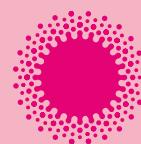




The Women's Research Report 2022

Creating healthier futures
for women and babies



the women's
the royal women's hospital

Contents

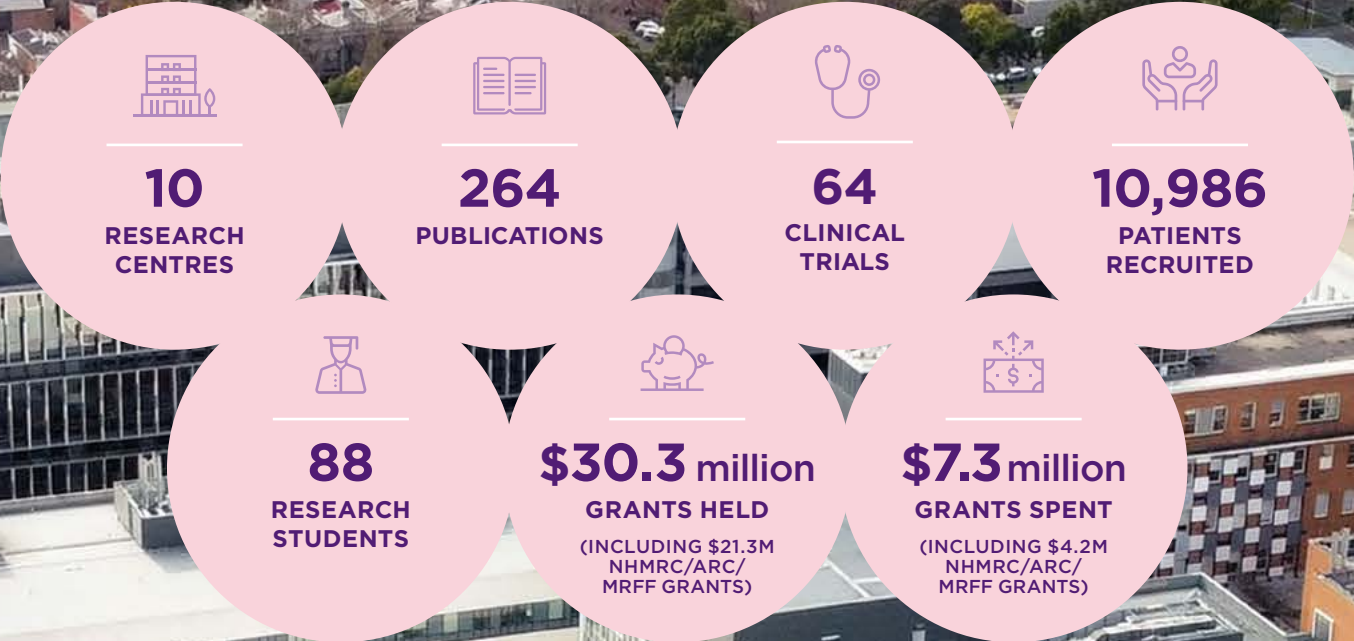
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Pictured (on front cover): IVF researchers Dr Wan Tin Teh (left) and Dr Genia Rozen.

2022 highlights



Acknowledgements and thanks

Acknowledgement of Traditional Owners

The Royal Women's Hospital acknowledges and pays respect to the Wurundjeri and Boonwurrung people of the Kulin Nation, the Traditional Custodians of the Country on which the hospital stands. We pay our respects to their Elders past and present.

The Women's is committed to improving health equity for Aboriginal and Torres Strait Islander women, children and families and we recognise the fundamental significance of cultural traditions, beliefs and connection to Country for the health and wellbeing of Aboriginal and Torres Strait Islander peoples.

We acknowledge the importance of kinship and family structures as a cohesive force that binds Aboriginal and Torres Strait Islander peoples and we recognise their cultures, community connection, and self-determination as critical protective factors for wellbeing.

Gender inclusivity

We respect and value people of all genders and acknowledge that the binary definition of gender excludes people of varied gender identities.

Although we use the terms 'women' and 'girls' in this report, this is not intended to exclude anyone. We will continue to strive to be as inclusive and affirming as possible of people of all experiences, backgrounds, beliefs, bodies, genders, sexualities, and relationships.

Thanks to our supporters

As a public hospital, the Women's relies on the generous support of donors to fund vital clinical research, including many of the initiatives highlighted in this report.

We offer heartfelt thanks to our community of supporters, donors, charitable trusts and patients past and present. Their generosity helps ensure women and babies - of this generation and the next - receive world-leading, evidence-based care.

Thanks to our contributors

We would like to sincerely thank all those who contribute to our research efforts - from the many different funding agencies, our research staff, collaborators, and supporters; to our dedicated Human Research and Ethics Committee members. Most importantly, we extend our gratitude to the patients and families who participate in our research. Your contributions make progress, hope and change possible.

Support our work

Gifts, bequests and grants play an integral role in supporting the research, innovation and leadership described in this report and enable the Women's to deliver world-class advances in clinical care, treatment and social support.

If you would like to support our research efforts, you can donate online at thewomens.org.au/donate or contact our Philanthropy and Community Investment Office on (03) 8345 2954 or email admin.philanthropy@thewomens.org.au



Pictured left: Kian, a healthy, active boy who was born at the Women's in 2022.

Pictured right: Kian with his parents Azam and Saeed. Kian was born at 23 weeks' gestation, weighing just 550 grams.



Foreword

In 2022, the Women's released its 2022-2025 Strategic Plan. It includes an ambitious goal to accelerate our research capabilities, reach and impact. High quality translational research is key to enabling more women and babies to access leading care and exceptional experiences.



The Women's is committed to:

- expanding the depth and breadth of our research
- undertaking new research into underfunded and stigmatised areas of women's health
- attracting and retaining the brightest and best researchers from across the globe
- exploring the establishment of a Women's Research Institute, a world-class hospital-based facility with a dedicated focus on women's health. We welcome the Victorian Government's 2022 election promise to invest \$5 million to support the creation of a business case for a Women's Health Research Institute in Melbourne (see page 7).

In 2022, as the impact of COVID receded, we were able to resume the positive trajectory of our research activities. We held 64 clinical trials and published 264 peer-reviewed medical papers, contributing to global knowledge across the full spectrum of women's and newborn health.

More than 10,000 people participated in our trials, including approximately 500 women who shared their experiences of having a baby at the Women's during the COVID-19 pandemic. The interim findings of this study were swiftly passed on to our clinical teams, influencing our clinical practice (see page 19) and highlighting the substantial translational opportunities of our research.

Two of our esteemed researchers – Dr Sarah Price and Professor Clare Scott – received National Health and Medical Research Council (NHMRC) Investigator Grants during 2022. This grant scheme supports the research pursuits of outstanding investigators at all career stages. With Dr Price's research focusing on improving the metabolic health of prospective mothers and Prof Scott's work on improving cancer outcomes, we can expect to see significant insights that will change lives in the near future.

In testament to the high quality of research being undertaken at the Women's, we held \$30.3 million worth of grants for research during this period. Four new grants from the National Health and Medical Research Council (NHMRC) and the Medical Research Future Fund (MRFF) started in 2022.

This year we broadened the scope of one of our 10 research centres, resulting in the Centre for Women's Mental Health becoming the Social Model of Health Research Centre. This expanded centre will explore how to address health inequities caused by the social determinants of health, which include socioeconomic status, access to education and housing, freedom from violence, and many other factors (see page 25).

We are proud to be part of the Melbourne Biomedical Precinct, which includes more than 40 hospitals, research, teaching and biotechnology organisations, all working towards the common good.

Most importantly, we are grateful to our research staff and students for their initiative, intelligence and dedication. In particular, we wish to thank Professor Lex Doyle, who is retiring in 2023. We celebrate his legacy, which includes mentoring many members of our world-class Newborn Research Centre (see overleaf).



Professor Sue Matthews
Chief Executive, the Women's



Professor Peter Rogers
Director of Research, the Women's

Lex Doyle: A brilliant career

Professor Lex Doyle AO has dedicated nearly half a century to the most vulnerable of patients - preterm babies.



Lex Doyle: A brilliant career

When Professor Lex Doyle began his career in the 1970s, most premature babies born before 28 weeks of pregnancy died. Through research and advancements in care, equipment and technology, babies born before 28 weeks of gestation are now surviving into adulthood at higher rates than ever. However, some preterm babies who survive have ongoing health problems.

Prof Doyle dedicated his career to understanding the long-term impacts of neonatal treatment on the future health of children. His research helped save the lives of preterm babies and minimise the chance of long-term disability associated with preterm birth.

In the 1980s, he played a key role in establishing the Victorian Infant Collaborative Study Group. This long-term study, which followed prematurely born infants throughout their childhood and into adulthood, continues today. He also worked on longitudinal studies of children born at the Women's.

Over his career, Prof Doyle has been published in over 670 scientific articles and spoken at more than 150 conferences internationally. His expertise is sought all over the world, especially in developing countries where his work has been particularly influential.

In addition to his extensive research, Prof Doyle has also been deeply involved in undergraduate and postgraduate clinical research education, mentoring and supervision.

Professor Jeanie Cheong, a neonatal paediatrician and researcher at the Women's, the University of Melbourne and Murdoch Children's Research Institute, was one of many mentored by Prof Doyle.

"Lex championed the development of many clinicians and researchers. A standout feature is his dedication to supporting the careers of women. He is a truly progressive thinker in all spheres," Prof Cheong said.

Professor Peter Davis, Director of the Women's Newborn Research Centre, was also mentored by Prof Doyle.

"Lex has shown us that babies going home after our care deserve to be counted, they matter. Because of his work, we know that they mostly do very well, live full and happy lives, bring joy to their families and enrich our society," Prof Davis said.

Prof Doyle will retire in 2023. He chaired the Women's Research Committee and was Professor of Neonatal Pediatrics at the University of Melbourne.

Prof Doyle's distinguished service to medicine and medical education was recognised in 2019 when he was appointed an Officer of the Order of Australia, and was awarded the prestigious Howard Williams Medal from the Royal Australasian College of Physicians.

Known for his humility and aversion to the limelight, Prof Doyle said the real heroes are the vulnerable babies who battle against the odds and go on to lead healthy lives. He feels privileged to have been able to play a part in making that happen.

World class research institute

Research into women's health and the impacts of sex and gender on health access, treatments and outcomes is still considered a marginalised area.

As a result, Australia is limited in its capacity to significantly investigate and address these gaps, and failing to effectively meet the needs of over half of Australia's population.

