WESTERN HEALTH RESEARCH REPORT

2019-2020

Western Health

OUR VISION

Together, caring for the West, our patients, staff, community and environment.

OUR PURPOSE

Leading the delivery of a connected and consistent patient experience and providing the best care to save and improve the lives of those most in need in our community.

OUR VALUES

Compassion Consistently acting with empathy and integrity

Accountability Taking responsibility for our decisions and actions

Respect Respect for the rights, beliefs and choices of every individual

Excellence Inspiring and motivating, innovating and achieving

Safety Prioritising safety as an essential part of everyday practice

ACKNOWLEDGMENT OF TRADITIONAL OWNERS

Western Health acknowledges the Traditional Custodians on which our sites stand.

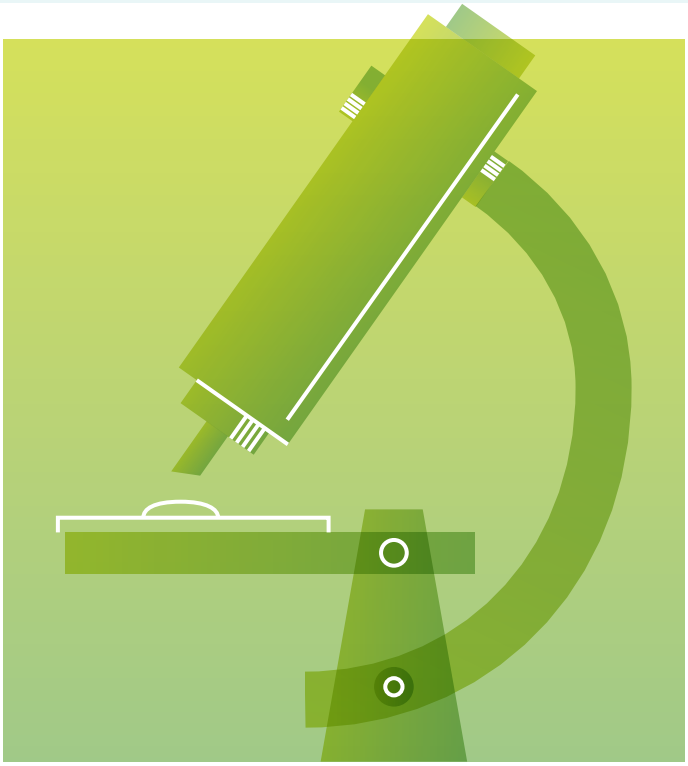
We pay our respects to Elders past, present and emerging.

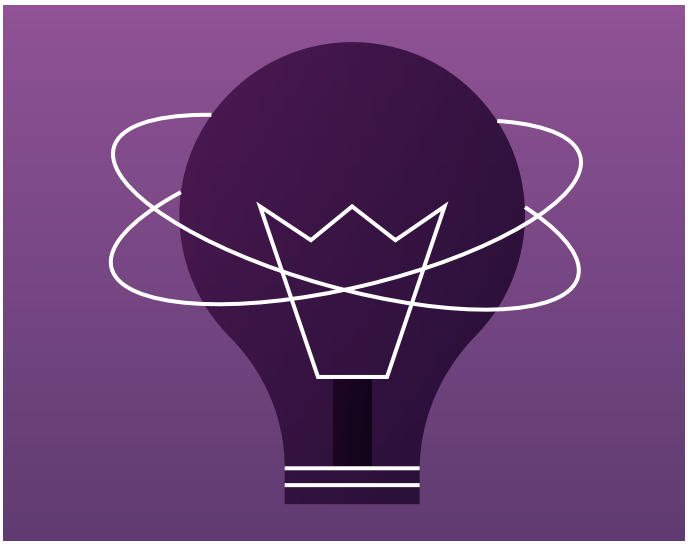
We are committed to the healing of country, working towards equity in health outcomes, and the ongoing journey of reconciliation.

CONTENTS

FOREWORD

Our research endeavours over the past five years have been guided by the Western Health Research Roadmap 2015–2020, which outlines our research strategic direction.





The first four years of the Research Roadmap saw significant progress within the strategic direction. While this was disrupted in 2020 due to COVID-19, the pandemic itself presented many research opportunities—across many areas—at Western Health.

Sunshine and Footscray hospitals managed the largest number of confirmed and suspected COVID-19 cases nationally, allowing our staff to demonstrate not only clinical excellence, but also an aptitude for innovation. At the height of Victoria's outbreaks in 2020, a lot of recruitment into non-COVID-19 trials was necessarily deferred. We joined the international research community in trying to understand the impact of COVID-19, Western Health participated in world-leading COVID-19 research, such as the ASCOT and COVID SHIELD trials.

Research across allied health, infectious diseases, respiratory medicine, anaesthetics and even fluid mechanics was initiated to improve safety, with the ultimate aim of delivering better treatment for patients. Consequently, research activity during COVID-19 did not cease; it merely changed focus. COVID-19 has changed many aspects of our working lives, and it has also made clear that organisations that embrace research are best-placed to respond to uncertainty, and to convert ideas into innovations.

It's difficult to find a better example of the ingenuity and agility that Western Health is renowned for than the personal ventilation hood, which gained global attention throughout 2020. The hood allows staff to administer standard treatment to patients with a confirmed or suspected COVID-19 diagnosis—without compromising clinician safety or patient comfort.

This concept was conceived by Associate Professor Forbes McGain, advanced through a collaboration with the Fluid Mechanics Department at the University of Melbourne and patient trials in the intensive care departments at Sunshine and Footscray hospitals, and was completed with the commercialising of the 'MediHood'. This Western Health invention made national and international news and is now playing a significant role in protecting healthcare workers globally. The collaboration, in partnership with CSIRO, was also one of the first to demonstrate the importance of aerosol generation in the spread of COVID-19.

While research into COVID-19 continues, Western Health is also progressing the new research strategy with excitement, as opportunities such as the New Footscray Hospital development and Phase 2 of the Electronic Medical Record, come to life.

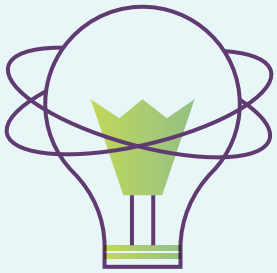
Western Health is one of the fastest growing health services in the country, thus our research portfolio will only grow, as the population we serve expands, no doubt bringing more diversity and complexity. While we continue to live in uncertain times, we know our staff and partners will continue to produce high-quality research, which benefits our patients locally and globally.

Western Health's 2019-2020 Research Report pays tribute to our researchers, academic partners and staff for maintaining our excellent research culture, and promulgating the innovative spirit that has served our community well during these tumultuous times, and will provide a strong foundation to lead research into the future.

Western Health Chief Executive Russell Harrison

Western Health Chief Medical Officer Dr Paul Eleftheriou

200
Publications



189
Projects approved

180
Projects submitted

RESEARCH 2019

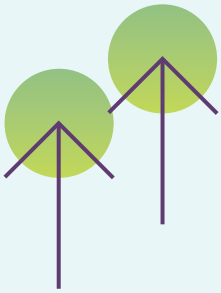
Supporting best care

Collaborating to conduct world-class research, Western Health is committed to improving outcomes for patients in the West and the world.

5

Successful patient outcomes

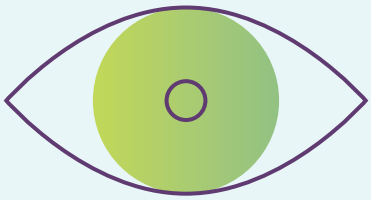
In the Western Health Cardiogenic Shock treatment program. (**Page 38**)



216

Patients

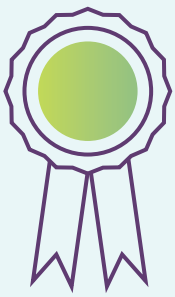
Across eight active sites involved in the ASCOT ADAPT trial. (**Page 40**)



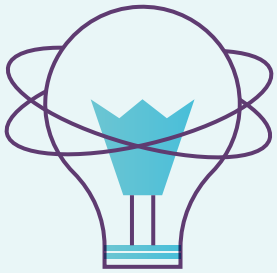
$6 m

Funding boost

Received by Future Health Today. (**Page 16**)



265
Publications



221
Projects approved

238
Projects submitted

RESEARCH 2020

Innovation at the fore

New research opportunities arose in unprecedented circumstances, a testament to the ingenuity of Western Health researchers.

1111

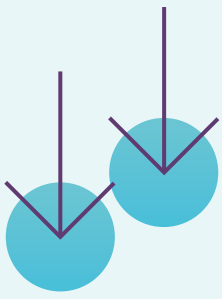
Families

Recruited into one of the world's largest-ever cohort studies Generation Victoria. (**Page 22**)

55%

Fall reduction

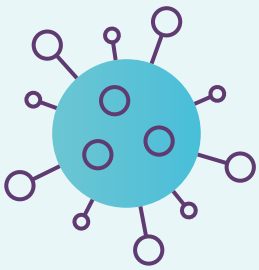
As a result of a system within the Falls and Fracture Clinic at Western Health. (**Page 44**)



1 in 6

Staff

Predominantly nurses and midwives, had been in direct contact with a COVID infected patient. (**Page 46**)



GRANTS AND AWARDS

2019 RESEARCH AND BEST CARE SESSION PRIZES

Best Care

BEST CO-ORDINATED CARE PRESENTATION PRIZE

Cindy Ogluszko: Implementing and evaluating a shared-care model of survivorship for prostate cancer patients in the west – a Western Health and North Western Melbourne Primary Health Network collaboration

Supported by Maxxia

BEST PERSON-CENTRED CARE PRESENTATION PRIZE

Danielle Hitch, Anna Novak, Lyn Bongiovanni & Angela Mucic: The identification, care and management of refugee patients at Western Health: The healthcare worker perspective

Supported by Maxxia

BEST RIGHT CARE PRESENTATION PRIZE

Cindy Ogluszko: Nurse-led prostate biopsy follow-up care

Supported by Maxxia

BEST SAFE CARE PRESENTATION PRIZE

Ainslie Senz & Elisa Ilarda: Introducing Routine Risk Assessment for Occupational Violence in the emergency department

Supported by HESTA

CO-ORDINATED CARE POSTER PRIZE

Melanie Wong & Catherine Grant: Book now! Improving access to Physiotherapy at Western Health Community Based Rehabilitation

PERSON-CENTRED CARE POSTER PRIZE

Marianne Phillips: Improving End of Life Care in the acute care setting

RIGHT CARE POSTER PRIZE

Lana Pepdjonovic: Would an automated booking program prevent delays in intravesical Botulinum Toxin injections?

