evaluating the impact of hepatitis C treatment on transmission, as well as prevention benefits as a result of expanded treatment access in Victorian prisons.

Left: BUPA grant recipients Dr Trish Peel (left) and A/Prof Vijaya Sundararajan (right).

Below: Prof Joseph Doyle.

AWARDS

Congratulations to our St Vincent's and partner researchers who have been recognised for contributions to their research field in the past 12 months.

Endocrine & Diabetes

Dr Sybil McAuley
International Travel Award, Juvenile Diabetes Research Foundation

International Travel Award, ESA IPSEN

Margaret Loh
Gwen Scott Award, Australian Diabetes Victoria

Dilshani Jayawardene
Clinical Poster prize, ACMD Research Week

Dr Sybil McAuley
Best in Session Oral Poster Presentation, ACMD Research Week

Gastroenterology

Dr Peter De Cruz
Victorian Premier's Award for Health and Medical Research

Prof Paul Desmond
Distinguished Clinician Award, Gastroenterology Society of Australia (GESA)

Dr Ola Niewiadomski
Y-ECCO Congress Abstract Award, European Crohn's and Colitis Organization

Dr Jacinta Holmes
Young Investigator Award 2015, European Association for the Study of the Liver

Dr Joe Doyle
Young Investigator Award Finalist, Australian Gastroenterology Week

Dr Rachel Yam
Platform Prize, Scholarly Selective Program, University of Melbourne

Mental Health

Prof David Castle
Ian Simpson Award, Royal Australian and New Zealand College of Psychiatrists

High Commendation for Schizophrenia, British Medical Association Medical Book Competition

Bridget Organ and Early Psychosis Team
Leaders in Catholic Healthcare and service to the poor and vulnerable award, SVHA Innovation and Excellence Awards,

Prof Susan Rossell
International Women's Day Award, Swinburne University

Oncology

K Geddes, H Rouse, S-A McLachlan, V Sundararajan, M Moore
Best Oral Presentation by a Young Medical Oncology Consultant, Medical Oncology Group of Australia, Annual Scientific Meeting

A/Prof Prudence Francis
Novartis Oncology Cancer Achievement Award, Medical Oncology Group of Australia

Orthopaedics

Michelle Dowsey
Travel Scholarship, 16th E-Fort Prague Congress

Excellence in Research Award, University of Melbourne, Department of Surgery, SVHM

Trish Peel
Excellence in Research Award, University of Melbourne, Department of Surgery, SVHM

Prof Peter Choong
Award for Research Excellence, Australian Orthopaedic Association

Leading reputation Award, SVHA Innovation and Excellence Awards

Melbourne Award

Award for Excellence, CSIRO

Neuroscience

Prof Mark Cook
Shark Tank Prize, United States Epilepsy Foundation

A Peterson, I Mareels, H Meffin, D Grayden, M Cook, A Burkitt
Best Poster, Organisation for Computational Neuroscience (OCNS) Conference

Palliative Care

Anna Collins
Emerging Researcher Award, Palliative Care Australia

Physiotherapy

Kim Brock
Best Oral Presentation in Neurology, Australian Physiotherapy Association Conference

Jenna Brimblecombe
Best Poster Presentation in Neurology, Australian Physiotherapy Association Conference

Sarah Fitzgerald
Best Poster Presentation in Physiotherapy, University of Melbourne Research Higher Degree Student Colloquium

Rheumatology

Dr Kathleen Morrisroe
Shields Research Entry Scholarship, Royal Australasian College of Physicians

PhD top-up scholarship, Australian Rheumatology Association (Victorian Branch)

The boundaries
HAVE BECOME QUITE BLURRED BETWEEN CLINICAL RESEARCHES AND SCIENTIFIC RESEARCHERS.

10%–15%

of older people will experience a measurable degree of cognitive impairement after surgery

>50%

of all anaesthetics will be administered to patients over 65 years of age by 2015

THE LONG ROAD TO COGNITIVE RECOVERY *after surgery*

Following surgery, older patients often report being unable to think clearly, which may affect their ability to live independently.