The frequent exclusion of women from research studies into conditions not related to reproduction, such as type 2 diabetes, Alzheimer's disease and heart disease, dismisses the notion that diagnosis, prognosis, care and treatment is nuanced and may need to vary according to sex and gender.

This is why the Women's is engaging with government to plan for a world-class research institute in Melbourne with an explicit and dedicated focus on the health of women and newborns.

As a leading tertiary hospital and a major teaching and research centre, the Women's understands the importance of evidence-based approaches to healthcare and the need to increase the scope, breadth and quality of health research, including in areas that are important to women themselves.

The Women's CEO, Professor Sue Matthews believes the time is right to establish a world-class hospital-based research institute with a focus on delivering more equitable health outcomes.

"Our vision is to broaden research to consider the social determinants of health and include areas where sex and gender have not traditionally been considered. Our research will consider a person's genetic code right through to their postcode. Our hope is to redress the health disadvantage and discrimination that affects too many people," Prof Matthews said.

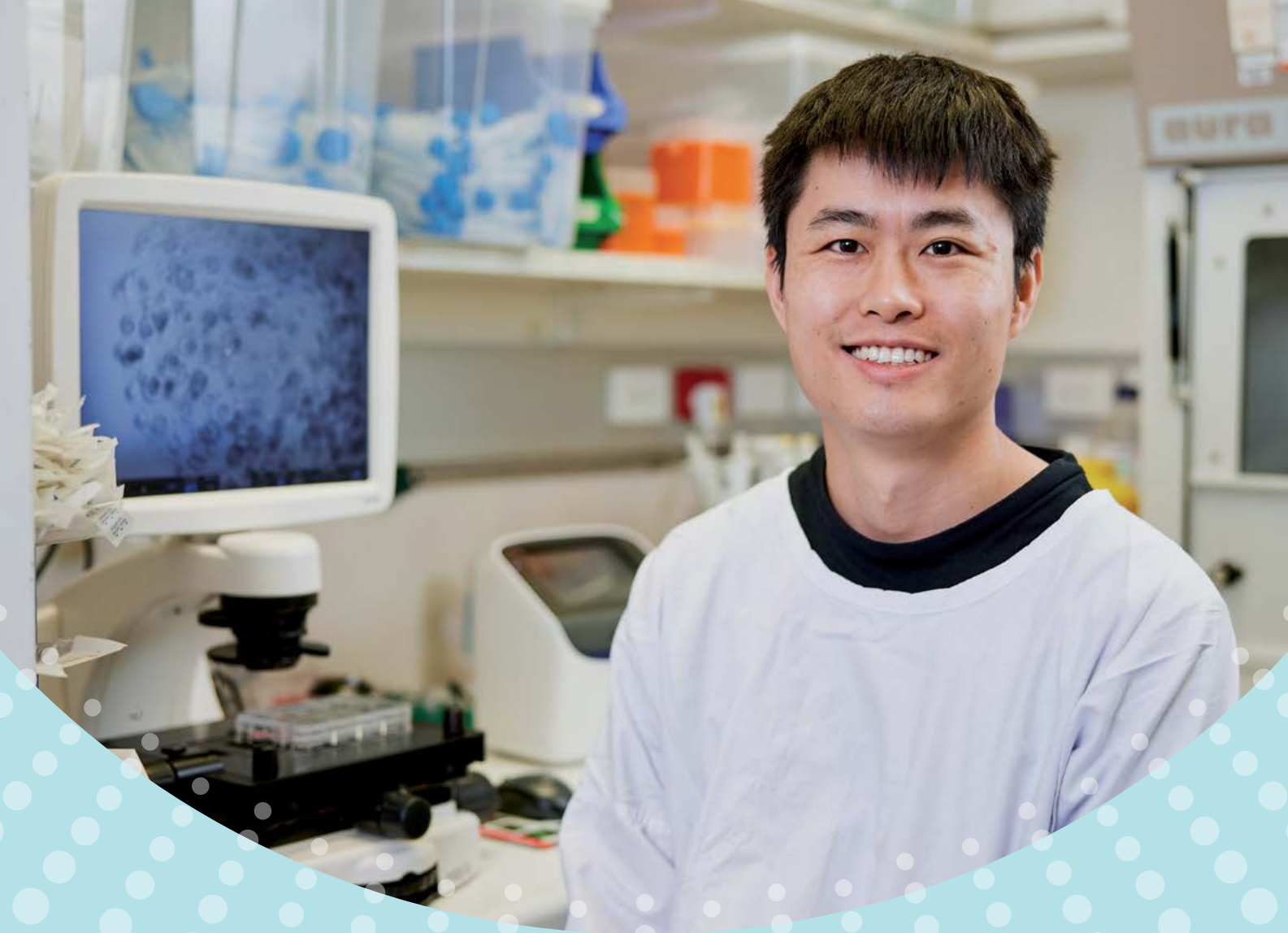
"Through relevant, evidence-based research, Australia can improve access to healthcare and support better outcomes for all women, including Aboriginal and Torres Strait Islander women, culturally diverse women, women with lived experience of disability, and people assigned female at birth."

Prof Matthews said the institute would attract the world's best clinicians and researchers working in women's and newborn health to live and work in Victoria.

In late 2022, the Women's welcomed the Victorian Government's election promise to invest \$5 million to develop a business plan for the creation of a Women's Health Research Institute in Melbourne.

The Women's is looking forward to working with its government, academic, research and philanthropic partners to bring the vision for a women's research institute to life.

Pictured at left: Professor Lex Doyle (centre) with some of the clinician researchers he has mentored at the Women's (from left Professor Alicia Spittle, A/Professor Brett Manley, Professor Jeanie Cheong, Dr Rocco Cuzzilla, Dr Kate Hodgson, Dr Jennifer Walsh and A/Professor Sue Jacobs)



Gynaecology Research Centre



The Women's Gynaecology Research Centre brings together clinical, psychosocial and laboratory expertise to investigate common conditions affecting women of all ages.

The centre's research has directly improved patient care through prevention, diagnosis and management of a wide range of conditions affecting women's health.



Professor Martha Hickey
Co-Director



Professor Eva Dimitriadis
Co-Director



Professor Peter Rogers
Deputy Director

Pictured above: Dr Wei Zhou

Hope for a new, accurate, global fertility test

Lead Researchers:
Dr Wei Zhou, Dr Wan Tinn Teh, Professor Eva Dimitriadis

A study into the importance of the endometrium (the lining of the uterus) for fertility and pregnancy may lead to a new non-invasive fertility test for women.

Until now, testing endometrial functions in women has been a difficult, invasive and complex process.

In this study, a novel way to measure infertility in women was trialled, by testing secretions from endometrial tissue. The tissues were grown in the lab to become organoids, replicating much of the complexity of the original tissue so it could be studied in more detail.

Tissue organoids from women with primary infertility were compared to tissue organoids from women with more standard fertility.

Lead researcher Dr Wei Zhou, a Research Fellow at the Women's, said the research found an increase of 19 unique proteins in the secretions from women with primary infertility.

These proteins are in uterine fluid and are thought to influence whether a fertilised egg can implant in the endometrium.

This means that in the future women who are struggling to conceive could have their uterine fluid tested to determine if their endometrial lining is influencing their fertility.

"We know that measuring fertility in women is a difficult and complex process at the best of times, but this study brings us a step closer to providing patients with clear answers," Dr Zhou said.

"With further targeted research we may see this work translate into a new, accurate and globally available fertility test.

"In the future, we'd love to offer a non-invasive test to women who are struggling to conceive, and confirm whether their endometrial lining is influencing their overall fertility."

This research was published in *Frontiers in Endocrinology*.

The next generation of IVF researchers

Lead Researchers: Dr Genia Rozen and Dr Wan Tinn Teh

Two of the Women's leading IVF researchers, Dr Genia Rozen and Dr Wan Tinn Teh, are leading cutting-edge research to improve outcomes for people whose path to parenthood is not easy.

Dr Rozen led a study to find out whether the amount of progesterone in a woman's blood on the day of embryo transfer is linked to successful pregnancy outcomes.

The study analysed data from women who underwent IVF or intracytoplasmic sperm injection and had a single embryo transfer on the fifth day after fertilisation.

It found that measuring progesterone levels on the day of embryo transfer did not help in predicting pregnancy outcomes. There was no specific level of progesterone that resulted in a lower chance of pregnancy, and the chance of having a live birth after a blastocyst transfer (which involves extending the culture period of IVF embryos for five days in the laboratory) was similar across all progesterone level groups.

"The endometrium plays a vital role in pregnancy success, and understanding its receptivity is key to improving assisted reproductive technologies such as in vitro fertilisation," Dr Rozen said.

"Exciting advancements in this area include the discovery of new biomarkers and genetic factors that influence endometrial receptivity, as well as the development of personalised protocols based on patient-specific characteristics," she said.

"These ground-breaking studies hold the potential to revolutionise assisted reproductive technologies and offer new hope to couples struggling with infertility."

Meanwhile, Dr Wan Tinn Teh is leading a study into frozen embryo transfer (FET), a technique used in IVF to help couples conceive.

There are two types of FET protocols: natural and hormone replacement therapy (HRT).

The HRT protocol is used when the natural protocol is not an option. Studies show that pregnancies resulting from the HRT protocol are more likely to have complications such as hypertension in female patients.

To investigate this issue, Dr Teh and her team are conducting two studies. The first study is looking at the genes expressed in the endometrium of women who underwent FET with HRT, compared with those who underwent FET with natural protocols.

The second study compares the health outcomes of babies born from HRT FET with those born from natural FET. Although the studies are ongoing, the awareness raised by them has already led to a reduction in the use of the HRT protocol.

"IVF has changed the world. It was made possible by research. Further research is required to make IVF a safer treatment," Dr Teh said.

Dr Rozen's research was published in *Reproductive BioMedicine Online*.

Pictured at right: Dr Wan Tinn Teh (left) and Dr Genia Rozen





Newborn Research Centre

2022 figures

5

Clinical trials

77

Publications

\$4.8 million

Grants held

\$1.3 million

Grants spent

The motto of the Women's Newborn Research Centre is "making the babies better". To achieve this, the team at the centre is working hard to give all babies, irrespective of their size and maturity at birth, the best chance of growing into healthy adults.

Research in the delivery room is a difficult task due to the often chaotic and stressful environment but the centre has demonstrated that it is possible to do high-quality studies and discover new ways of monitoring and treating newborn babies.

