The Women's Research Report 2021

Creating healthier futures for women and babies



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Pictured (on front cover): Neonatal registrar Daniel Dorevitch and Dr Jen Walsh with baby Millie and her mum Jessica



Thanks and acknowledgements

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 our sites at Parkville and Sandringham stand. We pay our respects to their Elders past, present and emerging.

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.

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 **www.thewomens.org.au/donate** or contact our Philanthropy and Community Investment Office on (03) 8345 2954 or send an email to give@thewomens.org.au



Foreword

The Women's research capability and impact continues to grow as we strive to overcome challenges posed by the COVID-19 pandemic.

In 2021, we held 62 clinical trials and published 278 peer-reviewed medical papers, contributing to global knowledge on the full spectrum of women's and newborn health. We welcomed two leaders in emerging fields of research and 10 major research projects - funded by prestigious Australian research bodies - got underway.



We are grateful to the 2,395 people who participated in our trials during 2021, a 27 per cent increase compared with 2020. Through the introduction of COVID-safe practices (such as the use of telehealth for recruitment of patients into trials), we were able to benefit from the breadth of more people's experiences.

We were thrilled to welcome Dr Sarah Price and Associate Professor Helena Frawley, who are leaders in their respective fields. Dr Price has since established the Women's Obstetric Medicine Research Group, while A/Prof Frawley is the new Director of our Allied Health Research Unit. You can find out more about their backgrounds and research ambitions in our feature article (page 7).

We are delighted that three of our esteemed researchers - Professor Martha Hickey, Professor Suzanne Garland and Dr Sarah Lensen - were awarded National Health and Medical Research Council (NHMRC) Investigator Grants.

This grant scheme supports the research programs of outstanding investigators at all career stages. With these three researchers focusing on menopause, infectious diseases and reproductive health respectively, we can expect future learnings in many important areas of women's health.

Many of these major projects are led by clinician researchers who work at the Women's, demonstrating their skills and talents, as well as their strong commitment to improving patient outcomes.

The MRFF grants enable us to undertake translational research in areas of midwifery care, obstetric outcomes, and newborn health. Major projects funded include research into midwife-led group antenatal care, the effects of maternal immunisation on obstetric outcomes, and the impact of antenatal corticosteroids on the health of newborns.

Thank you to our research staff and students for their initiative, intelligence and dedication. 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.

In testament to the high quality of research being undertaken at the Women's, we held \$31.4 million worth of grants for research. A total of 10 new grants from the National Health and Medical Research Council (NHMRC) and the Medical Research Future Fund (MRFF) started in 2021.



Professor Sue Matthews Chief Executive, the Women's



Professor Peter Rogers Director of Research, the Women's

Leaders in emerging fields

Two of our hospital's newest leaders are overseeing important new research that is delivering positive health outcomes for women and babies.



Giving babies the best chance of good health

Like any other woman preparing for childbirth, patients with diabetes, obesity and high blood pressure want to give their children the best chance in life.

The inaugural Director of Obstetric Medicine at the Women's and Frances Perry House, Dr Sarah Price, said while women are commonly advised to maintain a good diet and exercise, there is not a lot of evidence that this improves pregnancy outcomes for women with complex health issues.

"I think we give these glib throwaway lines to women when they're really seeking evidence-based advice," Dr Price said.

"Many of these women have had a lifelong battle with diabetes or obesity and they want to prevent that happening to their children," she said.

"We know that babies who are born big, or who are born to women who had diabetes during pregnancy, start to show some features of being overweight and can have abnormal glucose levels or high blood pressure, before they get to school age. "And there is evidence that you can potentially prevent children being born with a pre-disposition to metabolic disease."

Dr Price started at the Women's in September 2021 and has since established our Obstetric Medicine Research Group. Her primary research interest is in the intergenerational impact of maternal metabolic disease.

She trained in adult endocrinology "because there was not a path for obstetric medicine" and in 2019, completed her PhD: 'Health consequences of substantial preconception weight loss in women with obesity'.

"There is little doubt that the needs of women entering pregnancy are becoming increasingly complex.

"Maternal age is increasing. Body weight is increasing. Medication burden is increasing.

"The interesting thing about my PhD was that when women managed to achieve a significant amount of weight loss prior to pregnancy,

Goal to support research leaders

One of Associate Professor Helena Frawley's PhD students has completed a feasibility study for a training program for women with pelvic floor dysfunction that will pave the way for a randomised controlled trial.

A/Prof Frawley, Director of the Women's Allied Health Research, will soon launch the trial, which will be physiotherapy-supervised and delivered via telehealth.

The program will provide a pelvic floor muscle training program for women with urinary incontinence resulting from their treatment for gynaecological cancer.

"If this proves to be effective, new options of care will be open to women in their rehabilitation phase, post cancer treatment," she said.

A/Prof Frawley joined the Women's in June 2021 and said it's her goal to encourage allied health clinicians to expand their research skills. She wants to support them to become independent research leaders. She is a physiotherapy clinical researcher, specialising in pelvic floor function and dysfunction. Her position is a joint appointment between the Melbourne School of Health Sciences, University of Melbourne, the Women's and Mercy Hospital for Women (MHW).

A/Prof Frawley will work closely with women's health, neonatal and allied health researchers and clinicians across the Women's and MHW to deliver health improvements for women and babies.

She plans to focus on women's pelvic health, investigating pelvic floor disorders and pelvic pain. She said it is important to translate clinical practice guidelines into everyday care and aims to break down barriers to implementation at the patient, clinician and service levels.

After a long clinical career, A/Prof Frawley completed her PhD in 2008, and transitioned into post graduate learning and teaching of women's health physiotherapy. their pregnancy outcomes did improve - although it was only a small group of women."

Obstetric Medicine is an emerging field and the role of research in the area is to provide evidence to demonstrate what women can do to improve the outlook for their children, Dr Price said.

Her current Continuous Glucose Monitoring in Obesity (COSY) study utilises novel technology to explore how glucose metrics change in non-diabetic women with obesity over the course of a pregnancy. In a future study, she will use large datasets to phenotype the women most likely to have 'metabolicallyprone' offspring, to ensure targeted preventative care.



Dr Sarah Price

In 2011, she became a Fellow of the Australian College of Physiotherapists as a clinical specialist in continence and women's health.

"My goals are to provide leadership to support high-quality clinical research with the aim of identifying effective, evidence-led allied health interventions for women and babies in the fields of physiotherapy, pharmacy, social work, nutrition, speech therapy, radiology, psychology and more."

A/Prof Frawley meets regularly with clinicians to explore their research interests and support applications for funding and ethics approval. She says she hopes to connect more allied health clinicians with research mentors and encourage researchers to pursue higher degrees.



Associate Professor Helena Frawley

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

Co-Director

Professor **Martha Hickey** Co-Director

Professor **Eva Dimitriadis Peter Rogers** Deputy Director

Drug exposure link to preeclampsia

Lead Researchers: Dr Ellen Menkhorst, Eliza Grbac, Professor Eva Dimitriadis

Preeclampsia, a serious condition that can occur midway through pregnancy, affects three to four per cent of women in Australia - and its incidence is increasing.

Women with preeclampsia experience high blood pressure, protein in their urine, swelling, headaches and blurred vision. The underlying cause of the condition is unknown.

Researchers at the Women's have found that exposure to prednisolone - a type of steroid commonly prescribed to women trying to conceive - during early pregnancy may have consequences for the long-term health of a pregnancy and could lead to preeclampsia.