Although the vast majority will recover and return to normal, 10 to 15 per cent of older people will experience a measureable degree of cognitive impairment even 12 months after surgery, according to Associate Professor David Scott, Director of Anaesthetics at St Vincent's.

'The Australian Institute of Health and Wellbeing estimates that by 2050 more than 50 per cent of all anaesthetics will be administered to patients over 65 years of age, so there is a pressing need to ensure that the 10 to 15 per cent of this ageing population are not adversely affected by anaesthetics or surgery,' the senior anaesthetist says.

Researchers believe that certain older people are predisposed to cognitive decline, and A/Prof Scott is working with colleague Associate Professor Lis Evered, an international expert on postoperative cognitive decline, to uncover more about this phenomenon. A/Prof Evered is the leading researcher on a number of world renowned observational and interventional studies looking at cognitive and functional decline in patients in the short and long term.

'We followed a group of patients for seven and a half years after cardiac surgery and found that there was a prevalence of dementia that is really much greater than we would have expected in that age group of people,' she says.

'What this tells us is there's something about that group of patients that means they are more susceptible to getting dementia. What this study doesn't tell us is if the anaesthesia and surgery has contributed to that.

'Are we just observing a decline that they were already going to experience or is something happening in the perioperative period that is either initiated or exaggerated in vulnerable patients?'

Last year A/Prof Evered was awarded an NHMRC-ARC Dementia Research Development Fellowship, which cemented her standing among the research community and will allow her to continue working with a number of international collaborators to further the body of research in this field.

'We are now providing samples of blood and cerebrospinal fluid to a group in Sweden who are looking at inflammatory markers to tell us what physical reaction they are having to surgery.'

A/Prof Evered is also about to begin an interventional study that will look at lifestyle changes in patients who are identified as being at risk.

'There is evidence to suggest that mild cognitive impairment symptoms can be delayed with strategies that control risk factors, in particular cardiovascular risk factors. Brain exercise and maintaining social interaction have also been found to delay the onset of cognitive impairment. So we are looking at how lifestyle changes that address these issues, together with early intervention where necessary, may prevent or reduce the incidence of cognitive decline.'

A/Prof Evered has often found that the terms used to define cognitive impairment differ across disciplines, so she is working with the Alzheimer's Association of the United States to introduce standardised terminology this year.

'For the last five years I have worked with an international group of neurologists, psychiatrists and geriatricians to reclassify and redefine the terms we use, so that we are talking a common language across all medical disciplines,' she says.

A/Prof Scott says the countless hours of work A/Prof Evered puts into keeping in contact with patients and training her research team mean the department can achieve much more.

'The boundaries have become quite blurred between clinical researchers and scientific researchers. Lis is embedded and excelling in terms of academic recognition here and around the world and she's got as much clinical knowledge about these aspects of patients as we do.'

4

hour window
for treatment

24–48

hours for laboratory
tests to be completed

Sepsis is still responsible for around 50% of deaths in Intensive Care, and with the emergence of resistant organisms, that number is trending up.

POINT OF CARE: SPEEDING

the diagnosis for infection

During his 17 years running the family cheese business, Ben Mooney was often struck by the sight of his highly skilled cheesemakers packing stock, or driving forklifts.

'I thought 'hang on', this isn't right,' Ben says. 'I started to think about what processes I had in place to ensure that I was maximising the time of my most skilled workers and minimising the tasks that aren't valuable. I became increasingly interested in the concept of quality systems.'

Ben's commitment to improving work processes led him to return to university to study advanced manufacturing technology.

With a cheesemaking background involving microbiology and biotech, and his newly acquired knowledge of system processes, Ben began looking for ways to combine his interests. He became interested in biodevices which led him to seek out St Vincent's Co-Director of Immunology Research, Professor Kumar Visvanathan.

'In my discussions with Kumar, we kept coming back to the issues around delays in identifying causative organisms in sepsis,' Ben says. Sepsis is a potentially life-threatening complication of an infection.