The centre conducts research into the care given to babies immediately after birth, throughout their time in hospital and during their first years at home. The centre is also working towards a better understanding of the long-term outcomes for tiny babies beyond the nursery, including into adulthood.



Professor Peter Davis
Director



Dr Marta Thio
Deputy Director

Pictured above: Professor Alicia Spittle

Early intervention to support development of premature babies

Lead Researchers:
Professor Alicia Spittle,
Dr Abbey Eeles, Gillian Henty

The birth of a premature baby is a significant challenge for parents. Not only are there concerns for the health and wellbeing of the child, but the experience can take a toll on the mental health of parents as well.

This is especially true when babies are born at less than 32 weeks, as this puts them at increased risk of experiencing developmental problems.

In a study called TEDI-Prem, researchers are testing the effectiveness of an early intervention program to help support these vulnerable newborns and their parents.

They are also looking into the benefits of families receiving continuity of care from their birthing hospital after they go home with their baby.

As part of the study, a physiotherapist or occupational therapist works with parents to provide activities which will promote their child's development. There are face-to-face sessions in the participating hospitals' nurseries and regular telehealth video sessions for parents at home.

Lead Researcher Professor Alicia Spittle said the goal of these sessions is to improve child development (particularly motor skills, thinking, and talking) as well as parents' mental health.

"For families of babies born preterm, it is important that we support both the baby and their caregiver/s to maximise outcomes," Prof Spittle said.

"Telehealth has many benefits for families as we can see the baby playing in their own environment and it reduces travel time."

The TEDI-Prem study could provide a new model for early intervention and continuity of care, with the use of telehealth making this support accessible to families from remote or rural areas.

Reducing risks for preterm babies

Lead Researchers: Anna Kidman,
Associate Professor Brett Manley,
Professor Peter Davis

Babies born before 28 weeks' gestation often need help with breathing because their lungs are not yet fully developed. This often involves support from a ventilator which provides "breaths" via a tube in the windpipe.

This mode of support carries many risks including damage to the lungs and infection. Therefore, the clinical team try and remove the tube as soon as possible. The process of removing the tube is called extubation and is often associated with periods of instability for the baby.

Lead researcher Anna Kidman said a main concern after removing the breathing tube is 'extubation failure', the inability of a baby to breathe on its own, requiring the reinsertion of a breathing tube.

"After observing infants experiencing extubation failure, I became interested in how we could improve the process of removing the breathing tube and keep the babies off the ventilator," Ms Kidman said.

"If we can do this, we have the potential to greatly improve the care and outcomes of this at-risk population," Ms Kidman said.

In the Extubation CPAP Level Assessment Trial (ÉCLAT), Ms Kidman and her team found that applying a higher than standard level of Continuous Positive Airway Pressure (CPAP) to vulnerable babies reduces the risk of extubation failure.

Ms Kidman said the risk of extubation failure was reduced by 22 per cent in those extubated to a higher CPAP level of 10 cm H₂O compared to the standard practice of CPAP level 7 cm H₂O.

A total of 138 extremely preterm babies from three Australian Neonatal Intensive Care Units (NICUs), including the Women's NICU, were involved in the three-year study.

Ms Kidman, a neonatal clinical nurse specialist, said the research team hoped the study would improve respiratory outcomes, reduce the need for reintubation, and inspire further research in neonatal respiratory care.

"It is a privilege to be involved in neonatal research and I look forward to further expanding our respiratory research as part of a world class team," Ms Kidman said.

The British Medical Journal published the protocol for this trial.



Pictured at right: Neonatal Clinical Nurse Specialist Anna Kidman



Centre for Women's Infectious Diseases

2022 figures

32

Publications

\$3.9
million

Grants
held

\$1.3
million

Grants
spent

The Centre for Women's Infectious Diseases conducts clinical research, cutting-edge molecular diagnostics and geno-surveillance in the fields of neonatal and infectious diseases research, including reproductive and sexual health.

Key research areas include cervical and anal cancer, and sexual health and mother-to-baby infections, with emphasis on providing evidence for changes that may translate into clinical practice to support improved patient health.



Professor Suzanne Garland AO
Director



Dr Gerald Murray
Senior Scientist

Pictured above: Dr Gerald Murray

Limiting the threat of antimicrobial resistance

Lead Researchers: Dr Gerald Murray, Dr Jennifer Danielewski, Professor Suzanne Garland

Antimicrobial resistance is a major concern in the healthcare system. When bacteria develop resistance to first-line treatments, it means the germs are not killed and continue to cause problems associated with the infection.

Mycoplasma genitalium is one such bacteria which has grown resistant to many common treatment options. It is a relatively common sexually transmitted infection that affects about 2 per cent of the population. It can cause pelvic pain and infertility in women.

To address the issue of resistance, Lead Researcher Dr Gerald Murray and his team analysed mutations in *Mycoplasma genitalium* that failed treatment with the antibiotic moxifloxacin.

They sought to answer two critical questions: how have resistance mutation levels changed over time, and which mutations are most strongly associated with treatment failure?

"Australia has very high levels of antimicrobial resistance in *Mycoplasma genitalium*, so it is an ideal location to study the basis of treatment failure," Dr Murray said.

The research team analysed 539 cases of *Mycoplasma genitalium* infections, with results showing a concerning trend of increasing resistance, from 13 per cent to 23 per cent, over the eight-year period from 2012 to 2020.

One specific mutation was the primary cause of treatment failure, associated with 80 per cent of unsuccessful treatments. The study's findings will be crucial in developing advanced diagnostic methods that can detect underlying resistance and enable more targeted treatments.

The study's results will also contribute to improved antimicrobial stewardship, which aims to preserve the effectiveness of antibiotics by ensuring they are used responsibly. Through understanding the basis of treatment failure, healthcare professionals can prescribe antibiotics more effectively, and therefore reduce the risk of resistance developing.

More targeted treatments and a structured surveillance system are needed. By acting now, we can work to combat this issue and preserve the effectiveness of antibiotics in treating infections.

This research was published in *Antimicrobial Agents and Chemotherapy*.

Progress towards the international elimination of cervical cancer

Lead Researcher: Professor Suzanne Garland

Incredible progress has been made to reduce the incidence of human papillomaviruses (HPV) and related diseases across the world, thanks to HPV vaccination programs and cervical screening programs.

However, reducing the incidence of HPV – which is the cause of cervical cancer – remains a significant global priority. The World Health Organisation (WHO) has launched an initiative to eliminate cervical cancer within generations, with the goal of making cervical cancer a rare disease, affecting less than 4 out of every 100,000 women per year.

To see how well HPV vaccination programs are working in real world settings, an international team conducted a systematic review of studies from around the world.

Lead Senior Researcher Professor Suzanne Garland, from the Women's, is also the President of the International Papillomavirus Society and a regular advisor to the WHO.

"A concerted global effort to improve worldwide vaccination rates is needed, as recent WHO data indicates that only 13 per cent of young girls eligible for vaccination worldwide have completed the vaccine series," Prof Garland said.

The international team looked into how vaccination affects rates of HPV infection at different sites on the body and the incidence of HPV-related diseases. The research involved reviewing observational studies on HPV vaccination globally from 2016 to 2020, involving 14 years of follow-up data, and 138 peer-reviewed publications.

The review found HPV vaccination programs worldwide have had a significant impact in reducing HPV infections and HPV-related disease outcomes, including precancers and cervical cancers. These results were seen in countries with high coverage of vaccination (such as Australia) where a majority of vaccinations occur when people are in their teenage years and have not yet been infected with HPV.



This research was published in the *Expert Review of Vaccines*.



Women's Cancer Research Centre



Behind the work in the Women's Cancer Research Centre is the philosophy that every woman should be given the opportunity to take part in research at every stage of her care journey.

As a multidisciplinary team, research at the centre considers the different gynaecological cancers: uterine; ovarian/ fallopian tube; cervical; and vulval. Translational research (laboratory and clinical) into rare cancers occurs across a range of clinical trials.

Researchers and clinicians also focus on the conditions which may lead to these cancers, as well as the genetic variations which put women at increased risk of gynaecological cancers. With this in mind, women are recruited where possible to clinical trials at the Women's, and collaboratively through the Victorian Comprehensive Cancer Centre (VCCC) Parkville Clinical Trials Unit, exploring all aspects of the clinical journey.



Associate Professor Orla McNally
Director Gynaecology Tumour Stream, Victorian Comprehensive Cancer Centre (VCCC)

Pictured above: Ange Steele, Nurse Coordinator of the Women's Dysplasia Clinic and the first nurse in Victoria to be trained in colposcopy

Australia continues to lead the way in cervical cancer elimination

Lead Researchers: Megan A Smith, Mr David Wrede, Karen Canfell

A research study has provided valuable insights into the effectiveness of Australia's cervical screening program.

The study involved analysing data from more than 3 million Australian women under the age of 40 who have been vaccinated against human papillomavirus virus (HPV) types 16 and 18, which are known to be risk factors for cervical cancer.

Lead Researcher Mr David Wrede, Consultant Gynaecologist and Lead for Dysplasia at the Women's, said the aim of the study was to assess the impact of the Australian cervical screening program following the introduction of HPV testing and the vaccination program.

"Australia is leading the world in the elimination of cervical cancer," Mr Wrede said. "Once a change to a screening program is implemented it is essential that the impact of this change is measured scientifically."

The research found that women who have received the HPV vaccine had significantly lower rates of HPV, compared with women who have not been vaccinated.

Importantly, the research highlighted that women with low-risk HPV types (non- HPV 16/18) could have three consecutive non-HPV 16/18 tests before being referred for further investigation, without increasing their risk of developing a high-grade abnormality.

This finding has a major impact on the delivery of service, meaning women most at risk can be prioritised for colposcopy services.

The research results support the benefits of HPV vaccination and the use of primary HPV testing in identifying women at risk of cervical cancer. They also contribute to Australia's ongoing efforts in the elimination of cervical cancer and serve as a testament to the importance of evidence-based research in shaping public health policies and practices worldwide.

This research was published in the *British Medical Journal*.

New hope for women with advanced ovarian cancer

Lead Researchers: Dr Gwo Yaw Ho, Professor Clare Scott, Dr Holly Barker

Ovarian carcinosarcoma (OCS) is a rare and aggressive form of cancer that poses significant challenges for treatment.

With limited effective treatment options available, many women diagnosed with OCS face a poor prognosis. However, researchers from the Women's, together with local and international colleagues, are determined to change this.

The research team embarked on a mission to study OCS, aiming to better understand its origins and discover more effective therapeutic approaches. They performed gene analysis on a large cohort of OCS tumours, both at the time of initial diagnosis and during recurrence.