Prednisolone is prescribed with the aim of reducing the number of "natural killer" cells in the uterus. These cells are thought to negatively impact pregnancy in some women and may lead to implantation failure or early pregnancy loss.

The study of 24 participants, who donated uterine and placental tissue, revealed that prednisolone affected the uterine production of proteins which are known to be altered in the uterus of women with preeclampsia.

The drug was also found to change the way the uterine and placental cells interacted, which could have consequences for the formation of the placenta and a healthy pregnancy.

IVF add-ons offer false fertility hope

Lead Researchers: Dr Sarah Lensen, Professor Martha Hickey, **Dr Michelle Peate**

IVF patients are being given false hope that "add-on" treatment options costing up to \$3,700 will improve their chances of conceiving, a survey by the Women's has found.

One in seven couples in Australia struggle to conceive and the chance of having a baby from one IVF cycle is about 30 per cent. This has created a market for additional procedures, techniques and medicines in what is already a costly and emotional experience.

The survey of 1,590 women who had IVF in Australia between 2017-2020 found that 82 per cent had used one or more add-ons during their IVF treatment. The most common of these were acupuncture, preimplantation genetic testing for aneuploidy (PGT-A), and Chinese herbal medicine.

Lead Researcher Dr Sarah Lensen said more than half of the women surveyed had learned about add-ons from their fertility specialist, while around 12 per cent heard of them through friends and family.

"Some of these options cost thousands of dollars, and many patients use them and still don't fall pregnant," Dr Lensen said.

Pictured at right: Dr Sarah Lensen

"Many women reported experiencing regret at their decision to use an add-on, especially when their IVF treatment was unsuccessful."

The research found IVF add-ons were common in Australia, but IVF patients often did not realise that many treatments had not been proven to increase the chances of having a baby from IVF.

"People having IVF should have access to accurate information about the evidence-base for these treatment options when they are making decisions about whether or not to use them," Dr Lensen said.



Lead Researcher Dr Ellen Menkhorst said the research suggests caution may be required when prescribing prednisolone to women in early pregnancy, and that corticosteroid use during pregnancy may be associated with poor pregnancy outcomes.

"Studies in rodents and populationwide cohort studies from Denmark have found an association with corticosteroid use and preeclampsia," Dr Menkhorst said.

"Our study has identified a mechanism by which this commonly prescribed drug may increase preeclampsia risk."

This research was published in Frontiers in Cell and Developmental Biology.

A resource is needed to help IVF patients in their decision making. The Women's research team plans to develop a website to provide accurate, up-to-date information about the evidence for add-on treatments.

"The website will be co-designed with IVF patients and clinicians to ensure it covers all aspects of importance," Dr Lensen said.

This research was published in Human Reproduction.



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

World-first trial helps sick newborns

Lead Researchers: Dr Kate Hodgson, Dr Louise Owen, Professor Peter Davis, Associate Professor Brett Manley

A world-first study may improve outcomes for babies with breathing difficulties and help train doctors around the globe.

The SHINE trial studied the intubation (placement of a breathing tube) of 251 babies over two and a half years. It compared the use of nasal 'high-flow' (warmed oxygen through small prongs in the nose) with standard care (which removes all breathing supports from a baby's face during intubation).

The study, led by the Women's neonatologist and researcher Dr Kate Hodgson, showed that high-flow oxygen increased the likelihood of successful intubation and kept babies more stable during the procedure. It can also be used readily by less experienced clinicians.

"This is the first trial around the world to look at this therapy in newborn babies," Dr Hodgson said.

"It is a simple method, which has a lot of potential. This innovation could help babies, both preterm and term babies, who are very unwell and need support with their breathing after birth."

Every year more than 100 babies born more than 12 weeks early are admitted to the Women's Neonatal Intensive Care Unit (NICU). Most need a ventilator to support their breathing. The average baby in the SHINE trial was born at 28 weeks' gestation and weighed less than 1kg.

Smart phone tool developed to predict preterm outcomes

Lead Researchers: Dr Rosemarie Boland, Professor Jeanie Cheong, Professor Lex Doyle

A study into the disparities between the perceived and true outcomes of infants born at 23-25 weeks' gestation has led to the development of a smart phone app.

NIC-PREDICT may help clinicians accurately predict outcomes in babies born extremely preterm (less than 28 weeks' gestation). It is an easy to use, readily available digital tool designed to estimate (PREDICT) outcomes for individual babies if they are offered neonatal intensive care (NIC) after birth.

Lead researcher Dr Rosemarie Boland and her team at the Women's developed the tool after identifying that most clinicians had been seriously underestimating the survival chances of extremely preterm babies and overestimating the risk of major disability in surviving children. "Parents facing the unexpected extremely early birth of their baby need accurate, up-to-date information about potential outcomes," Dr Boland said.

"This helps them make life and death decisions about providing active or palliative care for their baby at birth."

The researchers developed a scenario-based survey using six real-life examples of babies born at 23, 24 and 25 weeks of pregnancy, to determine whether clinicians caring for pregnant women and extremely preterm babies had accurate perceptions of infant outcomes.

They surveyed 165 clinicians - nurses, midwives, obstetricians, neonatologists and paediatricians from tertiary and non-tertiary maternity hospitals over three months.

Participants were asked to estimate the chances of each baby's survival to one year if active care was provided from birth, and the risk of each baby surviving with major disability to eight years. In 2019, Ann Le gave birth to twin girls, at just 28 weeks and five days. The girls shared an amniotic sac and a placenta (making them monochorionic-monoamniotic or MoMo twins). Zoe and Olivia required breathing support and were enrolled in the SHINE trial. They stayed in the Women's NICU for 11 weeks.

"My girls are aged three now and completely healthy," Ann said. "You wouldn't even know they were 1kg each when born."

This research was published in the *New England Journal of Medicine.*



"The study indicated the urgent need for the NIC-PREDICT tool, which will help clinicians accurately predict the need for neonatal intensive care treatment for these vulnerable babies now and into the future," Dr Boland said.

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

Women's Cancer

\$2.6 24 16 Research Clinical **Publications** Centre Grants trials held



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.

2021 figures

\$0.4

Grants

spent



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

Colposcopy database informs clinical guidelines

Lead Researcher: Dr Jeffrey Tan AM

A colposcopy database developed more than 20 years ago - by Dr Jeffrey Tan and Michael Murfitt at the Women's - has provided the evidence to change clinical practice nationally.

Colposcopy is a common procedure used to examine the cervix and vagina for disease. The Women's Dysplasia Clinic provides specialist care for women with pre-cancerous abnormalities, most of who are referred after receiving abnormal cervical screening tests.

The On-Dysplay database was developed as a tool to capture information about women attending the clinic for colposcopy, to better understand diagnostic, treatment and management for abnormal cervical screening results or post coital bleeding.

The database has captured information from 63,227 patients, 133.785 episodes of care. and 16.750 treatments. It was developed by Dr Tan and Mr Murfitt in 1999 through fundraising efforts by Professor Michael Quinn AM, the past Head of the Women's Oncology and Dysplasia Unit.

It was upgraded in 2017, when HPV screening was introduced, and was used at the Women's until August 2020, when a Electronic Medical Record system was implemented. More than 17 medical journal articles have been published as a result of the database.

Dr Tan said the data had been gathered over 20 years, at every patient visit, and allowed the team at the Women's to improve clinical care through an ongoing process of audit and research.

Colposcopy benefits considered

Lead Researchers: Dr Jeffrey Tan AM, Associate Professor Yasmin Jayasinghe, Mr David Wrede

Recurrent or persistent post coital bleeding (PCB), or bleeding after sexual intercourse, can be a warning symptom of serious disease, including cervical cancer.