SAFE CARE POSTER PRIZE

Patricia Kitney & Eugene Kwek: Implementation of track & trigger Observation and Response Charts (ORC) for Western Health Post Anaesthetic Care Units (PACU) / Day Procedure Units (DPU)

Research Week prizes

BEST ALLIED HEALTH RESEARCH PRESENTATION PRIZE

Allison Luscombe: Specialised vestibular physiotherapy in the emergency department: Safety and impact on diagnostic accuracy

Supported by BankVic

ROBERT HELME PRIZE FOR BEST NEUROSCIENCE RESEARCH PRESENTATION

Christy Kei: Atrial Fibrillation, Diabetes and Migraine Screening in the Sri Lankan Australian Community

Supported by The University of Melbourne

SUB-ACUTE AND AGED CARE RESEARCH PRESENTATION

Madeleine Beaumont: The role of the Comprehensive Geriatric Assessment prior to elective colorectal cancer surgery in older adults

Supported by tlc AGED CARE

BEST RESEARCH POSTER PRIZE

Reinetta Tanujaya: Cervical spine injury in emergency department attendees aged below 21 years: An audit of clinical features and medical imaging

Supported by HESTA

NEVILLE YEOMANS PRIZE FOR BEST INTERNAL MEDICINE RESEARCH PRESENTATION

Stefan Milevski: Weekend admission and changes in treating physician are associated with poorer outcomes in patients admitted with community-acquired pneumonia

Supported by Rotary Club of Footscray

BEST ONCOLOGY RESEARCH PRESENTATION PRIZE

Cheryl Ng: Retrospective audit of Symptom Urgent Review Clinic (SURC) utilisation in patients receiving chemotherapy for metastatic lung cancer

Supported by Roche

ROBERT SMITH PRIZE FOR BEST CRITICAL CARE RESEARCH PRESENTATION

Meike Foster: Estimating children's weight in emergency departments

Supported by WAICG

BEST NURSING AND MIDWIFERY RESEARCH PRESENTATION PRIZE

Margie McCormick: Perspectives of women and key stakeholders on organizational strategies aimed to optimize women's safety during labour and birth: A mixed qualitative study

Supported by Deakin University

KENDAL FRANCIS PRIZE FOR BEST SURGICAL RESEARCH PRESENTATION

Sam Pellegrino: Patterns of survivorship care for colorectal cancer – Experience from a single large tertiary institution

Supported by Medtronic

BEST PUBLISHED RESEARCH PAPER PRIZE

Melanie Lloyd: JAMA Internal Medicine: Effectiveness of Bundled Intervention Including Adjunctive Corticosteroids on Outcomes of Hospitalised Patients with Community Acquired Pneumonia. A stepped-wedge RCT

Supported by Maxxia

2019 RESEARCH AND BEST CARE SESSION PRIZES (continued)

Bank Vic Allied Health Grant

VANESSA WILSON

Title: Facilitating patient self management of Blood Glucose Levels (SMBGLs) in therapeutic exercise settings

Awarded: $5,000

Denise Patterson Scholarship Award 2020

CATHERINE PEELER

Title: Fertility concerns and related information needs and preferences of women with chronic kidney disease

Awarded: $5,000

Mavis Mitchell Scholarship Award 2020

JULIE SPENCER

Title: Research study surrounding pre and post implementation of ED based Peer Support Program

Awarded: $5,000

KATHERINE DRISCOLL

Title: A decade of publicly funded home birth—providing person centred care to women in the west

Awarded: $5,000

AIMSS

AIMSS BEST ORAL PRESENTATION AWARD

Cassandra Smith: Osteocalcin and its forms across the Lifespan in adult men

AIMSS BEST POSTER PRESENTATION AWARD-BASIC SCIENCE

Ahmed Al Saedi: Severely Decreased Bone Formation and Muscle quality in the Winnie Mouse Model of Inflammatory Bowel Disease (IBD)

AIMSS BEST POSTER PRESENTATION AWARD-CLINICAL SCIENCE

Jason Talevski: Effect of Clinical Care Pathways on Health-Related Quality of Life and Physical Function

2019 WH GRANTS

ELIZABETH FEHER

IMPROvE- Identification and Multidisciplinary Prehabilitation of at Risk Elderly patients undergoing Colorectal cancer Therapy. A feasibility scoping study

$10,000

IRENE DEFTEREOS

The impact of nutrition care pathway on the nutritional status and outcomes of patients undergoing resection for upper gastrointestinal cancer

$10,000

JONATHAN KAUFMAN

The Clean-Wee Research Series: Collecting paediatric urine samples cleanly with a simple skin-cleaning intervention

$25,000

RUWANI MENDIS

(Insomnia Cancer) INCA: Temazepam versus melatonin versus placebo for the treatment of insomnia in advanced cancer. A three arm, double blind, Phase IV, multicentre RCT

$35,000

2019 WH/Deakin Nursing and Midwifery Grants

SARA JORGENSEN

Evaluation of an exercise program for patients with breast cancer

$10,000

GRANTS IN 2020

Due to the pandemic, the following Western Health research grants were facilitated through the Western Health Foundation.

MATTHEW GUEST

Medical: Reusable N95/P2 mask prototype testing and secondary development

$5,000

JUSTIN YEUNG

Medical: Implementation of an organ space prevention bundle reduces the rate of organ space infection in elective colorectal surgery

$2,500

HAYLEY SCOTT

Allied Health: Experiences of Telehealth in community rehabilitation: An action research project

$4,000

REBECCA PILE

Allied Health: Improving care for paediatric patients with simple orthopaedic fractures via a virtual clinic

$4,957

ERIN SHAW

Allied Health: Virtual Home Assessment in Occupational Therapy

$4,000

LINDA SWEET

Nursing/Midwifery: Bariatric surgery before or after pregnancy? The experiences and information needs of Australian women

$5,000

SOPHIE GORE

Allied Health: Effectiveness of conservative management options for stable Weber B ankle fractures: A systematic review

$3,500

ALESHA SAYNER

Allied Health: Physiotherapy management in prostate cancer: A qualitative study of enablers, barriers and unmet needs

$4,923

REBECCA WOLTSCHE

Nursing/Midwifery: Preventing Patient Falls Overnight using Live and Portable Video Monitoring

$4,438

ANASTASIA COSTELLOE

Nursing/Midwifery: The Green Maternity Project; introducing a range of sustainability practices at JKWC

$5,000

FIKA TAMIRU

Nursing/Midwifery: Lactation Consultant Training Program

$975

RESEARCH DIRECTORATE

Mr Bill Karanatsios
Research Program Director

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Director of Research (until March 2020)

Ms Virginia Ma
Research Governance Officer

Ms Meera Senthuren
Ethics and Governance Administration Officer

Ms Noelle Gubatanga
Ethics and Governance Administration Officer

Dr Koen Simons
Biostatistician (until June 2019)

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ICU Consultant/ Anaesthetist

DEPUTY CHAIRPERSON/S

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Respiratory Physician

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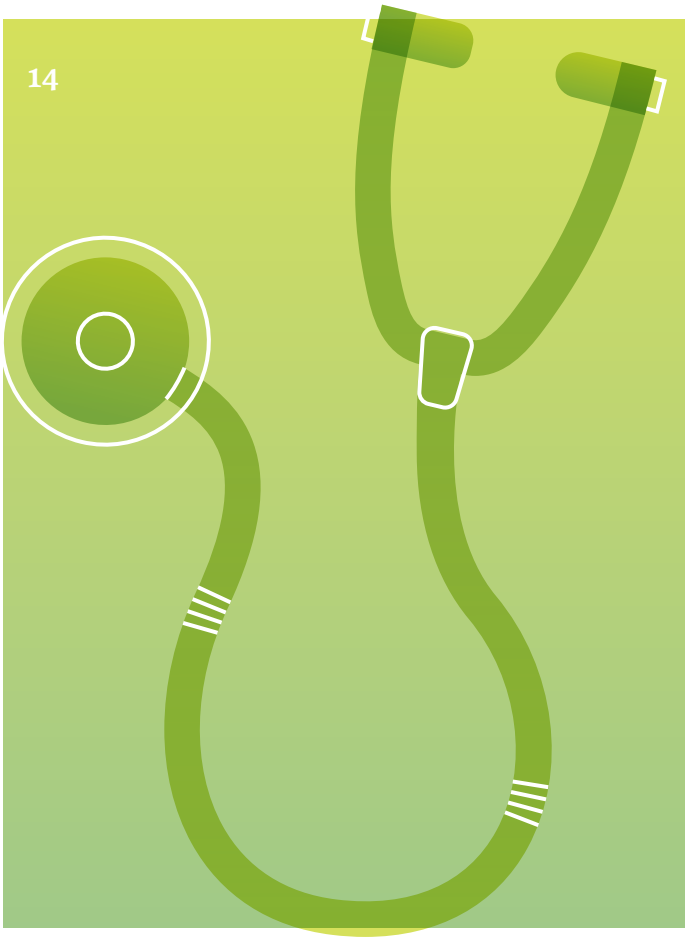