Twenty-four women with OCS took part in the study. The team then successfully created six patient-derived models that faithfully replicated the behaviour of the original tumours, which they then implanted in specifically-bred mice.

Their study confirmed that OCS originates from the same cells as high-grade epithelial ovarian cancer. However, during cancer development, a transformation occurs, converting these cells into sarcomatous cells

through a process known as epithelial-to-mesenchymal transition (EMT).

While EMT is a normal cellular function that allows controlled movement within the body, OCS cells exploit this process, leading to increased aggressiveness and treatment resistance.

The researchers found that eribulin, a type of chemotherapy, exhibited effectiveness against OCS and also had the ability to reverse the EMT process. This reversal triggered the activation of immune cells relevant to immunotherapies, opening new avenues for treatment.

Lead Researcher from the Women's Prof Clare Scott, a clinician-scientist who witnesses the devastating impact of female cancers on women, expressed hope for the future.

"This laboratory research is about bringing hope to these women. By understanding OCS better, we can treat the cancer more effectively," Prof Scott said.

Building on the findings of this study, an investigator-initiated clinical trial called EPOCH will commence in April 2023. The EPOCH trial will assess the effectiveness of eribulin as a standalone treatment, or in combination with immunotherapy (pembrolizumab), for women with advanced OCS.

This research was published in *Cancer Research*.



Pictured at right: Professor Clare Scott



Centre for Family Violence Prevention




The Centre for Family Violence Prevention focuses on improving the safety, health and wellbeing of women and their families.

Many women who come in to hospitals have experienced abuse and violence and feel afraid of their partner or family. To help women and their children feel safer, the Women's is assisting other health services to improve access to safe and appropriate support and prevent the harm caused by family violence.


The centre conducts practical research, working with women who have lived experience, as well as practitioners, to test health interventions (including the

use of technologies) for identification, early intervention and response for women of all ages and backgrounds.

The centre also supports hospital staff in their clinical work by providing evaluation of effective, evidence-based models of care within the context of family violence.



Professor Kelsey Hegarty
Director



Associate Professor Laura Tarzia
Deputy Director

Gaining insights into intimate partner violence to create change

Lead Researchers: Professor Kelsey Hegarty, Dr Elizabeth McLindon, Associate Professor Laura Tarzia

Earlier and more effective interventions and support are needed to prevent intimate partner violence and/or sexual violence.

That's the finding of a study titled *"I just felt like I was running around in a circle": Listening to the voices of victims and perpetrators to transform responses to intimate partner violence.*

The study found that victim-survivors and perpetrators of intimate partner violence want and need more support to seek professional help.

Lead Researcher Professor Kelsey Hegarty said 1,122 women victim-survivors and 563 people who had used intimate partner violence and/or sexual violence against women were surveyed as part of the study.

Thirty women victim-survivors and eight men who had used intimate partner violence and/or sexual violence were also interviewed.

"This research is important because it listens to the voices and experiences of men who use violence; a critical component to ending violence against women," Prof Hegarty said.

The study found many victims and survivors did not seek any formal help for their relationship issues. Barriers preventing victim-survivors and perpetrators from seeking help included: feeling ashamed, lack of awareness about services that could help, and concerns about confidentiality.

The study also found many victim-survivors experienced multiple types of intimate partner violence rather than one type during their lifetime. A significant proportion of victim-survivors had also experienced mental health issues and disability.

The study's findings show changes are needed in policy, social networks, early engagement services, as well as access and response services.

Recommendations for policy and practice level improvements include: ensuring the service system supports children, tailoring responses for people from diverse backgrounds, and offering sustained support for perpetrators within a framework that balances empathy with accountability. For the broader community, the study recommends improved public education on healthy and abusive behaviours in relationships and raising awareness of the support and resources available for victim-survivors and perpetrators of intimate partner violence.

This research was published by Australia's National Research Organisation for Women's Safety Limited.

Better support systems needed for domestic violence survivors

Lead Researchers: Dr Mandy McKenzie, Associate Professor Laura Tarzia

Providing the right support at the right time for victim-survivors of intimate partner violence is an ongoing challenge.

The national VOICES study sought to understand the help-seeking journeys and support needs of women at different stages, through in-depth interviews with 30 victim-survivors.

Lead Researcher Dr Mandy McKenzie said the study found that women victim-survivors largely did not feel adequately supported by the service system. The findings also offer important insights into the changes needed in service design and policy that could make an important difference.

"This study is unique in that it takes a deep dive into the help-seeking needs and experiences of women victim-survivors Australia-wide,"

Dr McKenzie said. "It contains a wealth of vital information to guide and improve practice across health, legal and specialist services."

The study identified five key stages of help-seeking for victim-survivors. It is important to note that women did not necessarily proceed through all the stages, nor was the journey always a linear one. The five stages were:

- maintaining hope and fixing problems
- assessing options and seeking solutions
- getting out
- establishing independence and safety, and
- addressing impacts and making sense.

Women shared the different types of support they needed at different stages of their help-seeking journey.

These ranged from empathetic listening and validation of their concerns to options for support and safety, through to tangible and practical support, such as housing, financial help, and legal advice.

Women also said they needed someone to support, guide, and advocate for them as they navigated a complex service system, and for perpetrators to be held to account for their behaviour.

Finally, women needed support to address the traumatic impacts of family violence for themselves and their children, including ongoing support from trauma-informed, sensitive counsellors and health professionals, as well as connecting with other victims and survivors.

This research was published by Australia's National Research Organisation for Women's Safety Limited.



Midwifery and Maternity Services Research Unit

2022 figures

7

Clinical trials

17

Publications

\$3.3 million

Grants held

\$0.4 million

Grants spent

The Midwifery and Maternity Services Research Unit is committed to making sure the care provided to women in pregnancy and childbirth is evidence-based and of the highest possible quality.

The main focus is on exploring how care is provided so the best outcomes are achieved for mothers and babies. This includes work on midwifery-led models of care, breastfeeding, and perinatal mental health.

Integral to the work is actively exploring the views and experiences of women, as well as those of the midwives who care for them. The unit also works to build research capacity among midwives and nurses.



Professor Della Forster
Director

First Nations mothers and babies thrive under new model of care

Lead Researchers: Professor Della Forster, Fiona McLardie-Hore, Gina Bundle OAM

Continuity of midwife care, known as caseload midwifery, provides better perinatal health outcomes for women accessing maternity services.

In the caseload midwifery model, women are provided with a known midwife throughout their hospital care journey.

Between 2017 and 2020, three major maternity services in Melbourne, including the Women's, introduced caseload midwifery specifically for Aboriginal and Torres Strait Islander mothers and for non-Indigenous women giving birth to an Aboriginal and Torres Strait Islander baby.

In this study, researchers from the Women's explored the capacity of the three maternity services to implement, embed and sustain a culturally responsive caseload midwifery model for First Nations families.

The researchers sought First Nation women's views and experiences, to understand the positive and negative aspects of the care they wanted and received.

Lead Researcher Professor Della Forster said 90 per cent of the 844 women offered the model accepted it. This represented a 21-fold increase in the number of First Nations women participating in caseload midwifery at the three sites during the study period.

"Women reported positive aspects of the culturally responsive caseload care as: knowing their midwife, feeling emotionally safe - supported, reassured and safe in the relationship, and feeling clinically safe," Prof Forster said.

Aunty Gina Bundle, Program Coordinator of the Women's Badjurr-Bulok Wilam centre and a member of the research team, said the voices of First Nations people must be placed at the centre of service design and delivery, rather than maternity services deciding how care will be provided for them.

"We are seeing clear evidence that our Baggarrook midwifery team, with assistance from our Aboriginal Hospital Liaison Officers, is 'closing the gap'," Aunty Gina said.

"The number of Aboriginal babies being admitted to our Neonatal Intensive Care Unit and Special Care Nursery is decreasing, as less Aboriginal babies are born prematurely and/or at low weight."

Prof Forster said the expansion of this caseload model should be prioritised, with further research focused on understanding key features of sustaining the model and continuing to bridge the partnership between First Nations and mainstream health services.

This research was published in *Women and Birth* and *eClinicalMedicine*.

Understanding women's experiences of having a baby during the pandemic

Lead Researchers: Rebecca Hyde, Professor Della Forster, Robyn Matthews

The COVID-19 pandemic had a profound impact on women's experiences of maternity care, according to a survey of women who gave birth at the Women's during September and October 2020.

The Women's experiences of maternity care in a pandemic (WREN study) involved nearly 500 women who shared their experiences of pregnancy care, labour and birth care, postnatal care, changes to visitor access, and the impact of COVID-19.

Lead Researcher Rebecca Hyde, a Research Nurse/Midwife at the Women's, said most of the women had at least some pregnancy care via telehealth, with 84 per cent having some care via telephone and 6 per cent via video. Physical screening tests were reduced when telehealth was used.

Women's rating of care across pregnancy, labour and birth and the early postnatal period was lower than in previous evaluations, while

visitor restrictions had a negative impact on the women's experiences across all areas.

"Maternity care changed significantly and at a rapid pace during the COVID-19 pandemic and these changes, as well as the uncertainty of the pandemic, impacted women's experiences of care in so many ways," Ms Hyde said.

"Changes such as telehealth have opened up opportunities for future care, but we need to use what we have learnt from the women, and further explore the implications of offering women some care via telehealth. This will help ensure that future care is positive for women, with the best clinical outcomes for women and their babies."

The WREN study found that what was most important to women receiving maternity care was: connection (developing a connection with staff through face-to-face care); reassurance (having reassurance from physical checks); safety (feeling safer when having had the physical

checks so things aren't missed); convenience (less impact on their day with telehealth for travel and waiting times); and choice/flexibility (wanting to have the option for telehealth).

Interim results were fed back to the Women's clinical teams, to help inform ongoing use of telehealth and other aspects of pregnancy care. The learnings were presented at the Perinatal Society of Australia and New Zealand Conference 2022.





Pregnancy Research Centre

2022 figures

3

Clinical
trials

27

Publications

\$1.8
millionGrants
held\$0.9
millionGrants
spent

The focus of the Women's Pregnancy Research Centre is to better understand the causes of pregnancy disorders that compromise the health of mothers and their babies. Common pregnancy complications include miscarriage, preeclampsia, fetal growth restriction, gestational diabetes and preterm labour.

The centre's work on pregnancy and its disorders ranges from biomedical laboratory research through to clinical studies, treatment trials and public health initiatives, all designed to support evidence-based clinical practice.