Colposcopy is currently recommended for all women with recurrent PCB even if their cervical cytology or co-test for HPV is negative.

Researchers at the Women's are seeking to understand the risk of cervical cancer and its precursors among women with recurrent PCB who have had a negative cytology report or a negative co-test.

The study is a retrospective analysis of 2,061 women with PCB referred to the Women's tertiary colposcopy clinic.

Lead Researcher Dr Jeffrey Tan said one group of women had cytologybased screening between January 2000 and December 2016. The other group included women referred between January 2018 and December 2019, after the introduction of primary HPV (human papillomavirus) screening.

suspected."

Dr Tan said.

Pictured at right: Mr David Wrede

"Our study showed that women presenting with PCB and negative cytology alone have a low risk of cancer and could have HPV testing before being triaged to colposcopy,"

"Women with negative co-tests (HPV not detected and normal cytology) could avoid colposcopy unless cervical cancer is clinically

"But our data collection functioned as much more than that; we have been able to use it to support patients and ensure they don't miss vital appointments," he said.

"It takes effort from all in the healthcare team to ensure the data is collected diligently and is complete and accurate.

"You need champions who can work through the data to develop recommendations. Ultimately this benefits our patients, ensuring they receive the best quality care."

Mr David Wrede, Consultant Gynaecologist and Lead for Dysplasia at the Women's, said it was the best colposcopy data tool he had seen.

"The database has changed our practice at the Women's and provided evidence to inform revision of the clinical guidance to the National Cervical Screening Program," he said.

Dr Tan said a larger cohort study was now required to substantiate these findings with more precision.

"This should be possible through the National Cancer Screening Register which now records national colposcopy data, including the symptom of PCB," he said.

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



| | 2021 figures | | |
|-----------------------------------|--------------|----------------|-----------------|
| Centre for | 38 | \$5.1 | \$1.1 |
| Women's | | million | million |
| nfectious | Publications | Grants held | Grants spent |
| <section-header></section-header> | | | |

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

HPV vaccination program yields long-term results

Lead Researchers: Dr Dorothy Machalek, Professor Suzanne Garland, Dr Gerald Murray

Women who receive human papillomavirus (HPV) vaccines are gaining long-term protection against cervical cancer-causing HPV infections, a study at the Women's has found.

There are more than 200 HPV types. Some can be spread through sexual contact and cause cervical, anal, oral and other cancers. Young people are at highest risk of HPV infection within months to a few years of becoming sexually active.

In 2007, Australia became the first country to implement a national HPV vaccination program in schools. A catch-up service was also offered to women aged up to 26 years, in the program's first two years.

The vaccine prevents infection with HPV16 and 18, which cause approximately 70 per cent of cervical cancers. High uptake has led to greater than 90 per cent of population-level reductions in the prevalence of these HPV types in women aged under 35. Lead Researcher Dr Dorothy Machalek said the study measured the prevalence of vaccinepreventable and non-vaccine preventable HPV types. It also documented risk factors for HPV infection in the context of a highly vaccinated population.

A total of 1,564 women aged 18-35 years participated in the study. When they attended health services nine to 12 years after the introduction of the vaccine program, they agreed to give a sample for HPV testing and completed a short questionnaire on risk and lifestyle factors.

"We found that overall prevalence of vaccine-preventable HPV types was very low," Dr Machalek said.

"However, we found that HPV types, particularly those not targeted by the vaccine, continue to be commonly detected in young women," she said.

"When assessed by vaccination status, we found that unvaccinated women were more likely than their vaccinated colleagues to be positive and had eight-fold higher HPV levels compared to vaccinated women."

Understanding STI burden and antibiotic resistance

Lead Researchers: Dr Dorothy Machalek, Professor Suzanne Garland, Dr Gerald Murray

Untreated sexually transmitted infections can cause pelvic inflammatory disease leading to serious complications such as infertility and premature birth.

Research conducted at the Women's to inform clinical practice examined the prevalence of the two most common STIs - Chlamydia trachomatis and Mycoplasma genitalium (MG) - among women attending the hospital for termination of pregnancy and contraceptive services.

Lead Researcher Dr Dorothy Machalek said clinical data was collected from 17,573 women aged 15-45 years, who sought pregnancy termination or contraception services (including insertion of intrauterine contraceptive devices) between 2009 and 2019. Antibiotic resistance was also examined from 2016, when resistance testing was introduced into routine practice.

The prevalence of women testing positive with Chlamydia was 3.7 per cent, and with MG 3.4 per cent. One in 10 women who tested positive to Chlamydia was also infected with MG.

Risk of pelvic inflammatory disease is increased after gynecological procedures, including termination of pregnancy and insertion of intrauterine contraceptive devices. To reduce this risk, screening for Chlamydia prior to these procedures is recommended. Unlike Chlamydia, MG is highly prone to antimicrobial resistance.

"What is most concerning is that one third of MG infections tested were resistant to the first-line antibiotic treatment with azithromycin," Dr Machalek said.



She said the results highlighted the need to continue efforts to increase vaccine coverage, and the importance of cervical cancer screening for eligible women.

This research was published in *Vaccine.*

"Single-dose azithromycin is the most common treatment for Chlamydia, but its use in the management of Chlamydia is leading to a rise in antibiotic resistance in MG."

Previous work by the team has shown that Australia has one of the highest rates of antibiotic resistance in MG in the world, and the findings of this study provide further evidence.

Dr Machalek said action was needed to reduce the spread of antibioticresistant MG in women.

"There is an urgent need for comprehensive MG and antibiotic resistance surveillance to inform treatment strategies," she said. "We also need a concerted effort to promote antimicrobial stewardship at a national, jurisdictional, and service level."

This research was published in *Sexually Transmitted Infections.*





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



New data for perinatal outcomes

Lead Researchers: Dr Stefan Kane, Dr Clare Whitehead, Dr Penny Sheehan, Dr Julia Unterscheider

Melbourne's prolonged COVID-19 isolation period between March 2020 and October 2021 provided researchers at the Women's with an extraordinary window into perinatal care.

The city endured one of the longest and most stringent pandemic lockdowns in the world (a total of 262 days). Researchers in the Women's Maternal-Fetal Medicine Department were able to collaborate on the first clinician-led, multi-centre perinatal data collection system for the Melbourne metropolitan area.

The department provides national and international leadership to improve outcomes for mothers and babies with pregnancy complications. It is leading the way in understanding pregnancy complications including miscarriage, preterm labour, preeclampsia, high blood pressure, poor fetal growth, diabetes and difficult or prolonged labour.

Acting Director, Department of Maternal-Fetal Medicine, Dr Stefan Kane, said the Collaborative Maternity and Newborn Dashboard (CoMaND) project was an observational study analysing maternal and newborn outcomes at Melbourne's 12 public maternity hospitals.

The study looked at weekly perinatal outcomes including rates of total births, stillbirths, preterm births and neonatal intensive care admissions; and maternal outcomes including induced labour, caesarean section, influenza and COVID-19 vaccination status. Data will be compared with

Database to help save lives of mothers and babies

Lead Researchers: Professor Shaun Brennecke AO, Adrienne White, Moira Stewart, Sue Duggan, Jo Bruhn, Gabriel Jones

A national database at the Women's is contributing to international consensus on the use of an important blood test to improve the care of mothers and babies at risk of preeclampsia.

The eight-year-old database has grown to be one of the world's largest repositories of information about the clinical use of the Preeclampsia Ratio Test (or PERT test).