'Sepsis is still responsible for around 50% of deaths in Intensive Care, and with the emergence of resistant organisms, that number is trending up,' Prof Visvanathan says. 'When someone is showing signs of sepsis, it is important that they are treated immediately with the appropriate antibiotic. On the flipside of that, though, is making sure that antibiotics are not given to patients who don't need them.'

It's a race against time – a four-hour window for treatment, when laboratory tests can take 24–48 hours. When doctors suspect sepsis, they can't afford to wait for the lab results; they will begin administering antibiotics. If the lab tests come back negative, this delay in diagnosis can contribute to antibiotic resistance.

There are hand-held sequencers, currently in beta testing, that have the potential to quickly diagnose sepsis using purified bacteria DNA from a patient blood sample. Previously the cost of running a sequencer has made their use prohibitively expensive in a clinical setting, but these handheld devices are driving down the cost and time delay of sequencing.

'The issue at the moment is extracting bacterial DNA from a patient's blood sample so that this kind of technology can be leveraged,' Ben says. The PhD student is looking to weld two different disciplines together to come up with a solution to this pressing clinical problem. 'If we can get a handful of bacteria out of blood, get the DNA, and amplify that DNA and sequence that, then we will quickly be able to know the bacteria's name, species and strain,' he says.

'At the moment we are dreaming of what may be possible in a few years' time, but this does seem the way of the future,' Prof Visvanathan says. 'If we can get it, a correct diagnosis at the bedside would make a huge difference. We may also be able to identify antimicrobial resistant genes, which will further help in designing an effective therapeutic response.'

Although Ben's aim is to develop a disposable point-of-care device, if a process for quickly purifying DNA could be established, this breakthrough could be as important as the device.

'We may be able to commercialise that process through a service business, or it may be information that hospitals, including St Vincent's, can use in the way the structure their microbiology labs,' Ben says.

At the moment

WE ARE DREAMING OF WHAT MAY BE POSSIBLE IN A FEW YEARS' TIME, BUT THIS DOES SEEM THE WAY OF THE FUTURE.

The uniqueness
OF THIS STUDY IS THE BRINGING OF ART TO THE BEDSIDE OF HOSPITALISED PATIENTS AS A TOOL FOR ENGAGEMENT.

Even for patients who may not know what day it is, art can trigger emotions and memories and lead to surprising conversations.

ART PAINTS A PICTURE *for dementia patients*

An innovative research project, using art to trigger memories and spark conversation, is reinvigorating dementia patients.

Cognitive impairment makes communication difficult for these patients, but social worker Danielle Moss and art curator Monique Silk have discovered that art has an amazing ability to elicit strong feelings in all people. Even for patients who may not know what day it is, art can trigger emotions and memories and lead to surprising conversations.

With the support of research mentor Dr Carrie Lethborg, Monique and Danielle are using the St Vincent's art collection to stimulate conversation with patients with cognitive impairment. St Vincent's is home to the largest art collection at a public hospital in Australia with over 1,000 pieces, providing a unique environment to explore the intersection of health and art.

'This study came about through a discussion with our Mission team about how we can use the extensive art collection at St Vincent's as part of patient care,' Danielle says about her first foray into research, under the mentorship of Dr Lethborg.

Five pieces were selected from the St Vincent's collection and Monique then sat down one-on-one with each patient and guided them through a viewing of each artwork, with each piece representative of a different art style or theme including landscape, portrait and Aboriginal abstract art.

Conversation around each artwork flowed, but interestingly it was the patient leading the discussion. At the session conclusion, they were invited to choose their favourite artwork and were given a copy to keep.

'One of the things we measured is engagement through non-verbal and verbal cues,' Dr Lethborg says. 'We found that art does increase engagement in these patients.

'The transcripts show that paintings trigger reminiscence. For example, there is one painting of the MCG that triggered memories in everyone. Most participants talked about their experiences of going to the MCG or of living in Melbourne.