The mission of the centre is to apply contemporary research techniques to the investigation of clinically important problems in maternal and fetal medicine and related fields.



Professor Shaun Brennecke AO
Director



Dr Bill Kalionis
Deputy Head,
Laboratory Research

Optimising care for pregnant women with cancer

Lead Researchers:
Professor Mark Umstad AM,
Professor Lesley Stafford,
Associate Professor Michelle Peate

Pregnant women with cancer need comprehensive medical care, involving the coordination of services from multidisciplinary teams of health professionals who may be located at different sites.

Currently, care for pregnant women with cancer is often fragmented, with different specialists working independently of each other.

This study sought to identify areas for improvement in patient care, through exploring the views and experiences of health professionals who care for pregnant women with cancer.

Lead Researcher Professor Mark Umstad said 27 health professionals from five Australian states, including obstetricians, oncologists, and allied/mental health professionals, participated in the study.

They were interviewed about their confidence in caring for pregnant patients with cancer, whether current guidelines and training met their needs, the psychological impacts of providing care to these patients, and whether there are service gaps.

Prof Umstad said the health professionals stated it was often challenging to provide these patients with comprehensive care, particularly when treatment was delivered at geographically separate hospitals. The study found a more integrated approach is needed, where obstetricians, oncologists, and other health professionals work together to provide coordinated care.

This approach has already been put into practice in some locations, such as in Parkville, where the Women's, Royal Melbourne Hospital and Peter MacCallum Cancer Centre collaborate to optimise care for pregnant women with cancer.

"While pregnant women with cancer are a relatively small proportion of the population, they are an increasing and important proportion," Prof Umstad said.

"Their care is complex and multidisciplinary, and our Parkville location provides an excellent opportunity to optimise their care in conjunction with colleagues at the Royal Melbourne Hospital and Peter MacCallum Cancer Centre."

This research was published in *The Breast*.

Identifying pregnant women at risk of pre-term birth

Lead Researchers: Dr Vicky Xu,
Professor Shaun Brennecke,
Professor Andrew Shennan

Preterm birth, defined as birth before 37 weeks' gestation, can have serious consequences for the health and development of a baby. It is the leading cause of perinatal illness and deaths.

Researchers at the Women's collaborated with local and international colleagues to find out what previous pregnancy and labour outcomes increase the risk of a woman having a subsequent baby who is born prematurely.

Lead Researcher Dr Vicky Xu said the researchers analysed existing data from 430 women and more than 700 pregnancies and found women's obstetric history is a risk factor in subsequent preterm births.

The research shows an increased risk of spontaneous preterm birth if women have had a previous pre-term birth and/or an emergency caesarean section at both the first and second stage of labour. It found a previous "in labour" emergency caesarean should be considered a risk factor for subsequent preterm birth.

"These research findings point to the value of collaborative research and the importance of clinical databases that help identify significant clinical problems that require further research for their solutions," Dr Xu said.

The study identified the need for further work on how best to identify and treat pregnant women in these at-risk groups, to minimise the likelihood of preterm birth and ultimately improve the health and wellbeing of mothers and babies.

This research was published in the *European Journal of Obstetrics and Gynecology and Reproductive Biology* and the *Australian and New Zealand Journal of Obstetrics and Gynaecology*.





Allied Health Research



The Allied Health and Clinical Support Services' directorate is committed to expanding its research involvement.

Within the directorate, four departments contribute to allied health research: pharmacy; nutrition and dietetics; social work; and physiotherapy. These areas all participate in clinical research to determine evidence-based interventions and treatment for women and babies.

The Women's Obstetrics and Gynaecology Ultrasound department, involving sonographers, also plays a pivotal role in research conducted by other services.



Associate Professor Helena Frawley
Director

Screening for food insecurity recommended for pregnant women

Lead researchers: Julia Zinga, Associate Professor Fiona McKay, Dr Paige van der Pligt

Food insecurity is a significant public health concern that affects over 13 per cent of Australians. It is also becoming more common due to the rising cost of living.

A person is food insecure when they lack access to enough safe and nutritious food for an active and healthy life. International evidence suggests that this public health concern has a significant impact on pregnant women and their offspring. Yet little is known in Australia about the health impacts of food insecurity during pregnancy.

Lead researcher Julia Zinga, a dietitian at the Women's, wanted to find out more about the experiences of food insecurity during pregnancy.

Her research team asked a group of pregnant women experiencing food insecurity how they made their food choices; what their coping strategies were to manage food insecurity; and the social and economic factors that influenced their food choices.

Findings from the research show food insecurity during pregnancy is burdensome, relentless, and undermines women's wellbeing.

The women in this study acknowledged the importance of eating well during pregnancy. Yet, they often defaulted to cheap, convenient and less nutritious food choices as a result of a limited food budget; pregnancy symptoms; cognitive overload associated with food insecurity; and the impact of the pandemic.

"The research presented here begins to highlight the challenges that food-insecure pregnant women face to make ends meet and how this influences their food choices, despite their awareness of the importance of a healthy diet," Ms Zinga said.

"It indicates that food insecurity screening within routine antenatal care and subsequent supportive strategies are needed to deliver an equitable health response for this priority population group."

More research is underway, to find out how pregnant women experiencing food insecurity wish to be supported, and how the antenatal health system can respond to this issue.

This research was published in the *Maternal and Child Health Journal*.

Optimising care for women seeking an abortion over 20 weeks' gestation

Lead Researchers: Clare McDonald, Dr Alyce Wilson

Gaining a better understanding of why women present for an abortion at or over 20 weeks' gestation is at the heart of this study.

Lead Researcher Clare McDonald said this research aims to give a voice to those who have lived experience of facing barriers in accessing an abortion.

"Women with unplanned or unwanted pregnancies over 20 weeks are often socially disadvantaged and their voices are underreported," Ms McDonald said.

"This research aims to identify barriers to time-sensitive abortion access in the later stages of pregnancy, and to promote better access to respectful, safe and holistic abortion care."

Ms McDonald, a leader in the Women's Abortion and Contraception social work team, said the Women's is the only hospital in Victoria which regularly provides abortions to women over 16 weeks' gestation.

Her research will identify whether this limit on abortion care contributes towards women receiving abortions at a later stage than they would if abortion care was more available.

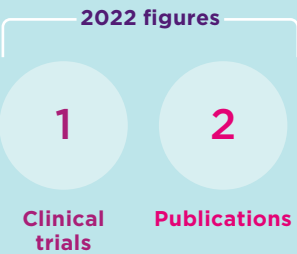
Her team has interviewed 16 women who received abortion care at the Women's when they were over 20 weeks' gestation.

They have also interviewed 16 healthcare workers from the Women's Abortion and Contraception service, including social workers, consulting doctors/surgeons, nurses, midwives and administration staff.

The findings are expected to be released in late 2023.



Anaesthetics Research Centre



The goal of the Anaesthetics Research Centre is to reduce maternal suffering and death by achieving optimal maternal health before, during and after birth.

The centre's work addresses the problems of high blood pressure, obstetric critical illness, and improving anaesthesia and analgesia for pregnant women, especially in the perioperative period.

Research at the centre also aims to increase understanding of heart function and structure in pregnant women and the cause of preeclampsia.



Professor Alicia Dennis
Director

Heart ultrasounds could reduce common C-section risks

Lead Researchers: Dr Bradley Smith, Professor Alicia Dennis, Associate Professor David Sturgess

Caesarean section surgery is performed in about 36 per cent of births in Australia. However, when women with undiagnosed cardiac disease undergo this procedure, it can lead to complications during and after surgery.

This study sheds light on the need to improve screening and diagnosis of higher risk patients before surgery, using echocardiography (a heart ultrasound).

Lead Researcher Professor Alicia Dennis said the study reviewed the cases of 763 Australian patients who were admitted to Intensive Care Units (ICU) after caesarean section surgery over a five-year period. These cases included patients who did not have any previously known heart problems.

The study found 56 of the patients cared for in ICU were given an echocardiogram during their admission into ICU. Two out of every three of these patients required this heart ultrasound because of pulmonary hypertension or high blood pressure in the blood vessels supplying the lungs. This condition cannot be easily diagnosed with other routine tests such as blood tests, chest X-rays or listening to the heart with a stethoscope.

The study's findings support the use of echocardiography in pregnant patients who are at high risk of heart problems, prior to them undergoing caesarean section surgery. The study also highlighted the importance of early diagnosis and targeted management of cardiac disease during pregnancy to significantly improve outcomes for both mother and baby.

"The next steps are to broaden the reach of echocardiography teaching and research by continuing to establish national and international collaborations," Prof Dennis said.

"And to incorporate echocardiography teaching into anaesthesiology and critical care training, especially in obstetric anaesthesiology, perioperative medicine and critical care, so obstetric patients can benefit from its use in routine clinical practice."

This research was published in *Australian and New Zealand Journal of Obstetrics and Gynaecology*.



Social Model of Health Research

The Women's is committed to a social model of health because we know that social and environmental factors - and not only medical problems - affect a woman's health and wellbeing.

Language, social, cultural and spiritual support or having a place to stay; these can be just as important as medicine.

This year, the Social Model of Health Research Centre emerged from the existing Centre for Women's Mental Health, to encompass a broader scope of research and to acknowledge the impact of non-medical factors upon women, babies and families.

These non-medical factors include: socioeconomic status, access to education and housing, freedom from violence, and more.

Director of Social Model of Health Clare Manning said her division's research explores how to address health inequities caused by the social determinants of health.

"We provide a range of specialist services that provide psychosocial wrap-around care," Ms Manning said.

"We seek to understand the impacts of social factors upon the health and access outcomes for women, particularly women who are experiencing a range of disadvantage."

The Social Model of Health division collaborates on research with colleagues from other research centres at the Women's, including those working in allied health and family violence prevention.

Social Model of Health research also includes:

Cornelia Program

Evaluating the long-term health and wellbeing outcomes for women and babies who have participated in this program, which supports pregnant women experiencing homelessness.

Social Work

Exploring the care and experiences of women who have experienced pregnancy loss, have accessed late-term abortion care, or are gynaecology patients with a history of trauma.

Mental Health

Researching the effectiveness of the Women's antenatal psychology program in building skills for new mums around anxiety and mood management, and in forming attachments with their babies.

Family Violence

Embedding and evaluating antenatal family violence screening for women who do not speak English, and implementing and evaluating Family Violence Clinical Champions and Contact Officer Programs.

Women's Alcohol and Drug Service (WADS)

Investigating the long term outcomes for women and babies involved in this service. The WADS service provides medical care, counselling and support to women with complex substance use and dependence, and assesses and cares for babies exposed to substance use during pregnancy.