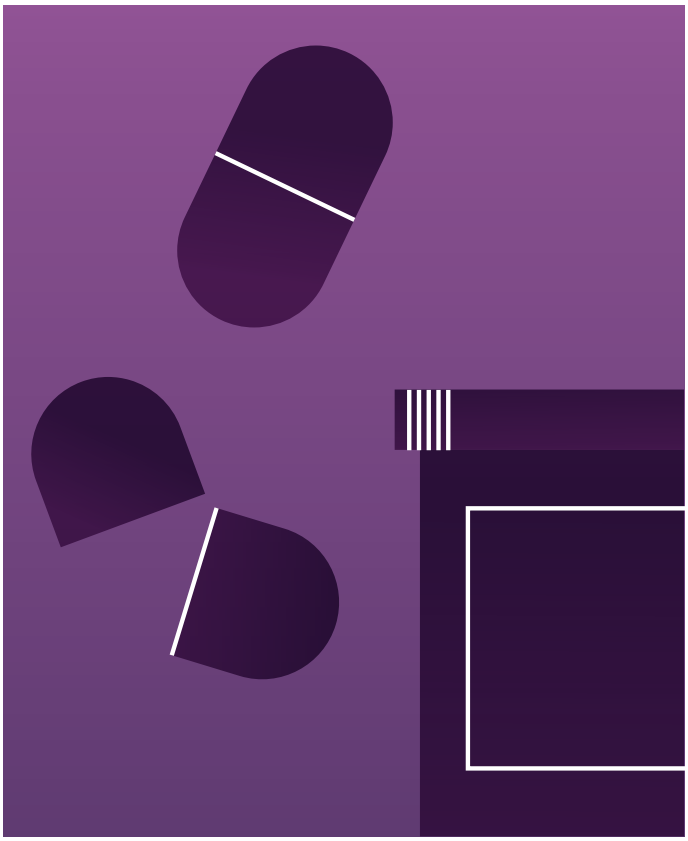

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Sharon Klim
Joseph Epstein Emergency Medicine

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Medical Oncology and Haematology

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Jing Lei
Nephrology

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Nephrology

Shannon Kokoszka
Nephrology

Sherisse Celestino
Neurology

Bodil Rasmussen
Nursing & Midwifery

Libby Spiers
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Kellie Foran
Pathology & Medical Imaging

Sue Casanelia
Respiratory & Sleep Disorders Medicine

Phuong Tran
Rheumatology

Kelsey Serena
Tissue Bank

Amanda Hickling
Urology

WESTERN HEALTH CHRONIC DISEASE ALLIANCE

New technology that helps doctors diagnose and treat patients is tipped to revolutionise early detection and management of chronic diseases.

The digital health tool uses medical records to automatically warn GPs when a patient is at-risk of developing cardiovascular disease, type 2 diabetes, chronic kidney disease and cancer. It also notifies them if key pharmacotherapy and management items from the national guidelines for care are missing.

Developed by the Western Health Chronic Disease Alliance (WHCDA) and the University of Melbourne, Future Health Today will enter clinical trials in late 2021. If successful, the technology could be rolled out in GP clinics around Australia.

Even in the face of the COVID-19 pandemic, chronic diseases remain an ongoing cause of ill health, hospitalisation, disability and premature death. It's estimated that 11 million Australians have one or more chronic diseases, and many more people remain at risk. Detecting at-risk patients and ensuring those already affected receive best practice care is crucial to changing the course of the chronic disease epidemic in Australia.

Western Health's Director of Nephrology, Associate Professor Craig Nelson said WHCDA aims to reduce the burden of chronic diseases through a targeted and collaborative approach to medical research. He said that for many patients, the best chance of reducing their risk of chronic disease, avoiding an escalation of an existing condition, or preventing another one from developing, was in primary care. Each week, two million Australians visit their GP, making it an ideal opportunity to implement prevention and early intervention plans that could change the course of chronic disease.

Future Health Today uses decision support and audit capability to analyse data from patients' electronic health records, alerting doctors to potential chronic disease cases and providing an opportunity for earlier treatment. It also aims to assist with providing first-class care to patients who have already been diagnosed.

"Working with the University of Melbourne we are developing and testing an audit and decision-support tool that makes it easier for GPs to provide best practice care and detect patients with chronic diseases earlier, so they can be given appropriate and timely treatment," A/Prof Nelson said.

> **"The technology analyses the risk factors that are documented in patient's medical records and alerts GPs to the potential risk. The GPs review the alert and order additional tests.**

"If the diagnosis is confirmed, the program will look for guideline-appropriate treatment within the medical record. If it's not there, it will alert the GP that certain treatments or investigations are required."

The Future Health Today technology builds on two previous projects by WHCDA. The first, eMAP:CKD, aimed to help doctors detect and manage patients with chronic kidney disease

(CKD), while the second, CD IMPACT, is a program to improve diabetes detection.

"Both of these projects relied on commercial products, but for Future Health Today we were lucky enough to work with the University of Melbourne's Department of General Practice, who co-designed it with GPs, to ensure it can be easily integrated into their everyday workflow," A/Prof Nelson said.

> **"We hope this will also mean it is more intuitive and less labour intensive, making it easier to roll out on a national scale."**

In 2019, Future Health Today received a significant funding boost totalling $6 million. The team was awarded a Melbourne Academic Centre for Health Medical Research Future Fund Rapid Applied Research Translation Grant and Fellowship and entered into a four-year partnership with the Paul Ramsay Foundation.

As well as providing GPs with support making decisions, Future Health Today can assist them with quality improvement programs.

> **"For instance, they could use it to find all patients who are at risk of kidney disease and see whether they've had appropriate tests," A/Prof Nelson said.**

"Then they could recall patients to complete the tests. Or they may choose to look at patients who have chronic kidney disease, who aren't taking medication, such as an ACE Inhibitor, which helps prevent the progression of disease, but also prevent the subsequent diseases."

A/Prof Nelson said the implementation of the trial will be led by their collaborators from the University of Melbourne Department of General Practice. He said he was thrilled that the project had developed its own momentum in the primary care space.

Western Health's Director of Nephrology, Associate Professor Craig Nelson.

Over the past two years, WHCDA partners have also had significant publications in endocrinology, neurology and cardiology. While COVID-19 had a significant impact on Western Health people and their patients, it has also led to an unexpected growth in international research collaboration.

"Australia has been less impacted by COVID-19 than the rest of the world, so many international trials have looked to us for collaborations," A/Prof Nelson said. "For instance, in countries where there have been extremely high mortalities, it makes it difficult to conduct clinical trials of new therapies. "WHCDA has had a period of growth in international trials, which has included expanding into infectious disease research."

Over the next 12 months, the alliance aims to further collaborate with colleagues in radiology, surgery, allied health, and nursing, to identify new research projects to reduce the burden of chronic disease.

OFFICE FOR RESEARCH

The release of the 2019-2020 Western Health Research Report culminates with the completion of Western Health's 2015-2020 Research Roadmap.

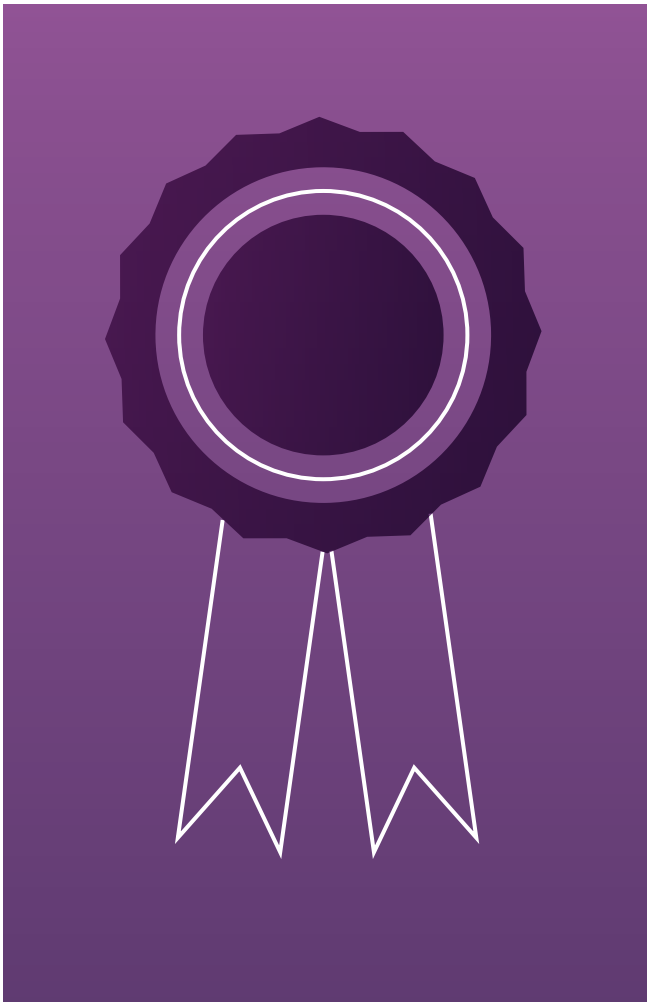
We can look back on the Western Health research trajectory over the past two years, in particular, and be proud of how the organisation has been able to navigate the challenges presented by the COVID-19 pandemic, and seize the many opportunities it has presented. Western Health has been able to make the best of this difficult situation by continuing to make progress on the priority areas identified in the Research Roadmap.

Left to right: Ms Meera Senthuren, Ethics and Governance Officer, Mr Bill Karanatsios, Research Program Director, Ms Kerrie Russell, Ethics and Governance Administrative Officer and Ms Virginia Ma, Research Governance Officer.

In particular, we have delivered against the following Research Roadmap priorities:

INCREASE AWARENESS OF THE IMPORTANCE OF RESEARCH TO UNDERPIN BEST CARE

The year 2019 saw the merging of Research Week and the Best Care Conference into a single event that celebrates the contributions of Western Health's research endeavours and Best Care achievements. The inaugural Research and Best Care Conference (RBCC) was a great success and depicted the synergy and interrelationship between research and the delivery of Best Care. Despite the 2020 RBCC being impacted by the COVID-19 pandemic, the virtual conference was well received and once again demonstrated the great work undertaken by Western Health staff during very challenging times.



SUPPORT HIGH QUALITY RESEARCH

Over the past five years, Western Health has realised significant research successes during a period of major growth and upheaval. Western Health researchers are publishing in high-impact journals and leading research and innovations around models of care, catching the attention of national and international media outlets.

The Future Health Today project is one example of a multimillion dollar project that has the potential to change the way the burden of chronic disease is reduced, particular in underprivileged populations.

Western Health's Sunshine Hospital was also the vanguard site for the launch of the Generation Victoria (GenV), which is one of the world's largest ever cohort studies—being led by the Murdoch Children's Research Institute (MCRI)—and aims to follow 150,000 children born in Victoria over the next two years.