'Another picture of a sunny holiday setting prompted one patient to speak about his brother living in Queensland. What's impressive is that it's hard to ask these patients where they are, how they are feeling and about their family. But when an image is introduced it triggers memories and all of a sudden you can engage and find out more about them.'

What was surprising for family members to see was the knowledge and willingness with which patients spoke about art.

'What we found was that aesthetic preference in art is stable over time. Patients with cognitive impairment are very open to talking about what they like or don't like about a particular artwork,' Danielle says. 'The uniqueness of this study is the bringing of art to the bedside of hospitalised patients as a tool for engagement'.

This study is an example of the powerful work that can be achieved when staff with a range of skills are brought together with a research expert to improve patient care. 'The study needed to involve both clinicians and someone who was very knowledgeable about art. Having an art curator on staff made it possible,' Dr Lethborg says.

Support from the Research Endowment Fund at St Vincent's and The Andrews Foundation has inspired some big picture ideas about other ways the art collection might be used in patient care. 'We have such an amazing art collection here and it gives us a unique opportunity to have a discussion about what else we can do. Now it's time to get creative.'

1,000

pieces make up St Vincent's art collection, the largest of any public hospital in Australia

5

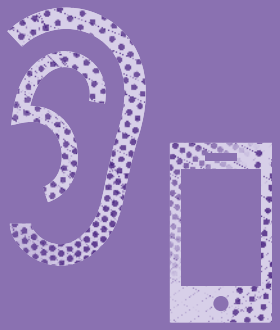
pieces were selected for the study, each representitive of a different style or theme

400,000

Australians suffer from epilepsy

60M

people suffer worldwide from epilepsy



The device will send constant data to a smartphone. This will promote accurate diagnosis, treatment, and eventually prediction of seizures.

GROUND BREAKING

trial to prevent epilepsy

In a world first, Professor Mark Cook and Associate Professor Wendyl D'Souza will this year begin patient trials of a device that will give people with epilepsy early warning of a seizure.

Before the trials have even begun, they are already turning their minds to using the device to directly treat and perhaps even prevent seizures.

Prof Cook and his team have adapted some of the technology used for the highly successful cochlear hearing device to develop a minimally-invasive implant which can be inserted under the skin behind the ear to detect epileptic seizures. It's a relatively simple operation.

It offers peace-of-mind to the 400,000 Australians – and 60 million people worldwide – who suffer from epilepsy, and further establishes Melbourne as a leader in biomedical devices.

Prof Cook says the device will send constant data to a smartphone. This will promote accurate diagnosis, treatment, and eventually prediction of seizures, allowing patients to live more confidently and safely as a result.

'There is nothing available at the moment that can do all three,' Prof Cook says. 'We haven't used this technology to predict seizures yet, but we expect based on findings from previous studies we can do so.'

'We have modified cochlear technology to record EEG activity continuously in order to make a diagnosis of epilepsy. Seizures are often infrequent so capturing brain activity is a valuable way of making a definite diagnosis.'

'If we have these devices in long term recording continuously, it will allow us to make a diagnosis where we couldn't before,' A/Prof D'Souza says.

'At the moment an EEG takes a snapshot of brain activity over 20-30 minutes, but they may only have a seizure every two or three months. They are still very disabled by these seizures, they still can't drive and they are still at risk of injury and worse, but the low frequency makes it hard to capture diagnostic information.'

The device has been tested for safety and long-term durability in an animal model and the next step will be a clinical trial of the device.

'We are aiming to begin testing in humans as part of a clinical trial in mid-2016,' A/Prof D'Souza says.

'It's a matter of keeping all of the balls in the air while we claim as much information as we can from these pre-clinical studies to show that it works, but there's this catch-22 where you need the money to show it works, but on the other hand you need to show it works before you can get any money,' Prof Cook says.

'We are currently in negotiations for commercial funds between two and five million dollars to complete a commercial trial once we have started manufacturing the device.'

Prof Cook is a passionate advocate for the Aikenhead Centre for Medical Discovery (ACMD) and believes the device is a great example of the type of research that the ACMD could fast track.