Clare Manning
Director



Pictured at right: Cornelia Program midwife Bec (at right) catches up with Jamie and her baby

Obstetric Medicine Research Group

Do Your Ovaries Keep You Slim? WHAM says no

Lead Researchers: Dr Sarah Price, Professor John Wark, Professor Martha Hickey

The above headline, in *The Journal of Clinical Endocrinology & Metabolism*, sums up the findings of a research project which will assist women at high risk of ovarian cancer.

Some women have a genetic mutation (BRCA1 or BRCA2) which makes them more likely than other women to develop cancers such as breast or ovarian cancer. To reduce the risk of ovarian cancer, these women can have their ovaries removed, which results in early menopause (also known as surgical menopause).

Lead Researcher Dr Sarah Price said women's decisions about whether to undertake this preventative surgery

may be influenced by the common belief that menopause results in weight gain and changes in body composition.

Her study demonstrated that surgical menopause actually has very little impact on the weight and body composition of women who have had their ovaries removed, by comparing their weight and body composition with women of the same age who retain their ovaries.

"This finding is important because it largely addresses a myth that has the potential to impact a woman's decision making around whether or not to have surgery to prevent ovarian cancer," Dr Price said.

"It will allow women to make decisions based on evidence rather than a misconception."

Dr Price said the study was made possible because Professor Martha Hickey, Director of the Women's Gynaecology Research Centre, had previously undertaken the What Happens After Menopause (WHAM) study. Dr Price analysed the weight and body composition of 95 premenopausal women who undertook preventative surgery and a comparison group of 99 women who retained their ovaries.

"The rich and varied research collaborations at the Women's enable us to conduct studies that are so translatable to the clinical setting," Dr Price said.

In 2023, this research will be published in *The Journal of Clinical Endocrinology & Metabolism*.



Gandel Simulation Service Research

Breaking down barriers for better teamwork

Lead Researchers: Dr Rebecca Szabo, Dr Lauren De Luca, Dr Eve Purdy, Dr Kara Allen, Nova Barrios

The physical environment of a workplace can affect the level of communication and collaboration within a team. This is particularly relevant in healthcare settings, where effective teamwork is essential for providing high quality care.

In this study by Gandel Simulation Service, simulation was used as a quality improvement and research tool. Simulations were run with clinicians in the Women's Birth Centre to explore the impact of making physical changes to the central shared space. This simulation work led to removal of a wall that separated the medical staff area from the front desk most used by midwifery staff.

A medical anthropologist, Dr Eve Purdy, held one-on-one interviews with Birth Centre staff six months after removal of the wall.

Data analysis identified three key themes: enhanced psychological safety, impacts on teamwork, and collateral consequences.

Positive impacts included improved psychological safety and teamwork across professions. A new ritual, a daily huddle, became possible, which enhanced familiarity and shared team goals, and there were improved relationships between midwives and doctors.

Unintended consequences were also identified, such as decreased privacy and impacts on the midwife-in-charge role through to increased frequency of communication with resident physicians.

Dr Rebecca Szabo, lead of Gandel Simulation Service, said the findings warrant further investigation through translational simulation for quality improvement and research, with the development of mitigation strategies.

"This research demonstrates the true impact of using simulation as a tool for quality improvement with frontline staff," Dr Szabo said.

"The impact of the wall was identified through simulation, and we were able to report back to maternity managers, directors and executives who understood the significance of the impact and literally knocked down a wall to prioritise teamwork and communication.

The findings have important implications for the design of healthcare facilities including use of simulation and the development of strategies to facilitate effective teamwork and communication in healthcare settings.

This research was presented at The Royal Australian and New Zealand College of Obstetricians and Gynaecologists conference in 2022.

Perinatal Research

Going beyond the limitations of ultrasound to predict brain health

Lead Researchers: Dr Clare Whitehead, Laura Harbinson

Understanding the early markers of brain health can provide key insights into a child's future.

Being able to identify which babies are at a higher risk of poor developmental outcomes helps to ensure they are provided with timely interventions and support.

Recent research by the Women's has shed light on the potential link between measurements taken during pregnancy and the longer-term development of a baby's brain and behaviour.

A review of existing studies explored the effectiveness of ultrasound measurements in predicting the brain health of babies, with thought-provoking results.

The review showed current ultrasound measurements taken during pregnancy do not perform well in predicting a baby's longer-term brain health.

Lead Researcher Dr Clare Whitehead said while ultrasound is a widely accessible and frequently used imaging technique, its limitations in this context mean there is an urgent need for better predictive tools that go beyond short-term outcomes and encompass longer-term health considerations for babies.

"Ten per cent of all babies are born small, which means they are at higher risk of poor developmental outcomes," Dr Whitehead said.

"However, it is unclear which babies are most likely to be affected. This study highlights how poor our current tools are and allows us to design better tools that might answer this question.



"The Women's is an excellent place to combine clinical research as we care for so many complex pregnancies, so we can help babies and families directly through research like this."

The next phase of this research involves investigating new ultrasound measurements of babies' brains, and comparing those with measurements gained using cutting-edge MRI techniques.

This research was presented at the International Society of Ultrasound in Obstetrics and Gynecology conference in 2022.

Pictured above: Dr Clare Whitehead

Imaging Research

Study into rare birth defect

Lead Researchers: Dr Edward Springhall, Karen Reidy, Associate Professor Ricardo Palma-Dias

Congenital diaphragmatic hernia (CDH) is a rare birth defect that affects 1 in every 4,000 births. It occurs when abdominal organs are displaced into the chest through a defect in the diaphragm, causing the heart and lungs to be compressed.

This condition can be associated with other differences and atypical genetic findings, and up to 40 per cent of survivors have a brain abnormality. It can affect a child's development and function.

A research team at the Women's is aiming to find out whether the long-term impacts of CDH start in the womb.

To do this, they are comparing brain Magnetic Resonance Imaging (MRI) results of 33 fetuses with CDH to the MRI results of 33 fetuses without CDH.

Lead Researcher Dr Edward Springhall said the team's hypothesis is that the MRI results will show that fetuses with CDH have significant differences in measurable brain biometry when compared with fetuses of the same age without CDH.

"A significant difference in brain measurements may suggest long term impacts of CDH on childhood development start in the womb," Dr Springhall said.

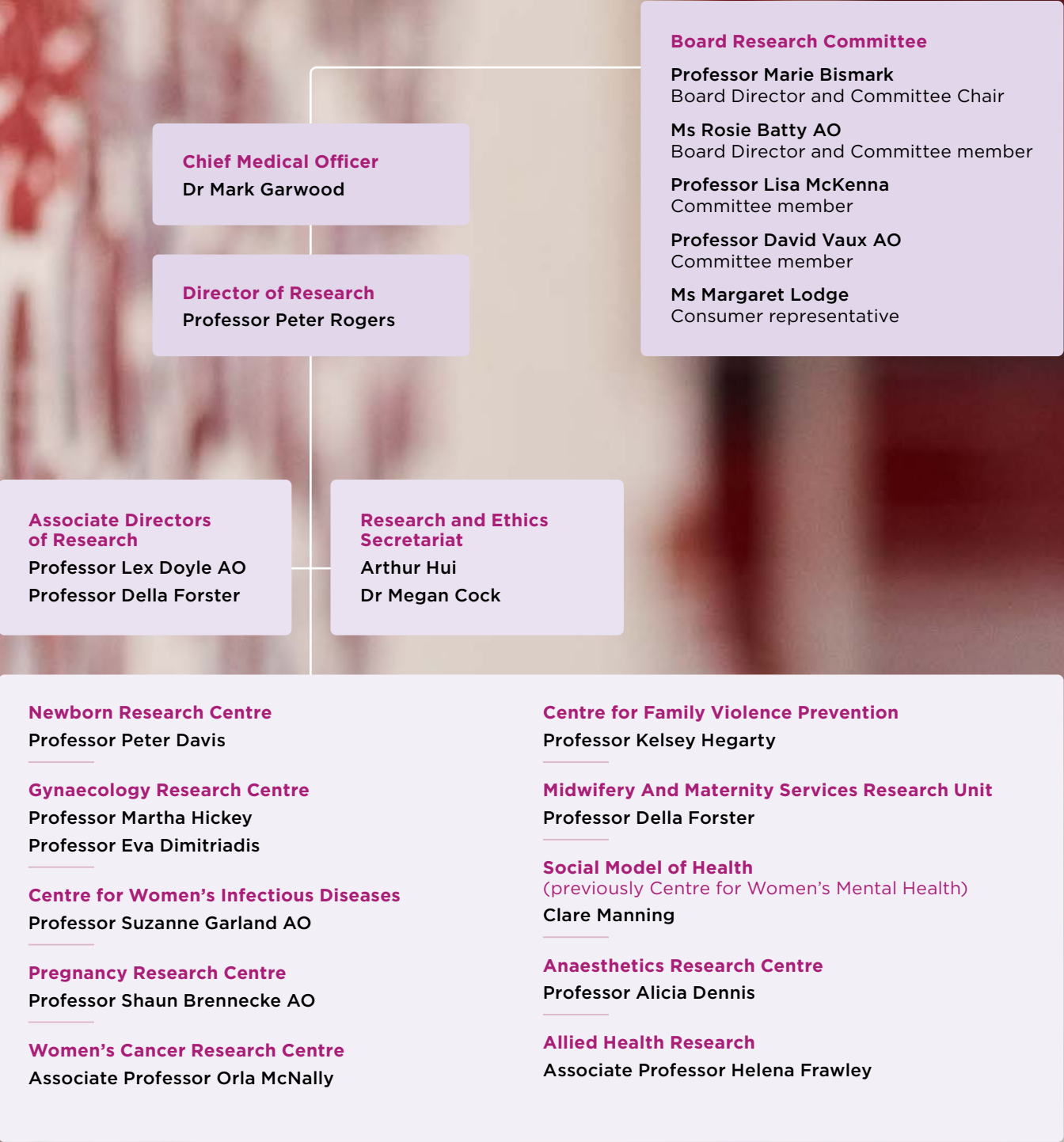
"The clinical implications of these findings are likely to be significant in counselling families regarding the neurological outcomes for children born with CDH."

The research findings are expected to be published in 2023.



Pictured left: Associate Professor Ricardo Palma-Dias

Organisational chart



Student completions 2022

Doctor of Philosophy

Badurdeen S. PhD, Monash University. *Improving transition at birth for compromised infants.* Supervisors: Davis P, Kamlin O.