The PERT test measures the ratio of two biomarkers in the blood. It is used to predict preeclampsia, a serious disorder that affects five to eight per cent of all pregnancies, leads to dangerously high blood pressure, and can threaten the lives of mothers and babies.

Lead Researcher Professor Shaun Brennecke said the database includes information on more than 7,000 tests undertaken by more than 4,000 patients.

"The database is enabling an increasingly sophisticated understanding of the scope and benefits of the test in routine clinical practice," Professor Brennecke said.

Although around 30 per cent of all pregnancies are evaluated for preeclampsia, diagnosis is difficult. This is especially true in patients who have underlying symptoms from other diseases.

Clinicians are able to use the PERT test, to better determine the need for patient admission or outpatient evaluation in cases of suspected preeclampsia.

"The Women's was the first Australian maternity hospital to routinely use this important new test," Professor Brennecke said. "We are leading the national rollout of the test and contributing to its international rollout.

"The test is dramatically improving the ability of maternity clinicians to optimise the care of women at risk of developing preeclampsia."

Melbourne woman Katie James, a former patient of the Women's, lost her baby daughter Ivy to preeclampsia. Professor Brennecke used the PERT test to monitor her subsequent pregnancies. She now has three healthy sons. pre-pandemic outcomes between January 2018 and March 2020.

"Melbourne's unique experience gave us opportunities to collaborate and look at preterm birth and preeclampsia outcomes and translate our findings into improved management strategies for mothers and babies with these pregnancy complications," Dr Kane said.

"One of the biggest changes that occurred very quickly was the rapid adoption of telehealth and its significant access and economic advantages for women who have limited access to hospitals.

"There is further study to be done, but if we can show that having half of your antenatal visits by telehealth is safe and leads to the same outcomes, then there are significant benefits in its use for many women."



"Professor Brennecke prescribed a low-dose of aspirin to be taken every day and with the PERT test, I was able to have that assurance that any potential preeclampsia was being monitored and would be acted upon fast," Katie said.

This research was published in *Pregnancy Hypertension.*

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, evidencebased models of care within the context of family violence.



Professor **Kelsev Hegarty** Director

Associate Professor Laura Tarzia Deputy Director

Steps to success in tackling family violence

Lead Researchers: Professor Kelsey Hegarty, Dr Heather McKay, Jenny Chapman

A visit to a health professional may be the first and only step that people affected by family violence take to access support and care.

Greater investment in family violence programs and strengthened identification and response practices are key to supporting victimsurvivors, a two-and-a-half-year research project has found.

The System Audit Family Violence Evaluation (SAFE) Project, launched at the Women's in March 2019, evaluated 18 Victorian health services at patient, staff and

organisation levels between November 2019 and April 2021.

Lead Researcher Professor Kelsey Hegarty said the State Government's Strengthening Hospital Responses to Family Violence program, launched more than six years ago, had resulted in system change across many organisations.

"However, there is still some way to go to ensure women and families are on a pathway to safety and wellbeing," Professor Hegarty said.

investment in family violence

Understanding the stigma of family violence

Lead Researchers: Dr Surriya Baloch, Professor Kelsey Hegarty, Dr Elizabeth McLindon

Healthcare providers are in a unique position to identify and respond to family violence faced by South Asian women, but they confront many barriers.

These barriers include a lack of understanding about the culture, social context and perspectives of their South Asian women patients.

Family violence is often considered a private issue by victims, who fear judgement, shame and family dishonour if they reveal abuse when they access healthcare.

The Women's conducted a series of eight studies that included 229 doctors, nurses, midwives, medical students and health workers from Pakistan, India and Sri Lanka, using medical databases that generated 6,685 results.

The research aimed to identify strategies for reducing family violence and improving the health and wellbeing of South Asian women living in Australia and South Asia (Pakistan, India, Bangladesh, Nepal, Bhutan, Sri Lanka and Maldives).

Lead Researcher Dr Surriya Baloch said the qualitative research underlined the risks to personal safety faced by healthcare providers who intervene in South Asian family violence cases.

Some revealed they had been targeted by survivor families.

"The study provides us with an understanding of the complexity of sociocultural factors associated with identification and response to family violence against these women," Dr Baloch said.

Professor Hegarty said the stigma associated with abuse can often mask family violence, but "antenatal healthcare workers in particular are vital in identifying and supporting survivors".



"Auditing and feedback are powerful mechanisms to change behaviour, individually and across organisations.'

The SAFE Project found that greater

programs would improve inclusivity and accessibility for diverse populations. It would also help in the development of strategies to safely do the work within telehealth arrangements.

"The patient-facing work of identification and response to family violence also needs greater attention and much can be done to build capacity through education and training," Professor Hegarty said.

The project recommended the annual implementation of the SAFE tool at Victorian health services, and the tool's wider use to promote national standards for responding to family violence in health service settings.

"Our research will help to find innovative solutions for strengthening antenatal screening for family violence," Professor Hegarty said.

A second systematic review is underway and has found that South Asian family violence survivors want to be understood by their healthcare providers so they can seek help.



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

Breastfeeding support for mothers with diabetes

Lead Researchers: Anita Moorhead, Dr Sharinne Crawford, Professor Lisa Amir, Professor Della Forster

\$0.1

Grants

spent

The complications experienced by women with diabetes in pregnancy can be a barrier to successful breastfeeding. Affected women are at risk of delayed lactation, are less likely to breastfeed exclusively, and have a shorter duration of breastfeeding.

The World Health Organisation (WHO) recommends breastfeeding for six months exclusively and continued breastfeeding, combined with solid foods, for up to two years.

Diabetes affects 13 per cent of pregnant women in Australia. Some women with the condition are advised to express breast milk in the last weeks of pregnancy to collect a supply for their babies. The Diabetes and Antenatal Milk Expressing (DAME) research trial was conducted at the Women's and five other Victorian sites between 2011-2015. That trial found women with diabetes and a low-risk pregnancy could safely express breast milk in late pregnancy without causing any harm to their babies.

A sub-study of the DAME research titled 'Is there any point in me doing *this?*' involved semi-structured interviews with 10 women involved in the previous research, this time during 2017.

Of the 10 women, three were unable to express any breast milk during the last weeks of pregnancy while the other seven expressed a range of volumes. The women shared their views and experiences from empowerment to disappointment, worry about themselves and their baby, their experience of health professional support and family support, or concerns with their expressing.

Lead Researcher Anita Moorhead said while it was common for women to be advised to undertake antenatal expressing, this advice was based upon limited evidence. She said it remains critical to listen to and learn from participants.

"We found that advising women to do antenatal expressing did not lead to poorer health outcomes for women's infants, but it is important to understand any other consequences, both positive and negative," Ms Moorhead said.

Call for maternity disability guidelines

Lead Researchers: Charlie Benzie, Professor Helen McLachlan Professor Della Forster, Associate Professor Michelle Newton

National guidelines are needed on identifying women with disability accessing maternity services in Australia, research at the Women's has found

Lead researcher Charlie Benzie said disability documentation is highly varied and fails to ensure the needs of women with disability are met.

"What we need are sensitive and consistent disability questions developed specifically for women accessing maternity care," she said.

The research team explored how women with a disability were identified when they accessed maternity services; whether there was an association between having a disability and pregnancy outcomes; and the prevalence of women with a disability accessing maternity services across Australia

An online survey of managers of all public hospitals offering maternity care in Australia found that 71 per cent of services routinely asked women about disability: however there was wide variation in how this was asked.

Sixty-three per cent of services did not have standardised documentation processes and only 13 per cent had specialised disability identification training for staff.