'We are combining the manufacturing expertise of the Bionics Institute and our clinical interest in epilepsy and bringing that together to do something really new, but the ACMD will help most with commercialisation, because at the moment that's the hardest part,' Prof Cook says.

Before these trials

HAVE EVEN BEGUN, THEY ARE ALREADY TURNING THEIR MINDS TO USING THE DEVICE TO DIRECTLY TREAT AND PERHAPS EVEN PREVENT SEIZURES.

NHMRC FELLOWSHIP

for emerging gut researcher

Attracting great medical talent is vital for outstanding patient care, so when St Vincent's Head of Gastroenterology Professor Alex Thompson heard that leading endoscopist Dr Bronte Holt wanted to return to Australia, he was quick to act.

Professor Thompson actively supported Dr Holt in applying for funding from St Vincent's Research Endowment Fund (REF), to allow the talented endoscopist to continue her research when she returned to St Vincent's, the hospital where she completed her medical training, Dr Holt leveraged this funding to apply for a prestigious NHMRC Early Career Fellowship, for which she was successful.

As a leader in the field of endoscopy, Dr Holt's research focus is on evaluating new endoscopic techniques that may improve the survival rate for patients, particularly in treating oesophageal cancer and its precursor Barrett's Oesophagus. Her skills in this area have been well recognised. Her NHMRC Fellowship will further research bolstered in 2013 when, while working in the US, Dr Holt was recognised with a Prime Minister's Queen Elizabeth II Diamond Jubilee Scholarship.

St Vincent's is becoming a leading centre in Victoria for treating oesophageal cancer using an endoscopic technique that burns off abnormal cells using radio energy.

'The Department of Gastroenterology has a really strong track record for endoscopic research and I wanted to add to and expand upon that body of research,' Dr Holt says. 'However, it can be very difficult to have the time and resources for research, so being supported is critical, and Prof Thompson has been instrumental in that.'

'This funding allows Dr Holt to focus on her research. Otherwise she would be doing research for free essentially, which is not sustainable in the long term,' Prof Thompson says.

Barrett's Oesophagus is the main risk factor to the development of oesophageal cancer and is quite common, appearing in two to three per cent of the population, predominately in men.

There are now new endoscopic techniques that mean we don't need to remove the oesophagus, a major surgical procedure that carried with it substantial morbidity and mortality.

Dr Holt is looking at ways to treat late stage Barrett's Oesophagus, right before it turns into cancer or when cancer is in situ, but before it is too deep to remove endoscopically. She is developing a randomised control study comparing the standard care for patients, which is surgical resection, with endoscopic resection plus the addition of chemotherapy, radiation therapy or a combination of both. This study is being designed in collaboration with the assistance of upper gastro-intestinal surgeons, oncologists and radiation oncologists.

'When oesophageal cancer is diagnosed due to presenting symptoms, such as inability to swallow, the five year survival rate is incredibly low, around 20 per cent, so it needs to be treated early,' she says.

'A lot of my research is about pushing the boundaries on when we can use endoscopy to treat things that are currently treated in other ways and seeing whether a less invasive approach may be suitable.'

'Surgery is a big operation that results in many side effects and quality of life issues. We would like to see if this new approach is just as effective. It is also likely to be much safer with far fewer complications,' Prof Thompson says. 'If we can find a simpler way that is safe, it would be much better for the patient.'

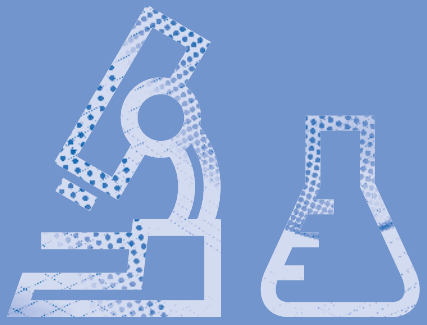
This study is **BEING DESIGNED IN COLLABORATION WITH UPPER GASTRO-INTESTINAL SURGEONS, ONCOLOGISTS AND RADIATION ONCOLOGISTS**

2%–3%

of the population suffer from Barrett's Oesophagus, predominately men

20%

five year survival rate for oesophagael cancer patients



It can be very difficult to have the time and resources for research, so being supported is critical.