Western Health has been leading the fight against COVID-19 by participating in world-leading clinical trials and inventing ways to reduce the spread of the virus, particularly within clinical settings.

FOSTER INNOVATION ACROSS WESTERN HEALTH

Over the past two years Western Health has been involved in a number of successful Melbourne Academic Centre for Health (MACH) and Medical Research Future Fund (MRFF) grants. Other significant highlights include the partnerships with the University of Melbourne to innovate and eventually commercialise the McMonty personalised ventilation hood, and the launch of the Innovation Acceleration Program (IAP).

This level of high-end research activity and innovation is the result of the evolving research culture at Western Health, which is empowering staff to lead important research in their own right and knowing that there is a safe and supportive platform for them to present their ideas and innovations.

Construction of the new Footscray Hospital is now underway, with the hospital expected to open in 2025.

STRENGTHEN AND SUSTAIN OUR RESEARCH PARTNERSHIP

It's important to acknowledge our academic partners who have also been integral in facilitating certain aspects of our success along the way. Our partnership with the University of Melbourne was important in progressing the concept of the McMonty Hood toward commercialisation, which subsequently inspired the establishment of the IAP.

Our affiliation with Deakin University, particularly through the two academic Chair appointments in Nursing and Midwifery, is facilitating greater high-quality research activity within the nursing and midwifery space, ensuring that these disciplines are adequately supported and staff participation in research increases.

Collaboration opportunities with Victoria University are also increasing, allowing both organisations to work together on major projects that have the potential to change how our community accesses healthcare and how they manage their disease while waiting to see a specialist.

With the new Footscray Hospital build now well under way, the planned Melton Hospital confirmed, and the voluntary amalgamation with Djerriwarrh Health Services completed, we will continue to strive to better understand the healthcare challenges facing our growing communities, and to deliver solutions that are globally relevant and sustainable, and inspire our people to further innovate.

Our vision for the future is to be leaders in translational and health services research in the chronic and complex disease space and to develop, deliver and evaluate models of care that address the needs of the community we serve in a sustainable and respectful manner. Innovation and invention remain a core goal of our current and future research pursuits.

The next five years hold great promise and even greater opportunities at Western Health, given the predicted growth and the provision of new state-of-the-art facilities. The next research strategic plan will aim to ensure we continue to draw our research inspiration from our local unmet needs, and that we are also well-placed to maximise the opportunities presented by our new facilities.

GENERATION VICTORIA

Joan Kirner Women's and Children's at Sunshine Hospital is playing a key role in a once-in-a-lifetime study that could ultimately improve the health and wellbeing of all Victorians.

Associate Professor Joanne Said is the Head of Maternal Fetal Medicine at Joan Kirner Women's and Children's Hospital.

The innovative Generation Victoria (GenV) project, led by the Murdoch Children's Research Institute (MCRI), is one of the world's largest-ever cohort studies. It will follow babies and their parents to ensure health challenges ranging from asthma, food allergies and mental illness, can be better predicted and treated.

Over two years, approximately 150,000 children born in Victoria and their parents will be invited to join the study. And it all started at Joan Kirner Women's and Children's (JKWC) in December 2020, with the official launch of the program and the commencement of recruitment.

> **As of July 2021, the GenV team has recruited 1111 families and 2427 participants at Joan Kirner Women's and Children's alone. Meanwhile, the program is being steadily rolled out to all maternity hospitals across Victoria.**

GenV's primary objective is to create large, parallel whole-of-state birth and parent cohorts for discovery and interventional research. It will enable scientists to explore the issues affecting Victoria's children and their families with greater speed and precision than we can today, allowing them to explore the critical links between environmental exposures, genome (genetics), physical characteristics and later outcomes across the life course.

Baby Eliana with parents Maria and Eddie at the launch of the GenV project at the Joan Kirner Women's and Children's Hospital.

Associate Professor Joanne Said, Head of Maternal Fetal Medicine at Joan Kirner Women's and Children's, member of the GenV Investigator Committee and the Chair of the GenV Pregnancy Working Group said the vast amounts of information collected would help identify trends across the population, including those detected in pregnancy.

"Many childhood conditions actually have their origins in pregnancy," explained A/Prof Said. "By understanding the impacts of the pregnancy on those childhood conditions, we will have the opportunity to understand more about the effects of pregnancy and predict which interventions will actually make a difference for those children."

GenV Director Professor Melissa Wake thanked the Western Health team for collaborating in such a significant study.

"GenV brings a size and a scale to research for children and parents that we simply haven't seen before in Australia, or really anywhere else in the world," Prof Wake said. "The more people who take part, the clearer the picture becomes, making it easier to predict, prevent and treat the problems that children and parents face every day."

Western Health's Research Program Director Bill Karanatsios said: "With both myself and Jo being involved very early on in a number of GenV working groups, it was natural progression that JKWC became the vanguard site for GenV to help test the various operational elements of the program and introduce further refinements before its state-wide roll out.

> **"The high birth rate numbers at JKWC coupled with the diverse populations it serves provided a great opportunity for the program to be tested in the 'real world' and such partnerships demonstrate how important they are for helping address current and future health challenges."**

GenV is led by the Murdoch Children's Research Institute, supported by the Royal Children's Hospital and University of Melbourne, and is funded by the Paul Ramsay Foundation, the Victorian Government and the Royal Children's Hospital Foundation.

RESEARCHER PROFILE:

GARY BLACKBURN

A nurse triggers an alert. It rings out across Footscray Hospital. A patient's blood pressure is dropping rapidly, and they may need to be transferred to intensive care.

Within minutes, health professionals swarm around the patient. But what if a patient's risk of deteriorating could be detected earlier? Perhaps they could avoid intensive care, or require less interventions upon admission?

Western Health has found a new approach that supports nurses and midwives to identify at-risk patients while they were still on the general wards, rather than waiting for staff to call for emergency assistance. It all started eight years ago with an idea by ICU Liaison Nurse Practitioner Gary Blackburn. An audit of observation charts found that more than half of nurses were not escalating patients when they met the criteria for a MET (Medical Emergency Team) call.

"MET calls are triggered when certain criteria on a patient's observation chart, such as their blood pressure or respiratory rate, cause alarm," Gary said. "Two teams appear at the patient's bedside. The treating team, who knows the patient, and the ICU liaison team, who have extensive experience caring for critically ill patients."

Under the new approach, ICU Liaison staff still attend MET calls, but they also do pro-active rounding. It involves the liaison team visiting the wards to identify at-risk patients, building a rapport with staff and sharing their knowledge. Gary said the aim was to improve referrals to the service, and identify and treat patients who were at risk of deterioration earlier.

> **"The secondary advantages include addressing staff knowledge gaps and bedside education, to help improve the management of deteriorating patients and lead to better patient outcomes," Gary said.**

"Anecdotally we were receiving great feedback, but I wanted to evaluate it, to find out what nurses and midwives thought of the approach."

Gary had never conducted research before. In fact, when he first arrived in Australia almost two decades ago, a fresh-faced nurse on an antipodean adventure, a career in intensive care was never on the cards—let alone leading an award-winning research proposal.

Around 15 years ago Gary was working at a private hospital on the cardiac ward when he was asked to do a shift in intensive care. It was a sliding doors moment that defined his career. Gary undertook postgraduate studies in ICU nursing, completed a Master's degree and became an ICU Nurse Liaison Practitioner at Western Health.

In 2018 his proposal to evaluate the pro-active rounding approach won the 2018 Denise Patterson Nursing and Midwifery Award, which supports early career researchers.

ICU Liaison Nurse Practitioner Gary Blackburn conducted research into a new way of identifying patients at-risk of deterioration.

Gary conducted online surveys and in-depth interviews with nurses and midwives. He found that staff viewed the pro-active rounding as a positive initiative that improved patient outcomes by helping staff make sensible and timely decisions about deteriorating patients. They said the liaison service was an excellent resource, praising their non-judgemental and supportive approach. Many valued the service so much that they wanted 24-hour access, which now exists at Sunshine and Footscray hospitals.

Gary has submitted his article to a peer-reviewed publication and looks forward to seeing it in print. The support he received from the Office for Research was invaluable and the satisfaction he felt after producing his first research project was immense.

"It was challenging, but it was worth it," he said. "I would encourage other nurses to consider doing research: as a profession we tend to undersell ourselves. Nurses have great ideas, instead of following the best-practice evidence- why don't we start producing it?"

Western Health runs a publicly-funded homebirth program.

MIDWIFERY RESEARCH REVOLUTION UNDERWAY AT WESTERN HEALTH

483

women gave birth at home between 2009-2019 through the publicly-funded Sunshine Hospital homebirth program.

In a first for Western Health, an innovative midwifery research role is helping to provide women and their families with high-quality evidence-based care.

Professor Linda Sweet is the inaugural Chair of Midwifery in the Deakin University Western Health Partnership. Whether it's postpartum haemorrhage, breastfeeding rates, or homebirths, Professor Sweet is conducting research that directly assists the health service to find ways to address clinical challenges or assess the success of existing programs.

Professor Sweet worked as a nurse for a decade before becoming a midwife. She made the move into education, and then academia, where she has amassed considerable experience. In her current role at Western Health, Professor Sweet is supported by Dr Vidanka Vasilevski, who has a background in neuropsychology and an interest in women's health.

> **"We have more than 30 projects underway involving Western Health staff and collaborators both in Australia and internationally," Professor Sweet said.**

"They are interprofessional, including collaborating with Newborn Services, Lactation Consultants, Midwifery Group Practice, Homebirth Midwives, Maternal Foetal Medicine Obstetricians, and the DIAMOND Clinic team who support pregnant women who are overweight and obese. This is important because pregnant women are seen by a variety of services across the hospital and by working with our colleagues; we ensure midwifery has a voice in shaping the provision of care.

One of the largest projects the team has been working on over the past year has been exploring the experience of women giving birth in our publicly-funded homebirth program at Sunshine Hospital, which is the largest of only two services of this kind in Victoria.

> **"Ten years ago the first publicly-funded homebirth programs were launched at Sunshine and Casey hospitals," Professor Sweet said. "It offers women increased choice of their place of birth."**

The majority of women in Australia give birth in a hospital, with approximately one percent of women having a homebirth.