In another part of the study, women in the postnatal wards at the Women's were asked about their experience with disability identification. Of the 371 women initially surveyed, five per cent self-identified as having a disability. In a second survey focusing on women's support needs, 16 per cent (of 295 women) identified as needing additional assistance and support. Most women said they preferred to be asked about their disability status routinely and directly, but three in four women were not asked at all.

"New knowledge of the lived experience of women with diabetes who have expressed in pregnancy should influence the advice that health professionals give.

"By understanding their experience. we can identify the women and babies that would benefit from expressing, and better support the women who will express."



The study also compared the outcomes of a group of women who attended our Women with Individual Needs (WIN) clinic, with the outcomes of women who gave birth at the Women's and did not access the WIN clinic

Women who attended the WIN clinic were more likely to have a caesarean section and give birth before 37 weeks. Their infants were more likely to be low birthweight, be admitted to neonatal intensive care. and receive formula in hospital.

"Our research identifies issues around disability identification and service provision for women within maternity services and highlights the need for changes to be made at a policy level," Ms Benzie said.

This research was published in Australian and New Zealand Journal of Obstetrics and Gynaecology, Women and Birth.



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

Within the directorate, four departments have a track record of contributing to allied health research this year: 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.



Sandra Gates Director (to June 2021)



Professor Helena Frawley Director (from June 2021 onwards)

Pictured above: Physiotherapist Kate Sindrey

Study to shed light on pelvic pain

Lead Researchers: Associate Professor Helena Frawley, Kate Sindrey

Women with persistent pelvic pain frequently experience bladder, bowel or sexual dysfunction and many have associated pain in their pelvic floor muscles.

In Australia gold-standard diagnosis of pelvic pain when endometriosis is suspected is laparoscopy, a keyhole surgical procedure.

Researchers at the Women's are studying a group of 150 women from pre-surgery to 12 months' post-surgery, to investigate the relationship between pelvic floor

muscle problems and pelvic pain in women with endometriosis.

Lead Researcher Associate Professor Helena Frawley said the research could help determine whether therapies, including physiotherapy and non-surgical, non-pharmacological treatments - provided either pre- or post-surgery - can reduce pain for affected women.

"The goal of our study is to accurately measure those problems - pelvic floor muscle pain, bowel, bladder and sexual dysfunction - in a group of women who have not previously had surgery," A/Prof Frawley said.

Medication support needed for women with hypertension

Lead Researchers: Amyna Helou, Kay Stewart, Johnson George

Nine out of 10 pregnant women using anti-hypertensive medication report some degree of suboptimal adherence to taking their medication. Health professionals, including pharmacists, general practitioners and obstetricians, have a role to play in supporting them.

Researchers studied 100 pregnant women with either chronic hypertension or gestational hypertension. These women were using at least one anti-hypertensive medication while also attending antenatal clinics at the Women's and the Mercy Hospital over a 10-month period.

Lead researcher Amyna Helou, an honorary pharmacist at the Women's during the study, said many of the women described putting up with medical problems as they were overwhelmed by the risks associated with their condition.

Others were confused about their medication, either as a result of lack of symptoms or because of conflicting advice from different clinicians. A third group said their lifestyles (being preoccupied with daily routines) affected their adherence to their medication regimens.

In-depth interviews were conducted with a subset of 27 women. Quotes from interviews were used to illustrate the quantitative results.

Pictured at right: Clinical Pharmacist Sarah Abou-El-Makarem

"A couple of times I forgot to take it and nothing happened to me." (First pregnancy, chronic hypertension, aged 30).

"I have sort of avoided asking because I have been a bit scared." (First pregnancy, chronic hypertension, aged 35).

"I was a bit confused at the beginning of the pregnancy because I saw that my blood pressure wasn't that high." (Second pregnancy, chronic hypertension, aged 33).



"This will help us understand how these problems respond to surgical treatment, and whether there are differences in the experiences of women who are diagnosed with endometriosis at the time of surgery, compared with those who are not.

"If we can more clearly identify patients who have pelvic floor muscle pain, bowel, bladder and sexual dysfunction associated with their pelvic pain, with or without endometriosis, we may be able to initiate physiotherapy and other treatments, and prevent a cycle of surgery for a group of women experiencing persistent pelvic pain."

"Non-adherence to medication can contribute significantly to treatment failure and unnecessary overprescribing," Ms Helou said.

"Good adherence to treatment for pregnancy-induced conditions such as gestational hypertension is important to optimise health outcomes for the mother and the foetus."

This research was published in Pregnancy Hypertension.

Centre for

Women's Mental Health



<image>

The Centre for Women's Mental Health offers clinical services, undertakes research and provides education and training across the hospital.

The centre's research focuses on the psychological aspects of physical health issues, pregnancy and early parenting. Specific areas of interest include support for women with a cancer diagnosis, promotion of healthy ageing and psychological interventions for women impacted by trauma. Programs in early parenting and postnatal mood disorder and anxiety are also being evaluated.

The centre offers support where social factors such as family violence, substance misuse and refugee status impact wellbeing and psychological health.



Associate Professor Lesley Stafford Acting Director

Sex advice and support for ovarian cancer survivors

Lead Researcher: Associate Professor Lesley Stafford

Health professionals can do more to provide survivors of ovarian cancer with adequate information and support for ongoing sexual function.

Ovarian cancer is the 10th most common cancer diagnosed in Australian women. Just 48 per cent of women diagnosed between 2013 and 2017 survived for five years beyond their diagnosis. Treatment involves surgery and chemotherapy, which can cause menopause.

Sexual function is impacted beyond initial treatment and into survivorship for many of these women. However, research conducted at the Women's suggests that the information and advice women want on the topic may not be readily provided by health professionals. The research involved 98 women, with an average age of 52.8 years and at an average of five and a half years post diagnosis. About 22 per cent of these women reported that health professionals had discussed the impact of ovarian cancer on their sexuality. Of these, 46 per cent were satisfied with those discussions.

Lead Researcher Associate Professor Lesley Stafford said 52 per cent of the women wanted to discuss sexuality concerns with a health professional during treatment and 43 per cent still felt the need for this discussion.

"The women were recruited nationwide via social media, print advertisement and the database of a support organisation, Ovarian Cancer Australia," A/Professor Stafford said.

Peer support for women with gestational cancer

Lead Researchers: Associate Professor Lesley Stafford, Michelle Sinclair

Experts suggest that women diagnosed with cancer during pregnancy (gestational cancer) require greater psychosocial support than either other women with cancer or other pregnant women.

Gestational cancer affects approximately one in 1,000-1,500 pregnancies.

A study at the Women's of this small-but-vulnerable population explored their psychological needs, identified gaps in available support, and made recommendations for future programs and research.

Lead Researcher Associate Professor Lesley Stafford said the findings "depicted a group of women for whom cancer diagnosis and treatment had resulted in a sense of isolation and loneliness".

"Women reported seeking tailored information about their condition and treatments as well as one-onone peer support with other gestational cancer survivors," A/Prof Stafford said. "This was challenging for them to access, and existing services struggled to provide it. "To address these unmet needs, innovative solutions may be necessary," she said.

In-depth, semi-structured interviews were conducted with 23 Australian women diagnosed with gestational cancer in the previous five years. A/Prof Stafford said the research found technology had the potential to connect and match women with one-to-one peer support and provide the tailored information they required.



"We explored the psychological and sexual wellbeing of this sample of Australian women diagnosed with ovarian cancer, to inform the development of effective, targeted sexuality resources."

Open-ended responses revealed the need for more information that was detailed and specified what to expect post-diagnosis. Shortcomings of health professionals in addressing sexuality were also revealed by the study.