Cameron K. PhD, University of Melbourne. *Dance as an intervention for extremely preterm children at risk of motor impairment.* Supervisors: Spittle A, Cheong J.

Ratten L. PhD, Monash University. *Using Metagenomic Techniques to Determine the Cause of NGU and BV.* Supervisor: Fairley C.

Yang M. PhD, University of Melbourne. *Mesenchymal stem cell bioreactors for scale up of production.* Supervisors: Kalionis B, O'Connor A.

Masters

Maxted V. MSc, University of Bath. *Exploring the psychosocial unmet needs of Australian women with endometriosis: a qualitative study.* Supervisors: Peate M, Smith S.

Laura Harbinson. MSc Clin Res, University of Melbourne. *Neurodevelopmental outcomes in FGR.* Supervisor: Whitehead C.

Springall T. MAppSci, La Trobe University. *Exploring breastfeeding among Aboriginal and Torres Strait Islander women - a sub-study of the Women's Journey NHMRC Partnership grant.* Supervisors: McLachlan H, Forster D.

Hilmy F. BMedSc, University of Melbourne. *Interventions to manage vasomotor symptoms after cancer.* Supervisors: Peate M, Marino J.

Muawam A. BMedSc, University of Melbourne. *Interventions to manage vasomotor symptoms after cancer.* Supervisor: Peate M.

Rui Peh C. BSc (Hons), University of Melbourne. *Investigating the Basis of Antibiotic Resistance in Mycoplasma genitalium.* Supervisors: Murray G, Machalek S.

Bachelor (including Honours)

Bilston B. BSc (Hons), University of Melbourne. *The functional role of VEZT in the endometrium.* Supervisor: Donoghue J.

Chedra E. BSc (Hons), Monash University. *Stem cell ECVs.* Supervisors: Kalionis B, Parkington H, Colfella K.

Robertson M. BSc (Hons), University of Melbourne. *Obesity and Leptin as drivers of preeclampsia.* Supervisors: Price S, Kalionis B.

Fryer C. BSc (Hons), University of Melbourne. *The function of NCEH1 in the placenta and preeclampsia.* Supervisors: Dimitriadis E, Menkhorst E.

Howe M. BSc (Hons), University of Melbourne. *The role of MUC5AC in endometrial receptivity and blastocyst implantation.* Supervisors: Dimitriadis E, Menkhorst E.

Ravindran J. BMedSc (Hons), Monash University. *Assessing of accuracy of comorbidity data collection at the National Gynae-Oncology Registry.* Supervisors: Perera S, Vicario E.

Medical Degree Research Project (MDRS)

Bigelow J. MDRP, University of Melbourne. *Concordance between endometrial receptivity analysis and histopathology regarding endometrial dating.* Supervisor: Rozen G.

Gauci L. MDRP, University of Melbourne. *Exploring the facilitators and barriers to using an online patient-driven stepped-care platform for guidance of menopausal symptom management after cancer; a qualitative study protocol.* Supervisor: Peate M.

Liu J. MDRP, University of Melbourne. *Use of Goserelin in Adolescent Oncofertility.* Supervisors: Jayasinghe Y, Assis M.

Morrison S. MDRP, University of Melbourne. *Platelet-rich plasma for patients with repeated implantation failure: prospective study protocol.* Supervisor: Rozen G.

Su F. MDRP, University of Melbourne. *Examining the effect of medical lubricant formulations on female sexual satisfaction.* Supervisor: Lew R.

White O. MDRP, University of Melbourne. *Examining the effect of medical lubricant formulations on female sexual satisfaction.* Supervisor: Lew R.

VCCC Clinical Trial Internship Program

O'Reilly D. MBiotech, Monash University. *Standard Operating Procedures (SOP) for Tissue bank collection at the Royal Women's Hospital (RWH) Gynae-oncology and Dysplasia Unit.* Supervisors: Silver J, Vicario E.

Publications 2022

A total of 264 papers was published in peer reviewed medical journals by the Women's in 2022.

The publications below have been selected to highlight the quality of our research at a national and international level. The papers have been selected based on the quality of the journal in which they were published. The journals selected are in the top two per cent of journals, as is indicated by an 'impact factor' greater than 10. Impact factor (as determined by InCites Journal Citation Reports) is a measure of the frequency with which the 'average article' has been cited in a particular year or period.

A full list of 2022 publications for each research centre is available on the Women's website at www.thewomens.org.au/research.

Badurdeen S, Davis PG, Hooper SB, Donath S, Santomartino GA, Omar FKC, Kane SC, et al. *Physiologically based cord clamping for infants >=32+0 weeks gestation: A randomised clinical trial and reference percentiles for heart rate and oxygen saturation for infants >=35+0 weeks gestation*. **PLoS Med** 2022 19:e1004029.

Bloomfield FH, Jiang Y, Harding JE, Crowther CA, Cormack BE, Pro VTG. *Early Amino Acids in Extremely Preterm Infants and Neurodisability at 2 Years*. **N Engl J Med** 2022 387:1661-1672.

Bui DS, Perret JL, Walters EH, Lodge CJ, Bowatte G, Hamilton GS, Davis PG, et al. *Association between very to moderate preterm births, lung function deficits, and COPD at age 53 years: analysis of a prospective cohort study*. **Lancet Respir Med** 2022 10:478-484.

Dargaville PA, Carlin JB, Davis PG, Investigators O-AT. *Minimally Invasive Surfactant Therapy vs Sham Treatment and Death or Bronchopulmonary Dysplasia in Preterm Infants With Respiratory Distress Syndrome-Reply*. **JAMA** 2022 327:1614-1615.

Delahunty R, Nguyen L, Craig S, Creighton B, Ariyaratne D, Volcheck M, et al. *TRACEBACK: Testing of Historical Tubo-Ovarian Cancer Patients for Hereditary Risk Genes as a Cancer Prevention Strategy in Family Members*. **J Clin Oncol** 2022 40:2036-2047.

Du Berry C, Nesci C, Cheong JLY, FitzGerald T, Doyle LW, et al. *Long-term expiratory airflow of infants born moderate-late preterm: A systematic review and meta-analysis*. **EClinicalMedicine** 2022 52:101597.

Gaertner VD, Helwig ED, Manley BJ, Kamlin OF, Kraus A, Ruegger CM. *"Harry Potter and the Multitudinous Maladies": a retrospective population-based observational study of morbidity and mortality among witches and wizards*. **Med J Aust** 2022 217:592-597.

Garsed DW, Pandey A, Fereday S, Kennedy CJ, Takahashi K, Alsop K, McNally O, et al. *The genomic and immune landscape of long-term survivors of high-grade serous ovarian cancer*. **Nat Genet** 2022 54:1853-1864.

Gould JF, Makrides M, Gibson RA, Sullivan TR, Cheong JLY, Davis PG, Doyle LW, et al. *Neonatal Docosahexaenoic Acid in Preterm Infants and Intelligence at 5 Years*. **N Engl J Med** 2022 387:1579-1588.

Hegarty KL, Andrews S, Tarzia L. *Transforming health settings to address gender-based violence in Australia*. **Med J Aust** 2022 217:159-166.

Hickey M, Hunter MS, Santoro N, Ussher J. *Normalising menopause*. **BMJ** 2022 377:e069369.

Ho GY, Kyran EL, Bedo J, Wakefield MJ, Ratnayake G, McNally O, Scott CL, et al. *Epithelial-to-Mesenchymal Transition Supports Ovarian Carcinosarcoma Tumorigenesis and Confers Sensitivity to Microtubule Targeting with Eribulin*. **Cancer Res** 2022 82:4457-4473.

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Thomas M, Greaves RF, Tingay DG, Loh TP, Ignjatovic V, Newall F, Oeum M, Tran MTC, Rajapaksa AE. *Current and emerging technologies for the timely screening and diagnosis of neonatal jaundice*. **Crit Rev Clin Lab Sci** 2022 59:332-352.

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Vrselja A, Latifi A, Baber RJ, Stuckey BGA, Walker MG, Stearns V, Hickey M, Davis SR. *Q-122 as a novel, non-hormonal, oral treatment for vasomotor symptoms in women taking tamoxifen or an aromatase inhibitor after breast cancer: a phase 2, randomised, double-blind, placebo-controlled trial*. **Lancet** 2022 400:1704-1711.

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Pictured above: Jay bonds with his triplets Nyra, Om and Namya

Australian Government grants 2022

Australian Research Council (ARC)

Guy R, Broom A, Whiley D, Bradshaw C, Applegate T, Treloar C, Wiseman V, Huston W, Williamson D, Kaldor J, Valley A, Hocking J, Regan D, Donovan B, Kelly-Hanku A, Murray G. Industrial Transformation Research Program. *Research Hub to Combat Antimicrobial Resistance*. \$10,000,000; 2020-2024

Spangaro J, Hegarty K, Rutherford A, Zwi A, Man N, McMahon T, Perry A, Koziol-McLain J. Linkage Program. Screening and responding to domestic violence experienced by refugee women (SAHAR project). \$449,514; 2020-2023

Ussher J, Perz J, Hickey M, Chambers S, Dowsett G, Robinson K, Boydell K, Davis I, Parton C, Anazodo A, McDonald F. Linkage Program. *Out with Cancer: LGBTI experiences of cancer survivorship and care*. \$369,960; 2018-2022

National Health and Medical Research Council (NH&MRC)

Clinical Trials and Cohort Studies Grants

Brown S, Gartland D, Giallo R, Carlin J, Gold L, Hegarty K, Sanci L, Fogarty A, Herrman H, Macmillan H. *Uncovering the hidden impacts and costs of exposure to intimate partner violence in childhood: a 20-year cohort study*. \$1,595,473; 2022-2024

Mishra G, Hickey M, Dobson A, Wilson L, Doust J, Tooth L, Moss K, Buckley L. *Maternal and early life origins of adolescent menstrual disorders and pelvic pain*. \$1,475,456; 2022-2027

Said J, Groom K, Crowther C, Doyle L, Karahalios A. PRECeDe: *Prevention of neonatal Respiratory morbidity with antenatal corticosteroids prior to Elective Caesarean section in women with Diabetes: A Randomised triaDE*. \$3,409,951; 2022-2027

Stark M, Collins C, Sullivan T, Andersen C, Morton R, Marks D, Owen L. *The effect of transfusion with washed versus unwashed red blood cells to modify neonatal morbidity and mortality: A randomised controlled trial*. \$2,071,936; 2020-2024