Between 2009-2019 a total of 483 women gave birth at home through the Sunshine Hospital program.

"We sought to explore the experiences of women who were involved in the program, including: women who ended up birthing at home, those who were transferred to hospital care before, during, or after birth, and women who were not eligible for a homebirth but applied."

As well as conducting in-depth interviews with a range of women, they assessed the maternal and neonatal clinical outcomes and spoke to healthcare workers about their experience of the program. Whilst the findings are awaiting publication, Professor Sweet said their research is providing invaluable insight into the homebirth program.

Professor Sweet has completed a pilot trial of a new lactation device for breastfeeding women to apply massage, heat and cold, and compression to the breast. The team is also evaluating the Registered Undergraduate Student of Midwifery (RUSOM), which involves health services like Western Health employing students to work in their hospitals while they continue to study.

It's hard to believe that it has only been two years since Professor Sweet took up her position at Western Health, but already the impact of her expertise is having a positive impact on women and their families in the West and beyond.

WAITLIST PROJECT TO EMPOWER PATIENTS

A new tailored e-health program aims to enhance the health and wellbeing of people with osteoarthritis, who are awaiting specialist care in Melbourne's West.

Mary De Gori, Allied Health Manager, Physiotherapy and Exercise Physiology.

The intervention, a partnership between Western Health and Victoria University, aims to further our understanding of the patients who are waiting for an orthopaedic assessment in the public health system.

"Osteoarthritis is highly prevalent in our community resulting in a high demand for specialist care," Mary De Gori, Allied Health Manager, Physiotherapy and Exercise Physiology said.

> **"Conditions like this can result in chronic debilitating pain, which can have a significant impact on a patient's physical and mental wellbeing."**

Ms De Gori knows too well the impact of chronic pain. Her first foray into physiotherapy was inspired by her family experience.

"As an eight year old, I decided I was going to become a physio, my mum had chronic neck pain and I was going to fix it."

After working as a physiotherapist and in a variety of non-clinical management roles for many years, Ms De Gori recently returned to Western Health to reconnect with her passion for improving patient care, education and research.

The decision to launch a feasibility study of an e-health intervention emerged after discussions with Western Health's Orthopaedic Unit Head Mr Phong Tran and research partners at Victoria University.

Rebecca Pile, Grade 4 Advanced Practice & Musculoskeletal Physiotherapist at Western Health.

"We know there is a period of time between when a patient is referred to an orthopaedic surgeon and their appointment, but we want to understand more about the health and wellbeing of patients while they are waiting," Ms De Gori said.

"Excitingly, we will also be developing a novel online program, which will provide patients with strategies around self-management and education of pain management, exercise, nutrition and wellbeing."

"The online program will be co-designed by patients in the West, they will be able to influence the type of information and support they need based on their own lived experience."

Orthopaedic specialists, dietitians, psychologists, occupational therapists and physiotherapists will design the program in conjunction with 15 patients awaiting orthopaedic specialist care, who would normally be managed by their GP while they wait.

> **"We hope it will give us a really good understanding of the quality of life and physical functioning of this group of patients, which will help the health service deliver targeted and appropriate holistic care."**

A patients' suitability for the intervention will be assessed by Advanced Practice Physiotherapists, who are skilled in diagnosing and treating patients with musculoskeletal conditions and trained in reading X-rays, and supported by orthopaedic consultants.

"The Advanced Practice Physiotherapists will review the patient's referral from their GP and confirm the suspected diagnosis by reading the X-rays and perform a physical assessment of the patient."

Improving aspects of a patient's mobility, nutrition or mental wellbeing can have a wide range of benefits that could not only improve their quality of life while they await surgery, but also put them in the optimal position to recover from the operation.

"For instance, weight loss can assist with pain management and reduce the risk of surgery, while other patients may need assistance with nutrition to improve their bone health.

"In addition, chronic pain often requires a psychological and physiological approach, it's about helping patients manage their life and be able to live with the pain."

The online program may even reduce the need for surgical intervention.

Ms De Gori said if the program is successful, it could eventually be offered to patients with a range of musculoskeletal conditions.

INNOVATION ACCELERATION PROGRAM

A new partnership between Western Health and the University of Melbourne is offering exciting opportunities for staff to turn their brightest ideas into reality.

The Innovation Acceleration Program (IAP), launched in late 2020, is connecting innovative Western Health staff with the world-class research and commercialisation capabilities of the University.

The first round of the IAP received 17 submissions, with three teams and concepts being announced as finalists in February following a series of mentoring sessions and presentations. The teams made their formal pitch to an expert IAP panel in March.

In the first round, two projects were funded, which will allow their concepts to be developed and commercialised. These are detailed below. It is now hoped that the IAP will be an ongoing program, with second-round submissions to be invited in late 2021.

Western Health's Research Program Director Bill Karanatsios said the key criteria for IAP submissions was the identification of a "genuine unmet need" in healthcare.

> **"The successful teams will then have access to funding to further develop their concept and will also be supported by experts to help progress their concepts along the commercialisation and translation journey," Mr Karanatsios said.**

One of the best examples of a successful collaboration between Western Health clinicians and University of Melbourne field experts was the iHood – created by anaesthetist and intensivist Dr Forbes McGain and Professor Jason Monty, Head of Mechanical Engineering at the Melbourne School of Engineering, as featured on **page 42**.

Innovation Acceleration **Program**

innovationaccelerationprogram.com.au

Western Health pharmacist Pauline Megallaa who was part of the team designing a novel re-useable mask.

Dr Josh Szental, Specialist Anaesthetist at Western Health, is part of the team developing a novel system to quickly and accurately detect blood loss during surgery, which was funded by the Innovation Acceleration Program (IAP).

PROJECT: RERESP (REUSABLE RESPIRATOR) – A NOVEL RE-USABLE MASK DESIGNED FOR COMFORT AND IMPROVED ACOUSTIC ABILITY

TEAM: Pauline Megallaa, Matthew Guest, Katherine Langan and Dr Forbes McGain (Western Health), David Collins (University of Melbourne, Faculty of Engineering and Information Technology), and Jerome Wielens (University of Melbourne, Business Development).

Medical respirators are a core component of personal protective equipment. During the COVID-19 pandemic, the universal adoption of facemasks put an enormous burden on their supply and disposal. In 2020, the World Health Organisation (WHO) estimated that 89 million medical masks were required each month to meet the global demand and called for a 40 per cent increase in manufacturing.

Current alternatives do not address the shortfalls of disposable medical respirators; Powered Air Purifying Respirator (PAPR) and elastomeric masks have issues relating to cost, maintenance and cleaning. They can decrease speech intelligibility by 40 per cent and industrial masks cannot be easily sterilised. This product design affords many benefits including the use of a novel concept to enhance sound acoustics and improve user experience. Additionally, with improved mask fit and user comfort we aim to improve protection against respiratory viruses thereby having a social and health impact. ReResp can be upscaled for a national and global market and is marketable in other high-risk settings beyond the healthcare system.

PROJECT: BLOOD LOSS MONITOR – A NOVEL SYSTEM TO ENABLE QUICK AND ACCURATE DETERMINATION OF BLOOD LOSS DURING SURGERY

TEAM: Joshua Szental (Western Health), Eric Schoof and Kevin Kevin (University of Melbourne, Faculty of Engineering and Information Technology) and Damon Beckwith (University of Melbourne, Business Development).

10-15%

of surgery results in major bleeding.

An estimated 10-15 per cent of surgery results in major bleeding. During an episode of major bleeding, determining the exact level of blood loss is time consuming and distracts from other areas of patient care that are equally time critical. Inaccurate assessment of blood fluid loss can lead to improperly treated acute haemorrhage, with significant side effects especially in elderly or compromised patients. A cross-disciplinary, inter-institutional team aims to assist surgical staff with monitoring the net blood loss of patients during surgery through a system of automated, accurate, and real time measurements. This system will reduce cognitive load on surgical staff by automating calculations that are currently manual and ad hoc, and also improve patient outcomes by reducing cases of undetected moderate and severe intrasurgical blood loss.

FINALLY, a third project by Western Health urologist Dr Dinesh Agarwal, which investigates improved processes for conducting prostate biopsies, is also very promising. Dr Agarwal continues to work with the University of Melbourne team to further his project's progress.

Dr Jonathan Kaufman is a General Paediatrician at Sunshine Hospital, Clinical Lead for research for paediatrics and Director of Clinical Training at Western Health.

PREMIER'S AWARD FINALISTS

Two of Western Health's most promising clinical researchers – paediatrician Dr Jonathan Kaufman and physiotherapist Melanie Lloyd – were recognised as finalists in the 2020 Premier's Awards for Health and Medical Research. These prestigious awards recognise the exceptional contributions and capabilities of Victoria's emerging early-career researchers in their PhD studies.

DR JONATHAN KAUFMAN

Paediatrician Dr Jonathan Kaufman was named a finalist in the 2020 Victorian Premier's Awards for Health and Medical Research in recognition of his research into the effective investigation of urinary tract infections in young children.

Urinary tract infections (UTIs) are very common in young children, but hard to diagnose. If untreated UTI can cause life-threatening infections and kidney damage. Testing a urine sample is the only way to detect UTIs but collecting a reliable urine sample from a young child can be very difficult.

Dr Kaufman, who works as a clinician-researcher at Sunshine Hospital, developed a simple, gentle and practical collection method known as Quick-Wee. Rubbing the child's abdomen with wet gauze triggers urination so a sample can be collected quickly. The research found the method was three times more effective than current practice, is preferred by parents, nurses and doctors, and is more cost-effective.

Dr Kaufman's research, completed as part of his PhD in the Health Services Research Group, Murdoch Children's Research Institute and The University of Melbourne, was published in the prestigious *British Medical Journal* and has been adopted into clinical practice guidelines in Australia, the United Kingdom, Italy and Canada.

Associate Professor Stephen Lew, Director of Medical Education, Western Clinical School, said the impact of Dr Kaufman's work had been far-reaching: "Findings from Jonathan's research have been used in clinical practice guidelines, and his research has been recognised with more than 20 awards and prizes".