"This research provides further evidence that sexual health remains inadequately addressed in ovarian cancer care for most women and is an area of unmet need."

This research was published in *Supportive Care in Cancer.*

"Creative solutions such as virtual resource hubs, monitored or moderated by experts, could meet the information needs of this group," A/Prof Stafford said.

"However, as gestational cancer is relatively rare, the development and evaluation of such interventions would require a collaborative effort across multiple sites, as well as international collaboration and data pooling."

This research was published in *Supportive Care in Cancer.*



Anaesthetics

\$80 \$10 3 thousand thousand Research Clinical **Publications** Grants Grants Centre trials held spent

2021 figures



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

Study to reduce anaemia link to C-sections

Lead Researchers: Dr Mark O'Donnell, Professor Alicia Dennis

Australia has one of the highest rates of caesarean section births in the developed world. In 2019, 36 per cent of Australian babies were delivered by the surgical procedure.

Data indicates that at least one in six of these mothers, around 15,000 women, are discharged with anaemia each year following the procedure. Anaemia is a lack of red blood cells or haemoglobin, which can make sufferers feel tired and weak.

In an award-winning study of 60 patients at the Women's, researchers sought to understand the impact of anaemia on post-surgical recovery. The aim was to discover interventions that may improve quality of life for mothers and babies.

Dr Mark O'Donnell was awarded the 2021 Kevin McCaul prize from the Australian Society of Anaesthetists (ASA) for the study. He said anaemia was often accepted as a part of life for mothers who had given birth via caesarean section.

"We want to challenge this view and show that anaemia has negative impacts on life, just as it does after other major surgical operations," Dr O'Donnell said.

"Our aim is to work towards reducing the prevalence of anaemia in this group of patients, first by understanding its impact and then by introducing targeted evidence-based treatments."

Reducing risks of anaesthesia

Lead Researchers: Dr Patrick Tan. **Professor Alicia Dennis**

High-flow nasal oxygen has been shown to reduce breathing problem risks for pregnant women undergoing caesarean sections and could be more widely used in surgery.

More than 100,000 babies are born by caesarean section in Australia each year. When general anaesthesia is required for these operations, oxygen is commonly delivered via a face mask.

Seventy participants in a trial held at the Women's found the nasal oxygen system acceptable for use. Researchers found it more effectively delivered a constant flow of oxygen to pregnant women at the start of a general anaesthetic for the birth of their baby.

The participants were recruited over a period of 12 months and each participant was tested on both modes of oxygen.

The randomised trial, in which pregnant women were allocated high-flow nasal oxygen using Optiflow or oxygen via a traditional face mask, also showed that high-flow nasal oxygen may be safer to use.

Lead Researcher Dr Patrick Tan said the study showed high-flow nasal oxygen may reduce uncommon

Pictured at right: Dr Patrick Tan and Prof Alicia Dennis

complications of anaesthesia and improve outcomes for mothers and their habies

"The results are the clearest signal to date that high-flow nasal oxygen could be of significant benefit to pregnant women undergoing general anaesthesia," Dr Tan said.

"The overarching aim of this arm of our research has always been to make general anaesthesia safer for our pregnant mums.



The researchers asked participants whether they would be willing to undergo post-operative blood tests and ongoing questionnaires about their health

Of the women studied, 94 per cent were willing to have blood tests to measure their haemoglobin levels after their discharge from the Women's.

The researchers believe a multicentre study is the next step in understanding the impact of anaemia on post-operative recovery and providing better care for these women.

The Kevin McCaul prize is awarded annually to ASA members, registrars or junior specialists.

"The results of this randomised trial are exciting because they pave the way for the use of a different type of oxygen delivery system in pregnant women having anaesthetics."

Dr Patrick Tan was awarded the 2021 Gilbert Brown Prize from the Australian and New Zealand College of Anaesthetists for his work.

Organisational chart

Chief Medical Officer Dr Mark Garwood

Director of Research Professor Peter Rogers

Associate Directors of Research **Professor Lex Doyle Professor Della Forster**

Research and Ethics Secretariat Arthur Hui Dr Megan Cock

Newborn Research Centre Professor Peter Davis

Gynaecology Research Centre Professor Martha Hickey Professor Eva Dimitriadis

Centre for Women's Infectious Diseases Professor Suzanne Garland AO

Pregnancy Research Centre Professor Shaun Brennecke AO

Women's Cancer Research Centre Associate Professor Orla McNally

Centre for Family Violence Prevention Professor Kelsey Hegarty

Midwifery And Maternity Services Research Unit Professor Della Forster

Board Research Committee

Board Director and Committee Chair

Board Director and Committee member

Professor Marie Bismark

Professor Lisa McKenna

Professor David Vaux AO

Consumer representative

Ms Rosie Batty AO

Committee member

Committee member

Ms Margaret Lodge

Centre for Women's Mental Health Associate Professor Lesley Stafford (Acting Director)

Anaesthetics Research Centre Professor Alicia Dennis

Allied Health Research Sandra Gates (to June 2021) Associate Professor Helena Frawley (from June 2021)

Student completions 2021

Doctor of Philosophy

Colgrave E. PhD, Uni Melb. Evaluating risk genes for endometriosis. Supervisors: Holdsworth-Carson S, Girling J.

Ekawati F. PhD, Uni Melb. Pregnancy Hypertension management in Indonesian primary care. Supervisors: Brennecke S, Lau P, Gunn J, Licgurish S, Emilia O, Temple-Smith M.

Grimes H. PhD, La Trobe Uni. RUBY (Ringing up about breastfeeding): exploring telephone support in the early postnatal period to increase breastfeeding: an RCT - a focus on the volunteers' experiences Supervisors: Forster D, McLachlan H, Shafiei

Kane S. PhD, Uni Melb. Maternal ophthalmic artery Doppler waveform analysis in the assessment and management of preeclampsia. Supervisors: Brennecke S, Dennis A, da Silva Costa F, Kornman L.

Masters

Alarcon LV. MClinRes, Uni Melb. Psychometric properties and clinical utility of patient reported outcome measures (PROMs) to evaluate sexual function in cancer survivors Supervisors: Marino J, Peate M.

Allahyari A. MSc, Uni Melb. 3D printing of ECM biomaterials. Supervisors: Kalionis B, Heath B, O'Connor A.

Alshabibi M. MSc, Uni Melb. Biological pathways used by decidual mesenchymal stem cell-derived extracellular vesicles in repairing the dysfunctional endothelium. Supervisors: Kalionis B, Georgiou H.

Harbinson L. MSc, Uni Melb. Fetal growth restriction and ultrasound parameters associated with adverse neurodevelopmental outcomes: a systematic review and meta-analysis. Supervisor: Whitehead C.

Huang Y. MSc, Monash Uni. Can stem cell exosomes from a healthy human pregnancy ameliorate preeclampsia symptoms? Supervisors: Kalionis B, Parkington H, Colafella K.

Ong C. Masters, Uni Melb. Evaluation of a low health literacy decision aid for fertility choices in women with breast cancer. Supervisors: Peate M, Marino J.

Bachelor (Honours)

Blochlinger G. BSc (Hons), Uni Melb. The TABLET Study: Accuracy of documentation during neonatal resuscitation in the delivery room. Supervisors: Thio M, Dawson J, Davis P.

Bult E. BSc (Hons), Uni Melb. Multidisciplinary meetings in paediatric oncofertility. Supervisors: Jayasinghe Y, Assis M, Allingham C.