Centre for Clinical Research Excellence

Canfell K, Brotherton J, Saville M, Castle P, Kaldor J, Garland S, Kelaher M, Guy R, Valley A, Simms K. *Centre for Research Excellence in Cervical Cancer Control (C4)*. \$2,486,382; 2017-2022

Cheong J, Doyle L, Davis P, Anderson A, Spittle A, Hunt R, Thompson D, Lee K, Manley B, Owen L. *Centre for Research Excellence in Newborn Medicine*. \$2,496,997; 2019-2023

Mishra G, Hickey M, Dobson A, Gannon B, Doust J, Fisher J, Cicuttini F, Huxley R, Tooth L, Brown H. *Centre of Research Excellence on Women and Non-communicable Disease (CRE WaND): Prevention and Detection*. \$2,495,848; 2018-2023

Teede H, Norman R, Mishra G, Boyle J, Hart R, Mol B, Moran L, Hickey H, Laven J, Rodgers R. *Centre of Research Excellence - Women's Health in Reproductive Life (CRE WHiRL)*. \$2,499,056; 2020-2024

Development Grants

Theda C, Prentice E, Pflaumer A, Grayden D, Chia L. The Neonav ECG Tip Location System: Better & safer care for paediatric intensive care patients. \$879,010; 2021-2023

Theirry B, Warkiani ME, Zander-Fox D, Whitehead C. *Genome-Wide Non-Invasive Prenatal Testing based on Circulating Fetal Trophoblastic Cells*. \$780,215; 2020-2022

Ideas Grants

Crossley K, DeKonick P, Hodges R, Thio M. *Reducing the risk of pulmonary hypertension in infants with a congenital diaphragmatic hernia*. \$920,076; 2020-2023

Hegarty K, Tarzia L, Humphreys C, Murray E, Hameed M, Feder G. *BETTER MAN Project: Tailored early online intervention for men using intimate partner violence*. \$506,202; 2021-2023

Jordan S, Wilson L, Hickey M. *Hysterectomy, Oophorectomy and Long-term chronic Disease - the HOLD study*. \$690,000; 2021-2024

Ingram W, Amir L. *A paradigm shift in lactational mastitis: Exploration of immune factors in breast milk: cohort study of women at high and low risk mastitis*. \$723,935; 2022-2024

Parkington H, Sheehan P. Mechanisms underlying the generation of spontaneous contractions in human uterine muscle: Potential therapeutic target for dysfunctional labour. \$374,926; 2021-2023

Investigator Grants

Garland S. Leadership 3. *Improving Reproductive Health Through Infectious Diseases Research*. \$1,957,108; 2021-2025

Hickey M. Leadership 2. *Better evidence and new tools to improve health after surgical menopause*. \$1,855,260; 2021-2025

Lensen S. Emerging Leadership 1. *Towards evidence-based use of IVF add-ons in Australia*. \$645,205; 2021-2025

Price S. *Improving maternal metabolic health prior to pregnancy to prevent metabolic disease in the offspring*. \$650,740; 2022-2026

Scott C. *Super-Responders and Super-Survivors - how to dramatically improve cancer outcomes*. \$2,372,570; 2022-2027

Partnership Grants

Spittle A, Novak I, Boyd R, Morgan C, Doyle L, Dale R, Scuffham P, Whittingham K, Colditz P, Pannek K. *Early diagnosis and early intervention for infants with cerebral palsy: implementation of international evidence-based guidelines into practice*. \$1,196,362; 2018-2023

Project grants

Chamberlain C, Atkinson C, Herrman H, Campbell S, Lovett R, Canuto K, Nicholson J, Segal L, Mohamed J, McMahon M. *Healing the past by Nurturing the Future: perinatal awareness, recognition, assessment and support for Aboriginal and Torres Strait Islander parents experiencing complex trauma - Phase 3*. \$1,100,000; 2022-2026

Cheong J, Anderson P, Thompson D, Ranganathan S, Spittle A, Doyle L, Clark R, Burnett A. *Long-term impact of moderate and late preterm birth: effects on neurodevelopment, brain development and respiratory health at school age*. \$1,467,294; 2019-2022

Kaldor K, Machalek D, Delany-Moretlwe S, Rees H, Chikandiwa A, Brotherton J, Petoumenos K, Cornall A, Valley A. *Impact of 2-dose and 1-dose human papillomavirus (HPV) vaccination schedules on community level HPV prevalence in South African adolescent girls (The HOPE study)*. \$1,482,052; 2019-2023

Manley B, Kamlin CO, Davis P, Doyle L, McKinlay C, Schmolzer G, Jacobs S, Cheong J, Dargaville P, Donath S. *Intratracheal budesonide mixed with surfactant to reduce bronchopulmonary dysplasia in extremely preterm infants - the PLUS Study*. \$2,113,820; 2019-2023

Skinner S, Marino J, Lymer S, Doherty D, Steinbeck K, Straker L, Kang M, Tait R. *The health, social and economic implications of risk-taking in adolescence over the life-course: a data linkage study of the Raine cohort*. \$1,061,014; 2019-2023

Personal support

Davis PG. Practitioner Fellowship. *Generating and applying clinical research to improve the outcomes of neonatal intensive care*. \$585,270; 2019-2023

Owen L. Career Development Fellowship. *Protecting premature lungs for life: supporting the first breath and every breath*. \$305,924; 2019-2022

Spittle AJ. Career Development Fellowship. *Early detection and early intervention for infants born at high risk of neurodevelopmental impairments*. \$483,404; 2019-2022

Whitehead C. Early Career Fellowship. *Placental function testing to prevent stillbirths*. \$481,952; 2018-2022

Targeted call for Research

Kelaher M, Paradies Y, Ritte R, Nicholson J, Brown S, Hegarty K, Armstrong G, Water L. *Responding to Aboriginal and Torres Strait Islander family aspirations to foster self determination and social and emotional wellbeing*. \$1,924,345; 2018-2022

Special Initiative: Mental Health

Palmer V, Gunn J, Pikis J, Patton G, Eades S, Wheeler A, Kisely S, Hiscock H, Panellis C, Maybery D, Lautenschlager N, Almeida O, Sanci L, Larkins S, Wright M, Morgan V, Galletly C, Brophy L, Hegarty K, et al. *ALIVE - A National Research Translation Centre to implement Mental Health Care at Scale*; \$10,000,000; 2021-2026

Medical Research Future Fund (MRFF)

Emerging Priorities and Consumer Driven Research

Rogers P, Healey M, Holdsworth-Carson S, Donoghue J, Frawley H, Cheng C. *Improving treatment and diagnosis of endometriosis*. \$3,929,234; 2020-2025

Teede H, Geelhoed G, Arnott L, Boyle J, Byles J, Chambers G, Clifton V, Frayne J, Glover K, Hickey M, Hart R, Larkins S, Loxton D, Makrides M, Mishra G, Nagle C, Nippita T, Perz J, Walker S, Zaman S. *National Women's Health Research, Translation and Impact Network (WHRTN)*. \$5,000,000; 2020-2024

Clinical Trials Activity

Said J, Groom K, Crowther C, Morris J, Doyle L, Forster D, Zeps N, Harding J, Henry A, Whitehead C. International Clinical Trials Collaborations. *The C*STEROID Trial: An international, randomised placebo-controlled trial to determine the effect of antenatal corticosteroids on newborn health when given prior to planned caesarean section birth from 35+0 to 39+6 weeks of pregnancy*. \$2,151,495; 2021-2025

Clinical Translation and Commercialisation

Theda C, Navi Medical Technologies. *Safer care for critically-ill children: clinical translation of a new medical device to place and monitor paediatric central vascular catheters*. \$1,239,187; 2022-2024

Preventative and Public Health Research

Chamberlain C, Marriott R, Langton M, Gray P, Krakouer J, Atkinson C, Canuto K, Herrman H, Kendall S, McLachlan H, Segal L, Walker S, Skouteris H, Forster D, Fisher J, Atkinson J, Reibel T, Kotz J, Ah Chee V, Walker R, McCalman P, Bundle Gina, et al. *Replanting the birthing trees to support First Nations Parents and Babies*. \$4,999,905; 2022-2025

Forster D, Kane S, McLachlan H, Jacobs S, Shafiei T, Nguyen C, Nguyen T. *Exploring the impact of midwife-led group antenatal care on caesarean section rates and infant health: a multi-site randomised controlled trial*. \$1,284,106; 2021-2026

Giles M, Kollmann T, Davey M, Amenyogbe N. *The protective effect of maternal immunisation on obstetric outcomes: characterising the underlying mechanisms and impact on newborn immune function*. \$1,146,489; 2021-2025

McLachlan H, Forster D, Kane S, Sandall J, Shafiei T, Cuzzilla R, Shiell A, Nguyen C, Newton M, Kingsley M. *Exploring the impact of caseload midwifery on preterm birth among vulnerable and disadvantaged women: a multi-centre randomised controlled trial*. \$1,598,496; 2020-2024

Spittle, A. *Tele-rehabilitation for early intervention to improve neurodevelopmental outcomes of infants born preterm and their parents' wellbeing: a randomised controlled trial*. \$1,819,842; 2020-2024

Clinician Researchers

Jayasinghe Y, Anazodo A, Sullivan M, Orme L, Zacharin M, McCarthy M, Stern C, Lantsberg D, Anderson R, Gomez-Lobo V, Yano J, Winstanley M, Super L, Lockwood L, Heath J, Ryan J, et al. *The Australian New Zealand Oncofertility Clinical Trials Network*. \$2,999,970; 2021-2025

Manley B. Next Generation. *Optimising Respiratory Therapies to Improve Outcomes for Preterm Infants*. \$306,000; 2019-2022

Whitehead C, Manley B, Groom K, Davis P, Lee K, Mol B, Newnham J, Webb S, Morris J, Forster D, Lui K, Cheong J, Palmer K, Kumar S, Gordon A, Stark MJ, Strunk T, Dargaville P, Unger H, Dalziel K, Hua X, Huang L. *Transforming Clinical Research to Improve Outcomes for Preterm Infants*. \$2,642,199; 2021-2025

Australian Government Accelerating Commercialisation Grant

Theda C, Navi Medical Technologies. *Neonav: medical device to enable safer care for critically-ill newborns*. \$600,000; 2022-2024



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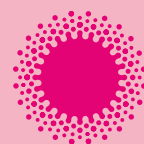
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Pictured above: Kirti with her son Ayaan, who was born at the Women's in 2015.
He was born at 30 weeks' gestation, weighing only 607 grams.

Pictured on cover: IVF researchers Dr Wan Tin Teh (left) and Dr Genia Rozen.



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