> **Dr Kaufman is the Clinical Lead for research for paediatrics at Western Health and Director of Clinical Training for the General Stream.**

In late 2020, Dr Kaufman was also awarded a prestigious one-year clinical investigator award by the Viertel Charitable Foundation, worth $85,000. The foundation was established by Charles and Sylvia Viertel in 1995 to benefit organisations or institutions involved in medical research into diseases, and the alleviation of hardship of the aged and the sick.

DR MELANIE LLOYD

Supporting Western Health's largest – and most complex – cohort of patients has been the prime focus of Dr Melanie Lloyd's outstanding research career.

The clinical physiotherapist has become renowned for her expertise in clinical trial design and outcome measurements. Her ongoing research into "measuring the quality of life in vulnerable, complex patients" had its foundations in the Improving Outcomes in Geriatric Pneumonia (IMPROVE-GAP) project. Dr Lloyd was one of eight principal investigators in the Western Health study, which aimed to optimise the care of community acquired pneumonia (CAP) patients, combining the best evidence-based interventions from the medical, physiotherapy and nutrition specialties.

Dr Lloyd has continued her work in this area with her PhD assessing instruments currently available to clinicians to measure the quality of life in older patients with co-morbidities.

"I looked at the quality and feasibility of the existing tools and found there were significant limitations that need to be addressed," Dr Lloyd said.

2000+

admissions of elderly patients in the general medical ward

"The group is very heterogenous. It's made up of complex patients with multiple chronic health issues and they have high rates of re-admission. Elderly patients in general medical wards make up the biggest individual cohort of inpatients at Western Health – we have more than 2000 admissions every year."

Dr Lloyd was named a finalist in the 2020 Premier's Awards for Health and Medical Research for her novel approach to embedding clinical trial methodologies alongside routine care, to simultaneously implement and evaluate an evidence-based health-system intervention.

The awards website concluded: Dr Lloyd's work has demonstrated that robust research methodologies can be integrated within routine care to resolve questions regarding health-system effectiveness.

> **"The outcome of the research represents a vital precedent for conducting robust clinical trials with the hospitalised elderly, and provides a template for future high-quality, low-cost health-services research."**

During 2020, Dr Lloyd also continued working as a clinical physiotherapist and was charged with overseeing Western Health's COVID-19 research database.

Allied Health Director Julia Blackshaw said Dr Lloyd was a highly valued staff member: "This is a major achievement and reflects an enormous amount of work from Mel."

Western Health research and clinical physiotherapist Dr Melanie Lloyd.

RESEARCHER PROFILE:

ASSOCIATE PROFESSOR WILLIAM CHAN

A/Prof William Chan is a cardiologist and clinician-investigator whose research has led to a life-saving treatment for heart patients.

5

Successful patient outcomes in the Western Health Cardiogenic Shock treatment program, the leading site in Australia.

He is the co-founder of the Western Health Cardiogenic Shock treatment program which was launched in late 2019 to pilot the use of a world-leading heart pump in Australia. Western Health is one of the highest volume centres for the treatment of acute heart attacks, and the program was developed to address the gap in satisfactory models of treatment and the high mortality rates of patients with this condition.

"Given where we are geographically and the large catchment area we service, Western Health was seeing a large number of patients present in a very sick way," explains A/Prof Chan.

> **"We are talking about patients in their 50s and 60s and our options to treat them in the acute phase was limited. This motivated us to find a solution."**

Since the program began, Western Health has used the cardiogenic shock treatment on five patients with successful outcomes, making it the leading site for its use in Australia. There is now growing awareness about the effectiveness of the device to treat very sick patients.

A/Prof Chan established a cardiogenic shock registry to capture data relating to these patients and a flow on from the program will be further cardiogenic shock-related research.

"I see lots of patients with heart issues and I'm very interested in the finer physiology of what happens to the heart muscles and what happens to the arteries in these cases. I have set up a PhD program where I've got two fellows working on various aspects of cardiogenic shock," he said.

Associate Professor William Chan is a cardiologist and clinician-investigator who co-founded the Western Health Cardiogenic Shock treatment program.

A/Prof Chan is also researching novel treatments, including the use of an antibiotic to reduce the risk of heart muscle failure. Together with one of his Research Fellows he has conducted a randomised trial with 103 patients and has submitted an abstract, with the full paper expected to be published in 2022.

With the onset of the COVID-19 pandemic, A/Prof Chan is concerned about the potential for effective and timely treatment of heart patients to be compromised.

"When the first wave hit Victoria, we noticed a change in the pattern of people presenting. People were not coming to hospital and when they did, they were presenting with more severe conditions, suggesting they waited too long before seeking medical attention," he said.

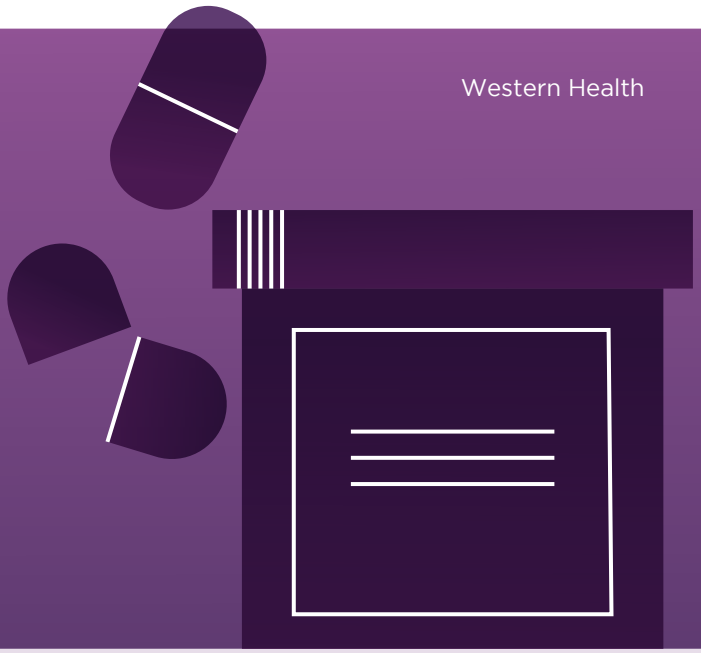
To investigate this further A/Prof Chan has sought and received approval for a Victorian Cardiogenic Outcomes Registry (VCOR) study that will be led by Western Health and compare the Ambulance Victoria utilisation, as well as the pattern of procedures, between 2019 and the two Victorian COVID-19 waves in 2020.

VCOR is a state-wide clinical quality registry that captures data on all patients who have undergone procedures and is used for quality assurance.

A/Prof Chan is the lead investigator of this study which will involve 30 hospitals across Victoria.

"The findings will help inform the public health response to ensure that, in the case of future outbreaks, people do not defer emergency healthcare," A/Prof Chan said.

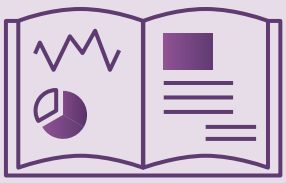
> **"It will help us with how we should communicate with the general public and put out a very strong message that people should not defer emergency healthcare if they get chest pains. If that happens, you should still call an ambulance even during a COVID-19 outbreak. That's a message that will save lives."**



RESEARCHER PROFILE:

DR JAMES MOLTON

With the onset of the COVID-19 pandemic and the first wave of infections in Victoria, Western Health's Dr James Molton was thrust into the global effort to better understand the disease and potential treatments.



216

Patients across eight active sites involved in the ASCOT ADAPT trial.

As a physician specialising in infectious diseases, Dr Molton's research portfolio had included therapeutic trials for Klebsiella liver abscess and studies on novel imaging technologies for tuberculosis. His route to Melbourne from the UK, which is where he is from, included a six-year stint in Singapore, where he was able to explore clinical interests in infectious diseases, tropical medicine and travel medicine.

After he joined Western Health in September 2019, Dr Molton expected his research to focus primarily on bacterial infections. But, like countless other clinicians and researchers globally, COVID-19 forced a change in direction.

He became the principal investigator at Western Health for the multi-centre ASCOT trial, which involves 216 patients across eight active sites; half are in Australia and the other half in India. The initial trial design involved a number of antivirals, but these were quickly found to be ineffective against COVID-19 and were removed from the study.

The trial was then re-named ASCOT ADAPT, reflecting its ability to add and subtract different arms as the trial progressed, giving researchers the ability to respond to new pieces of information as they emerged.

> **"Once ASCOT was changed to an adaptive trial design, it allowed us to drop treatments that were not found to be effective and then add new ones," Dr Molton explains.**

"For the second wave in Melbourne, we were recruiting patients for a non-blinded study to

Western Health's Dr James Molton is the principal investigator at Western Health on the multi-centre ASCOT trial.

investigate the relative effectiveness of standard care compared with convalescent plasma. This is plasma collected from the blood of people who have recovered from COVID-19, thus containing antibodies against the disease.

> **"At the end of the period of recruitment in Australia, data from an international trial that was running concurrently suggested convalescent plasma was not effective, so that arm was dropped from the trial."**

The data generated to date will contribute to a meta-analysis being conducted at Stanford University on the efficacy of convalescent plasma, which will draw data from multiple studies around the world. ASCOT ADAPT remains open for recruitment in Australia and continues to recruit patients at the sites located in India where COVID-19 infections dramatically escalated in April 2021.

"One of the wider benefits of ASCOT ADAPT is that it has allowed us to set up a platform with multiple sites linked together across Australia which will be very useful for future infectious diseases trials." Dr Molton said. "We are already planning on using the network to conduct trials on other respiratory viruses such as influenza."

Western Health's Infectious Diseases (ID) Department had been scaling up over the last few years and is now home to six consultants. Dr Molton said that the COVID-19 pandemic has led to the department expanding its presence in the research sphere, including two pharmaceutical trials that are still in the recruitment phase.

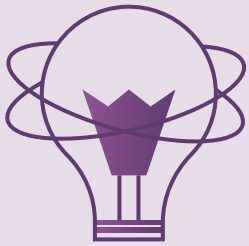
One study will look at INB03 as a treatment for participants with pulmonary complications from COVID-19. The other involves PTC299, an oral agent which potentially has some anti-viral properties against COVID-19 that could damp down the immune response.

With its expanding research capability, Dr Molton and colleagues from ID will continue to be well placed to contribute to research on COVID-19 and other respiratory diseases.