Douglas E. BSc (Hons), Uni Melb. Postnatal corticosteroids and developmental outcomes in extremely preterm infants: The Victorian Infant Collaborative Study 2016-2017 Cohort. Supervisors: Cheong J, Manley B, Davis P, Hodgson K.

Febrina F. BMedSc (Hons), Uni Melb. Interventions to manage symptoms of sexual dysfunction after cancer. Supervisors: Peate M, Paulovich B, Marino J.

Glackin A. BSc (Hons), Uni Melb. The experiences of Oncofertility care and decision-making in a national sample of adolescent and young adult (AYA) cancer survivors and parents. Supervisors: Marino J, Peate M, Sawyer S.

Le A. BSc (Hons), Uni Melb. Credentialing in paediatric gynaecology and fertility preservation surgery. Supervisors: Jayasinghe Y, Assis M, Lantsberg D, King S.

Lin J. BSc (Hons), Uni Melb. Predicting return of ovarian function after cancer therapy in paediatric and adolescent cancer patients. Supervisors: Jayasinghe Y, Assis M, Gook D.

Mukhopadhyay D. BSc (Hons), Monash Uni. *Developing a new* clinical quality registry for Congenital Anomalies. Supervisors: Whitehead C, Kane S, Karanam V.



Triyoga I. BMedSc (Hons), Uni Melb. Interventions to manage symptoms of sexual dysfunction after cancer. Supervisors: Marino J, Peate M.

Van Der Veeken E. BSc (Hons), Uni Melb. Cerebral oxygenation during neonatal endotracheal intubation with nasal-flow therapy for apnoeic oxygenation. Supervisors: Davis P, Hodgson K, Manley B, Cuzzilla R.

Wang G. BSc (Hons), Monash Uni. Preterm birth outcomes in HPV, cervical intraepithelial neoplasia and previous LEEP. Supervisor: Sheehan P.

Wynter M. BSc (Hons), Uni Melb. The role of the extracellular matrix in preeclampsia. Supervisors: Kalionis B, Georgiou H, Heath D, Kokkinos M, Brennecke S.

Yang G. BSc (Hons), Uni Melb. Identification of the molecular changes in early preeclamptic placentae by multi-omics methods. Supervisors: Dimitriadis E, Menkhorst E, Le Cao, KA.

Medical Degree Research Student (MDRS)

Corker S. MDRS, Uni Melb. Clinical significance of PERT tests at term. Supervisors: Brennecke S, Cade T.

Di Salvo L. MDRS, Uni Melb. Biomarkers of preterm cervical shortening. Supervisors: Brennecke S, Sheehan P, Georgiou H, Cade T.

Fu V. MDRS, Uni Melb. Combined treatment with urethral bulking Agent Bulkamid® and Onabotulinum Toxin A (Botox[®]) for mixed urinary incontinence in women. Supervisors: Dune T, Al-Salihi S.

Nott F. MDRS, Aust National Uni. Preeclampsia Ratio Test. Supervisor: Whitehead C.

Song R. MDRS, Uni Melb. Primary surgery for treatment of stress urinary incontinence: A retrospective comparative study of the autologous rectus fascia pubovaginal sling, burch colposuspension and retropubic mid-urethral sling. Supervisors: Dune T, Carey M.

Publications 2021

A total of 279 papers was published in peer reviewed medical journals by the Women's in 2021.

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' in a journal has been cited in a particular year or period.

A full list of 2021 publications for each research centre is available on the Women's website at www.thewomens.org.au/research.

Abdel-Latif ME, Davis PG, Wheeler KI, De Paoli AG, Dargaville PA. Surfactant therapy via thin catheter in preterm infants with or at risk of respiratory distress syndrome. Cochrane Database Syst Rev. 2021;5:CD011672.

Amir LH, Baeza C, Charlamb JR, Jones W. Identifying the cause of breast and nipple pain during lactation. BMJ. 2021;374:n1628.

Batura N, Saweri OP, Vallely A, Pomat W, Homer C, Guy R, Garland S, et al. Point-of-care testing and treatment of sexually transmitted and genital infections during pregnancy in Papua New Guinea (WANTAIM trial): protocol for an economic evaluation alongside a cluster-randomised trial. BMJ Open. 2021;11(8):e046308.

Beker F, Liley HG, Hughes IP, Jacobs SE, Macey J, Twitchell E, Davis PG. Effects on Growth of Smell and Taste of Milk During Tube Feeding of Preterm Infants: A Randomized Clinical Trial. JAMA Pediatr. 2021;175(11):1115-23.

Cahill LS, Stortz G, Ravi Chandran A, Milligan N, Shinar S, Whitehead CL, et al. Wave reflections in the umbilical artery measured by Doppler ultrasound as a novel predictor of placental pathology. EBioMedicine. 2021;67:103326.

Cheong J, Cameron KLI, Thompson D, Anderson PJ, Ranganathan S, Clark R, et al. Impact of moderate and late preterm birth on neurodevelopment. brain development and respiratory health at school age: protocol for a longitudinal cohort study (LaPrem study). BMJ Open. 2021;11(1).

Cheong JLY, Olsen JE, Lee KJ, Spittle AJ, Opie GF, Clark M, et al. Temporal Trends in Neurodevelopmental Outcomes to 2 Years After Extremely Preterm Birth. JAMA Pediatr. 2021;175(10):1035-42.

Chow EP, Fairley CK, Wigan R, Hocking JS, Garland SM, Cornall AM, et al. Accuracy of Self-reported Human Papillomavirus Vaccination Status Among Gay and Bisexual Adolescent Males: Cross-sectional Study. JMIR Public Health Surveill. 2021;7(12):e32407.

Chow EPF, Carter A, Vickers T, Fairley CK, McNulty A, Guy RJ, Machalek D, et al. Effect on genital warts in Australian female and heterosexual male individuals after introduction of the national human papillomavirus gender-neutral vaccination programme: an analysis of national sentinel surveillance data from 2004-18. Lancet Infect Dis. 2021;21(12):1747-56

Chow EPF, Tabrizi SN, Fairley CK, Wigan R, Machalek DA, Garland SM, et al. Prevalence of human papillomavirus in young men who have sex with men after the implementation of gender-neutral HPV vaccination: a repeated crosssectional study. Lancet Infect Dis. 2021;21(10):1448-57.

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Cui W, Francis PA, Loi S, Hickey M, Stern C, Na L, et al. Assessment of Ovarian Function in Phase 3 (Neo) adjuvant Breast Cancer Clinical Trials: A Systematic Evaluation. J Natl Cancer Inst. 2021; 113(12):1770-1778.

Dargaville PA, Kamlin COF, Orsini F, Wang X, De Paoli AG, Davis PG, et al. Effect of Minimally Invasive Surfactant Therapy vs Sham Treatment on Death or Bronchopulmonary Dysplasia in Preterm Infants With Respiratory Distress Syndrome: The OPTIMIST-A Randomized Clinical Trial. JAMA. 2021:326(24):2478-87.

Davidson SJ, Barrett HL, Price SA, Callaway LK, Dekker Nitert M. Probiotics for preventing gestational diabetes. Cochrane Database Syst Rev. 2021;4:CD009951.

Davies C, Marshall HS, Zimet G, McCaffery K, Brotherton JML, Garland S, et al. Effect of a School-Based Educational Intervention About the Human Papillomavirus Vaccine on Psychosocial Outcomes Among Adolescents: Analysis of Secondary Outcomes of a Cluster Randomized Trial. JAMA Netw Open. 2021;4(11):e2129057.