LIBERATING
diabetic patients

For the last four years, endocrinologists Associate Professor David O'Neal and Dr Sybil McAuley have worked together as part of a team in pursuit of the ultimate goal of developing a reliable and accurate 'artificial pancreas'.

Their efforts could contribute to relieving the burden for the more than 120,000 Australians who live with type 1 diabetes.

The aim of this marathon research journey is to identify the most accurate, effective and least invasive way to measure glucose and deliver insulin.

'An artificial pancreas is already a reality in the research world, though we are not quite there yet to implement this technology into everyday clinical practice. We are taking small steps towards that goal, by improving the reliability and accuracy in comparison to existing devices.' Dr McAuley says.

A/Prof O'Neal agrees. 'As a result of their pancreas no longer producing insulin to regulate glucose, people with type 1 diabetes need to measure their blood glucose levels by performing finger pricks several times a day.'

The artificial pancreas devices will automatically measure blood glucose and deliver the precise amount of insulin needed.

'It is hoped that this artificial pancreas will offer significant benefits both in terms of health outcomes and quality of life for people with Type 1 diabetes,' says A/ Prof O'Neal.

An important component of an artificial pancreas is a continuous glucose sensor. Glucose sensor technology has been evolving with the goal of achieving a level of accuracy required to replace finger prick glucose testing, together with a level of reliability for use in an artificial pancreas.

A/Prof O'Neal and Dr McAuley recently completed a trial evaluating a device that combined an optical glucose sensor together with two electrochemical sensors into a single device.

'The optical sensor works in an entirely different way to the currently available electrochemical sensors, meaning it will be able to operate under conditions which interfere with electrochemical sensing,' Dr McAuley says. 'By having both sensors working together, better accuracy and reliability may be achieved.'

'Our experiments have shown that an early version of an optical sensor improved reliability, though it is not yet as accurate as other sensors. However, the optical sensor shows much potential, and with further development we hope to improve its accuracy.'

'We are both clinicians first and foremost,' Dr McAuley says. 'I wanted to take part in research that is highly relevant to my clinical work, while relieving the burden of diabetes and improving the lives of my patients.'

'The ultimate goal is the automatic delivery of insulin, liberating the patient to go about their usual daily activities.'

Dr McAuley said she has been greatly inspired by her mentor, and has gained valuable experience as a clinician researcher working with the diabetes technology research team.

'I have recognised the value of building relationships with patients who are motivated to advance the knowledge of their chronic illness via participating in clinical research.'

'Our clinical research is directly applicable to patient care. We aim to push the boundaries with novel technology which will hopefully provide diabetes health benefits in the not-too-distant future.'

'When we design our studies we want to not only advance science, but also that our volunteer participants experience a tangible benefit regarding their health care,' A/Prof O'Neal adds. 'The positive reinforcement we receive from our patients provides an added dimension in motivating us to continue research in this field.'

120,000

Australians live with type 1 diabetes

4

years of research towards developing an artificial pancreas

The ultimate goal

IS THE AUTOMATIC DELIVERY OF INSULIN, LIBERATING THE PATIENT TO GO ABOUT THIER USUAL DAILY ACTIVITIES.

The artificial pancreas devices will automatically measure blood glucose and deliver the precise amount of insulin needed.

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ST VINCENT'S HOSPITAL
MELBOURNE

St Vincent's acknowledges

THE TRADITIONAL OWNERS OF THIS LAND, THE WURUNDJERI PEOPLE AND ALL THE MEMBERS OF THE KULIN NATIONS.

We pay our respects to their Elders, past and present. St Vincent's is Victoria's largest metropolitan provider of Aboriginal and Torres Strait Islander healthcare. We continue to develop our relationship with the Koori community and are proud to be acknowledged as a centre of excellence in healthcare for Indigenous Australians.