Left to Right: A/Prof Forbes McGain, Consultant Intensive Care and Anaesthesia, Ms Samantha Bates, Critical Care Manager, Ms Miriam Towns, Critical Care Research Coordinator.

MCMONTY ISOLATION HOOD

For proof that necessity is the mother of invention, we need look no further than Dr Forbes McGain and Western Health's intensive care team during COVID-19.



100+

McMonty isolation hoods manufactured in Melbourne.

As Europe and the United States were grappling with the first wave of the pandemic in early 2020 – and Australia was bracing for the unknown – intensive care specialist and anaesthetist Dr McGain began focusing on his colleagues.

While the novel coronavirus was frightening for patients, the risks to frontline workers was also of critical consideration. As Western Health, along with healthcare organisations across the world, prepared for the prospect of being inundated with COVID-19 cases, keeping staff safe was integral to pandemic planning.

> **"At Western Health we realised that we work in open planned Intensive Care Units (ICUs) where nurses in particular are prone to prolonged periods of exposure to patients with actual or suspected COVID-19," Dr McGain said.**

"These conditions are replicated in the hospital wards where there are many two and four-bedded rooms increasing the risk of hospital spread of SARS-CoV-2 to other inpatients and to staff. Staff were fearful of contracting COVID-19, which they indicated impinged upon their ability to work effectively and safely."

Dr McGain began thinking about how a protective barrier around COVID-19 patients (both confirmed and suspected) could reduce the risks for their treating doctors, nurses and allied health professionals.

Dr McGain, who is also an honorary with the University of Melbourne, contacted his colleague Professor Jason Monty, Head of Mechanical Engineering at the Melbourne School of Engineering, who specialises in fluid mechanics.

Working with the knowledge that COVID-19 is carried via droplets expelled by infected patients, the pair devised a ventilation hood, which was then developed by Prof Monty's engineering team and trialled in Western Health's ICUs at Footscray and Sunshine hospitals—during the peak of Victoria's second wave.

The transparent, movable personal ventilation hood—named McMonty, after its creators—sucks air away from the patient while also creating an effective droplet containment barrier. The device is also large enough to accommodate other medical equipment that might be attached to the patient.

Prof Monty explains: "The hood helps to confine bigger droplets to a known area around the patient while smaller droplets are sucked away through an attached ventilation system and filtered out through a high-efficiency particulate air (HEPA) filter."

The device was prototyped and tested with a team of fluid dynamics researchers, in consultation with intensive care specialists, nurses and other infectious disease experts at Western Health, to ensure it was practical, hygienic, effective and safe.

Dr McGain said the hood allows frontline workers, who were working under increasing pressure during the pandemic and were at risk of contamination, to feel much safer providing care.

"The hood allows healthcare workers to interact with their patients and get a visual sense of their condition through the clear plastic, but with a reduced risk of infection," Dr McGain said.

By April, 2021, more than 100 McMonty isolation hoods had been manufactured in Melbourne by Medihood/Evan Evans. There are isolation hoods in hospitals from Thursday Island and Port Moresby (PNG), and Nauru, to Hobart, and across to Adelaide, Alice Springs and rural hospitals in Far North Queensland.

Western Health Critical Care Research Nurse Manager Samantha Bates was instrumental in establishing the clinical trials of the hood, as well as engaging staff during training and roll out.

"Staff were engaged right from the beginning," Ms Bates said, who has also been visiting other hospitals to provide education support.

"In a sense this was a different sort of research trial because the research was designed around helping them, as well as helping our patients."

Dr McGain said he was very proud of the team behind the McMonty.

"Innovating collaboratively with mechanical engineers, nurses, doctors, and manufacturers has been pure joy," he said. "It is wonderful to know that hospital staff have been made safer when caring for patients with COVID-19. We hope to see the isolation hood used over many years for treating patients with a variety of respiratory infectious diseases."

RESEARCHER PROFILE:

PROFESSOR GUSTAVO DUQUE

Prof Gustavo Duque, an international authority on ageing and musculoskeletal conditions, has always sought to use his expertise to improve the quality of life of older people.

55%

Reduction in falls as a result of Prof Duque's work establishing a system within the Falls and Fracture Clinic at Western Health.

> **"There isn't a cohort with more unmet needs, whether it be long-term care, social isolation or malnourishment. I am motivated by the potential for my research to result in interventions that address these unmet needs," he said.**

Prof Duque's attention is currently turned to the impact of COVID-19 and he believes that nutritional interventions are key to protecting older Australians. He is leading a Medical Research Future Fund (MRFF) study on nutritional supplements to bolster the immune system of nursing home residents. It is being conducted under the auspices of the Australian Institute for Musculoskeletal Science (AIMSS), of which Western Health is a key stakeholder.

The Pomerium Study was initiated following the devastating wave of COVID-19 infections that resulted in fatalities across residential aged care facilities in Victoria. It will assess the effectiveness of nutritional supplements that have all separately shown to be effective in improving the immune and musculoskeletal systems.

"The study is significant because two-thirds of nursing home residents are malnourished, meaning their immune systems are deficient and they wouldn't respond well to vaccination," he said.

> **"The nutritional supplements can contribute to a better immune response as well as functional response, where respiratory and other muscles get stronger. So, it will provide a measure of protection for nursing home residents who aren't vaccinated and ensure that those who have been vaccinated will respond better."**

Through AIMSS, Prof Duque is working with Johns Hopkins University on the study where one of the top investigators in the field of geriatrics and immunology is a collaborator. The study is in the process of getting ethics approval and recruitment is due to start in June in nursing homes in Melbourne.

The Pomerium Study was named after a medieval wall designed to protect cities from enemies but was designed in a way that allowed inhabitants to move freely within it. Thus, the study aims to provide nursing home residents with protection while not limiting their mobility.

> **"This has the potential to be a game-changing intervention," said Prof Duque. "We are not just thinking of COVID-19, but influenza, which is a more regular enemy of nursing home residents and which we will hopefully be able to protect them from."**

Prof Duque's work on the Pomerium Study follows on from a series of other important research and clinical care breakthroughs. Four years ago, he set up the Falls and Fracture Clinic at Western Health after reporting a new geriatric syndrome called osteosarcopenia. Research revealed here was a population that had both osteoporosis and sarcopenia, diseases that relate to bone loss and muscle wastage respectively, and that they were at a high risk of catastrophic fractures.

"Previously, these conditions were literally treated on two different sides of the hospital even though the risk factors are identical. Our research enabled us to take a fragmented model and combine it in one clinic. There, patients are evaluated for both conditions, and a care plan is developed by a multi-disciplinary team and sent to the patient and their GP. The model has proven to be very effective," explains Prof Duque.

Western Health is now the leading centre on osteosarcopenia, with Prof Duque's work establishing a system that has reduced falls by 55 per cent.

Professor Gustavo Duque, an international authority on ageing and musculoskeletal conditions, is the Chair of Medicine at the University of Melbourne and Director of AIMSS.

STAFF TEMPERATURE CHECK

It was May 2020 in Melbourne. More than 1500 Victorians had contracted COVID-19 and the death toll had reached double digits.

More than

80%

of staff said they had avoided interacting with their friends and extended family.

While most of us were locked in our homes, hoping for the best and fearing the worst, healthcare staff put their physical and mental health at risk to care for patients.

There is no denying their actions were heroic, but it's important to remember that they are also human. That's the message from the Deakin University Western Health Partnership, which led one of the first studies in Australia into the psychological impact of the coronavirus pandemic on Victorian healthcare workers.

Co-investigator on the study and Senior Research Fellow Dr Sara Holton said the research uncovered significant rates of severe depression and anxiety in staff, highlighting the hidden toll of the virus on frontline workers.

> **"People perceive healthcare workers as infallible, but they are humans who struggle and need help too," Dr Holton said.**

When the pandemic began, Dr Holton and co-investigators Western Health Chair in Nursing Professor Bodil Rasmussen and Senior Research Fellow Dr Karen Wynter redirected their research efforts to help the health service understand the impact of COVID-19 on staff. Between May and June 2020, they conducted a 'temperature check' of more than 600 Western Health nurses, midwives, doctors and allied health staff via an anonymous online survey.

"We found that approximately a quarter of the healthcare workers we surveyed reported symptoms of psychological distress," Dr Holton said.

One in six staff, predominately nurses and midwives, had been in direct contact with an infected patient.

Deakin University Western Health Partnership Senior Research Fellow Dr Karen Wynter, Senior Research Fellow Dr Sara Holton and Western Health Chair in Nursing Professor Bodil Rasmussen.

"More than half of staff were concerned about infecting their family members and more than 80 per cent said they had avoided interacting with their friends and extended family."

The research published in the *Australian Health Review* also found approximately one third of staff were concerned about caring for patients who had been diagnosed with or had suspected COVID-19. Less experienced staff, those in poorer general health and those who had more concerns about COVID-19, had higher levels of depression, anxiety and stress than their peers.

Nurses and midwives reported more severe symptoms of anxiety than doctors and other allied health staff.

> **"Nurses are the largest occupational group in a health service and have direct, intense and sustained patient contact and so they are particularly vulnerable to infection," Dr Holton said.**

Many staff reported that the increased use of Personal Protective Equipment (PPE) presented communication challenges, made it difficult to shower patients and led to physical side-effects, such as headaches and dehydration.

Dr Holton said one of the study's most significant findings was that staff who thought the health service had responded appropriately to the pandemic and provided sufficient staff support, were more likely to have better mental health outcomes. Western Health introduced a range of initiatives, such as: wellness hubs, on-site counsellors, regular staff bulletins and CEO briefings.

"This indicates that continued provision of 'wellbeing' initiatives, including targeted discipline specific support interventions for midwives and nurses, is crucial," Dr Holton said.

Supporting the mental and physical needs of patients during pandemics was not only beneficial for staff, but essential for health services, she said.

"If staff aren't feeling psychologically well, they're taking lots of leave because they're concerned about coming to work, or they're resigning because they're worried about getting infected, the health service can't run the hospital and provide high-quality patient care," Dr Holton said.

RESEARCHER PROFILE:

PROFESSOR CRAIG FRENCH

The primary focus of Prof Craig French's career has been conducting large scale multi-centre research projects whose findings have substantially improved health outcomes for critical care patients.