Dawson JA, Summan R, Badawi N, Foster JP. Push versus gravity for intermittent bolus gavage tube feeding of preterm and low birth weight infants. Cochrane Database Syst Rev. 2021;8:CD005249.

Doyle LW, Cheong JL, Hay S, Manley BJ, Halliday HL. Early (< 7 days) systemic postnatal corticosteroids for prevention of bronchopulmonary dysplasia in preterm infants. Cochrane Database Syst Rev. 2021;10:CD001146.

Doyle LW, Cheong JL, Hay S, Manley BJ, Halliday HL. *Late (>/= 7 days)* systemic postnatal corticosteroids for prevention of bronchopulmonary dysplasia in preterm infants. Cochrane Database Syst Rev. 2021;11:CD001145.

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Jones E, Stewart F, Taylor B, Davis PG, Brown SJ. Early postnatal discharge from hospital for healthy mothers and term infants. Cochrane Database Syst Rev. 2021;6:CD002958.

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Khawar L, McManus H, Vickers T, Chow EPF, Fairley CK, Donovan B, Machalek D. et al. *Genital warts* trends in Australian and overseasborn people in Australia: A crosssectional trend analysis to measure progress towards control and elimination. Lancet Reg Health West Pac. 2021;16:100251

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Mulder RL, Font-Gonzalez A, van Dulmen-den Broeder E, Quinn GP, Peate M, et al. Communication and ethical considerations for fertility preservation for patients with childhood, adolescent, and young adult cancer: recommendations from the PanCareLIFE Consortium and the International Late Effects of Childhood Cancer Guideline Harmonization Group. Lancet Oncol. 2021;22(2):e68-e80.

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Subramaniam P, Ho JJ, Davis PG. Prophylactic or very early initiation of continuous positive airway pressure (CPAP) for preterm infants. Cochrane Database Syst Rev. 2021:10:CD001243

Taft A, Young F, Hegarty K, Yelland J, Mazza D, Boyle D, et al. HARMONY: a pragmatic cluster randomised controlled trial of a culturally competent systems intervention to prevent and reduce domestic violence among migrant and refugee families in general practice: study protocol. BMJ Open. 2021;11(7):e046431.

Tuan LA, Prem K, Pham QD, Toh ZQ, Tran HP, Garland S, et al. Anal human papillomavirus prevalence and risk factors among men who have sex with men in Vietnam. Int J Infect Dis. 2021:112:136-43.

Commonwealth **Government grants** 2021

Australian Research Council (ARC)

Guy R, Broom A, Whiley D, Bradshaw C, Applegate T, Treloar C, Wiseman V, Huston W, Williamson D, Kaldor J, Vallely 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

Tarzia L. Forbes-Mewett H. Tran L. Hegarty K, Segrave M, Humphreys C. Discovery Project. International student's sexual and intimate partner violence experiences study (INVEST). \$356.916: 2019-2022

Tarzia L. Discovery Early Career Researcher. Beyond Silence: Webbased help-seeking for intimate partner sexual violence. \$363,000; 2017-2021

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

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; 2018-2022

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

Hegarty K, Brown S, Humphreys C, Taft A, Arabena K, Sanci L, MacMillan H, Feder G. Glover K. Anderson P. Centre for Research Excellence to promote Safer Families: tailoring early identification and novel interventions for intimate partner violence. \$2,497,801; Dec 2016-2021

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 (CRF 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. Gravden 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

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

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.* \$1,196,361; 2018-2023

Taft A, Shiell A, Hegarty K, Feder G, Mazza D, Yelland J. HARMONY: a cluster randomised controlled trial of a whole of general practice intervention to prevent and reduce domestic violence among migrant and refugee communities. \$595,288; 2018-2021

Program Grants

Hooper S. Davis P. Wallace E. Improving perinatal outcomes. \$6,115,355; 2017-2021

Project Grants

Anderson P, Halliday J, Elliott E, Penington A, Thompson D, Muggli E, Spittle A, Forster D, Lewis S, Hearps S. Long-term effect on offspring of low to moderate or binge drinking during pregnancy. \$1,665,672; 2018-2021

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

Craig J, Seal M, Silk T, Burnett A, Theda C, Scurrah K. Quantifying the role of epigenetic factors in neurocognitive outcomes: a twin study. \$1,495,848; 2018-2021

Dimitriadis E, Rombauts L. Facilitating endometrial receptivity to improve pregnancy outcomes. \$734,252; 2017-2021

Forster D, McLachlan H, Dennis CL, Nicholson J, Shafiei T, Shiell A, Nguyen C, Nguyen T. Preventing postnatal depression in new mothers using telephone peer support: a randomised controlled trial. \$850,069; 2018-2021

Grzeskowiak L, Amir L, Smithers L. Jacobs S, Ingman W, Grivell R, Knight E. OPTimising Mothers' Own Milk supply in the neonatal unit - enhancing breast milk supply with Domperidone in mothers of preterm infants (OPTIMOM-D). \$980,000; 2019-2021

Hickey M, Peate M, Norman R, Hart R. Eggsurance? A randomised controlled trial of a novel Decision Aid for women considering egg freezing. \$593,043: 2019-2021

Hyett J, Tarnow-Mordi W, Tong S, Morris J, Hannan N, Dekker G, Brennecke S, Walker S, da Silva Costa F, Poon C. Can esomeprazole improve outcomes in women at high risk of pre-eclampsia? A Phase II placebocontrolled randomised, multi-centre clinical trial. \$1,597,124; 2018-2021

Kaldor K, Machalek D, Delany-Moretlwe S, Rees H, Chikandiwa A, Brotherton J, Petoumenos K, Cornall A, Vallely 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 PLUSS Study. \$2,113,820; 2019-2023

Mol B, Askie L, Thangaratinam S, Brennecke S, Wang R, Hyett J, Gibson R, Stark M, Espinoza D. Prediction and prevention of spontaneous preterm birth: an individual participant data metaanalysis comprising of prognostic and therapeutic data. \$1,103,273; 2018-2021

Novak I. Morgan C. Badawi N. Boyd R. Spittle S, Dale R, Kirby A, Hunt R, Whittingham K, Pannek K. Harnessing Neuroplasticity to Improve Motor Performance in Infants with Cerebral Palsy: a Pragmatic Randomized Controlled Trial. \$2,736,340; 2017-2021

Phillips K, Friedlander M, Oza A, Brand A, Stewart C, Scott C. STICs and STONes: a randomised, phase II. double-blind, placebo-controlled trial of Aspirin in chemoprevention of ovarian cancer in women with BRCA1 and BRCA2 Mutations. \$653,892; 2017-2021

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 neonatal intensive care. \$585,270; 2019-2023

> Dimitriadis E. Senior Research Fellow. Mechanistic and translational studies in female reproductive health. \$631.370: 2017-2021

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 in 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, Harris M, Laboupoulos J, Neil A, Chapman W, Preen D, Harvey C, Roper C, Bowman J, Lim M, Baker E, Parsell C, Coghill D, Hamilton B, Bennett J, Burchill L, O'Donnell M. ALIVE - A National Research Translation Centre to implement Mental Health Care at Scale; \$10,000,000; 2021-2026

Medical Research Future Fund (MRFF)

Abbott J, Rogers P, Montgomery G, Mishra G. To establish the national endometriosis clinical and scientific trials network, \$2,500,000; 2018-2021

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

research to improve the outcomes of

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

Preventative and Public Health Research

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 patients' wellbeing: a randomised controlled trial. \$1.819.842: 2020-2024

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

Clinician Researchers

Cheong J. Next Generation. Improving the health and development of high risk preterm newborns. \$333,709; 2018-2021

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



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