With this background, he has been instrumental in embedding a strong culture of research at Western Health, where he is the Director of Intensive Care.

Prof French was one of the chief investigators of a multi-centre research project that examined the role of Vitamin C as a treatment in the case of severe sepsis. The research took place across four sites in Melbourne, including Sunshine and Footscray Hospitals, and one in New Zealand. The study, which was published in the *Journal of the American Medical Association* in January 2020, refuted a commonly held belief within the profession.

"Proponents of using Vitamin C to treat severe infections would cite observational data suggesting it reduced the risk of death quite dramatically," Prof French explains. "Our study showed that this was not the case and, based on that, we determined that it should not be recommended as a treatment."

"This is just one example of a study that demonstrates the need to critically evaluate therapies in well-designed, multi-centre randomised controlled trials. Their value is that they either confirm or refute the findings of earlier research not done in such an environment."

Prof French said that given the advances that have been made in medicine, new treatments are likely to provide incremental benefit. To detect such benefit, trials must be larger and conducted in diverse environments.

> **"It's important to recognise that just because an intervention is shown to be effective in one study or in one particular country, it's not necessarily immediately generalisable to our population or applicable to our health care setting," he said.**

Prof French has steadily been building up the research capability within the areas he is responsible for. Five research coordinators have been embedded within clinical teams in intensive care and anaesthesia. This has been essential in the development of critical care research at Western Health and the publication of multiple pieces of research every year.

A strong commitment to building research networks across institutions has been particularly useful in the response to COVID-19. Prof French was a senior investigator in a nationwide study that described characteristics, interventions and outcomes of COVID-19 patients admitted to ICUs.

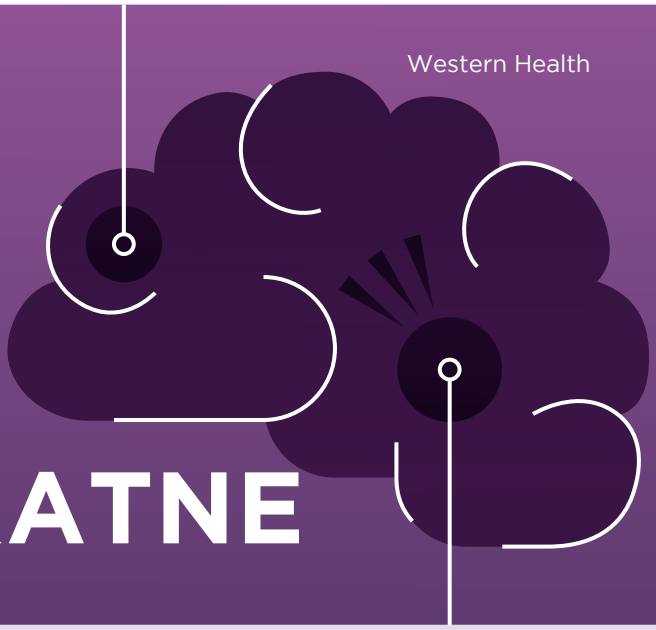
Western Health Director of Intensive Care Professor Craig French.

Through the registry that was established, the team at Western Health was providing weekly data that was essential for the planning of critical care services and the broader public health response.

"The study was important in that it clarified for us the characteristics of the typical COVID-19 patient and what was required from hospitals and ICUs. We quickly found that the major limiting factor was not so much equipment, but rather having appropriately qualified staff to look after patients, as we are now seeing in outbreaks overseas."

COVID-19 and medical innovations to respond to the pandemic will continue to be a focus of Prof French. He supported A/Prof Forbes McGain to facilitate the clinical evaluation of the personal ventilation hood developed in collaboration with engineers at the University of Melbourne to protect patients and staff. Their work looked at how procedures could be made safer by using the equipment to minimise aerosol generation.

> **"Collaborative research is more important than ever and we are all now acutely aware of its benefit to clinicians, hospitals and the broader community."**



RESEARCHER PROFILE:

PROFESSOR TISSA WIJERATNE

Professor Tissa Wijeratne has dedicated almost three decades to studying and practising medicine, but he said he's never learnt more than in the year 2020.

80-90%

Of stroke survivors have ongoing problems similar to Post COVID-19 Neurological Syndrome.

While COVID-19 has had devastating consequences across the world, Prof Wijeratne has identified a silver lining – the pandemic has provided unique opportunities for medical research.

> **"I learnt more last year than at any other time in my career, and I think many of my colleagues in medicine would say the same," he said.**

"When we were hit with COVID-19, out of nowhere, we were challenged from all angles. There were no protocols or published papers or guidelines to follow. This was a big opportunity for us to learn."

As the Director of Neurology and Stroke Services at Western Health, Prof Wijeratne's interest in COVID-19 has naturally focused on how the Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2) virus affects the brain and nervous system. And as answers have begun to emerge, it is looking increasingly likely that they might also be able to be applied to other, non-coronavirus medical questions.

Central to Prof Wijeratne's COVID-19 research has been the identification of Post COVID-19 Neurological Syndrome (PCNS) – commonly referred to as "long COVID" – with symptoms including fatigue, brain fog, lethargy, muscle pain, dizziness and loss of sense of smell, as well as problems with sleep and concentration.

"Currently, as we are still experiencing the pandemic and its effects, it is too early to describe the full clinical picture of PCNS," Prof Wijeratne wrote in *The Journal of the Neurological Sciences*.

"However, we believe published evidence has already made an undeniable case for medicine to recognize the increasing numbers of ex-patients with PCNS and the need for on-going neurological and cognitive monitoring of all cases of COVID-19 (irrespective of the severity from asymptomatic, mild to severe) for PCNS."

Given Western Health treated more seriously ill COVID-19 patients than any other health service in Australia during last year's outbreak – and more than 1500 positives cases overall – Prof Wijeratne and his team are very well-placed to conduct further research into PCNS.

His many lines of investigation include analysis of serial systemic immune inflammation indices (SSIIi), and their potential as a "prognostic biomarker for COVID-19 survival". The systemic immune inflammation index (SII) gauges the interplay between the innate and adaptive immune systems, through measures of neutrophil, platelet and lymphocyte counts. SII is commonly used in the assessment and treatment of patients with cancer, stroke and various neurological disorders.

An analysis by Prof Wijeratne: "We believe the value of SSIIi is far higher than a single SII. Given the pandemic's enormity, the routine reporting of SII in simple blood tests might provide extra, useful information universally."

Prof Wijeratne believes ongoing research into the neurological impact of COVID-19 could have significant implications for the treatment of stroke survivors, given what appears to be a similar response from the immune system.

"I have managed about 40,000 strokes at Western Health over the past 17 years, and I can tell you that 80-90 per cent of survivors have ongoing problems that are not unlike PCNS," he said.

Prof Wijeratne said there are an estimated 100 million strokes survivors worldwide, and that about two-thirds would not survive five years: "A lot of work has been done on acute interventions, but that has not translated into better long-term care".

While the immune responses of stroke and COVID-19 survivors is now the top research priority for Prof Wijeratne, he also has some advice for his junior colleagues.

"There's a belief among clinicians that you need to focus on one of the three pillars of medicine – clinical care, research or education – but you don't have to choose," he said.

> **"Researching and teaching can make you a better clinician. It's really important to remain curious and inquisitive. If you see things that you can't explain, like we have during COVID-19, keep asking questions and study your patients.**

"As my mentor told me when I was training in Sri Lanka, 'Always keep your eyes and ears open'."

Professor Tissa Wijeratne, Director of Neurology and Stroke Services at Western Health.

WELCOMING THE INCOMING DIRECTOR OF CLINICAL RESEARCH, ASSOCIATE PROFESSOR HARIN KARUNAJEEWA

I'm delighted to be taking up the position of Director of Clinical Research this year. I feel particularly fortunate to be starting this role at a time when Western Health has arrived at a point that is so rich with possibilities, as has been so well demonstrated in this report!

Associate Professor Harin Karunajeewa, the incoming Director of Clinical Research, with his predecessor Professor Edward Janus.

I'd especially like to acknowledge the contribution of my predecessor, Professor Edward Janus, in helping us reach our current position. I've had the pleasure of working closely with Edward now for more than 14 years, during which time he has become a valued friend and mentor to myself and numerous other clinical researchers at Western Health. Edward brought us an accumulated wealth of wisdom from a more than 40-year research career that ran the gamut of laboratory, clinical and population health research, and saw him drive significant translation in clinical therapeutics and public health policy in Australia and throughout the Asia-Pacific. A true, 'general physician', his own research covers a dizzying array of conditions, ranging from alpha-1-antitrypsin deficiency, dyslipidaemia, atherosclerosis, diabetes, obesity, cardiovascular disease to porphyria and pneumonia.

As the previous Director of Clinical Research, Edward had a leading role in establishing the Western Health Chronic Disease Alliance (WHCDA), which has become one of our flagship research collaborations. It has established both chronic disease and the development of innovative models of healthcare, as leading components of Western Health's 'brand identity'. Perhaps most of all, though, Edward's greatest contribution has been in promoting and nurturing a culture of continuous learning, together with practical efforts to improve the quality of the healthcare we deliver.

I would especially highlight his tireless efforts in organising a variety of fora and events to bring a broad, multi-disciplinary range of Western Health's research-interested clinicians together to foster new and productive synergies and collaborations. Notably, he did all this whilst also leading our biggest non-obstetric clinical service, the General Internal Medicine Unit.

So what does the future hold for research at Western Health as we farewell Edward? This report shows us how a vibrant culture of innovation, discovery and evidence-based service improvement has developed under his stewardship. It is this culture that provides the fertile soil in which we can continue to grow our reputation as an acknowledged *leader* in the healthcare sector: one where our peers look to *us* for guidance and inspiration as to how to achieve excellence in healthcare. Our nationally and internationally-lauded response to the COVID-19 pandemic has already proved our potential to be that knowledge-driven healthcare leader. It demonstrated how by leveraging our researchers' expertise, we could show the world how we can deliver the best healthcare. It shone a light on a vision of a health service where research and learning are fundamental everything we do.

I think we are just getting started...

Together, caring for the West

westernhealth.org.au

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