

RESEARCH EXCELLENCE:

# CHANGING OUTCOMES CHANGING LIVES

THE ROYAL  
WOMEN'S HOSPITAL  
RESEARCH REPORT  
2016



the women's  
the royal women's hospital  
victoria australia

# CONTENTS

2016 Research snapshot	1
Foreword: making a difference	2
Organisational chart	3
The Women's Declaration	3
Then and now	4
Bench to bedside	9
<b>Research Centres</b>	
Women's Newborn Research Centre	15
Centre for Women's Infectious Diseases	18
Women's Gynaecology Research Centre	21
Women's Cancer Research Centre	24
Women's Pregnancy Research Centre	27
Centre for Women's Mental Health	30
Midwifery and Maternity Services	33
Allied Health Research Centre	36
Anaesthetics Research Centre	39
Centre for Family Violence Prevention	42
Research highlights	44
Donors	49

# 2016 RESEARCH SNAPSHOT

<b>Publications</b>	<b>255</b>
<b>Research grants held</b>	<b>\$14.1 million</b>
<b>Research grants spent at the Women's</b>	<b>\$4.9 million</b>
<b>NHMRC grants held</b>	<b>\$7.5 million</b>
<b>NHMRC grants spent at the Women's</b>	<b>\$2.8 million</b>
<b>Clinical trials</b>	<b>59</b>
<b>Patients recruited at the Women's</b>	<b>2580</b>
<b>Research students</b>	<b>82</b>
<b>Completed or passed</b>	<b>26</b>
<b>Ongoing</b>	<b>56</b>



# MAKING A DIFFERENCE

From its beginnings in 1856, the Women's has been at the forefront of medical endeavours to provide treatment and care for all women and their babies.

It was the first, and it is now the largest public hospital in Australia dedicated to the health and wellbeing of women and newborns.

We are delighted to present the 2016 Research Report for the Royal Women's Hospital.

This report highlights some of our many achievements in research in 2016 – our 160th year. It profiles our early medical practice and breakthroughs, and demonstrates how our value of discovery and our spirit of enquiry have helped us to progress the healthcare of women and newborns. It shows how our research findings are translated from the 'bench to the bedside', becoming everyday practice, not only at the Women's, but in hospitals all around the world. Most importantly, it clearly demonstrates how our research makes a difference to the lives of thousands of women and newborns.

The Women's work is now undertaken across ten research centres – Newborn, Infectious Diseases, Gynaecology, Cancer, Pregnancy, Mental Health, Midwifery and Maternity Services, Allied Health, Anaesthetics, and Family Violence Prevention.

In 2016, we introduced the new Research Centre for Family Violence Prevention which will look at the impacts of violence against women and children as serious health issues. Supporting women experiencing family violence is an important commitment for the Women's. We now want to extend this commitment, and lead Victoria in the development of best practice for health care professionals and providers, and build the evidence base on the causes, effects and interventions related to family violence.

This year we continued our strong track record in attracting funding support for our research from the National Health and Medical Research Council (NHMRC).

Collectively, our ten centres were awarded competitive grants worth \$14.1 million in calendar year 2016, published 255 peer-reviewed medical papers, supervised 26 students to complete their higher education



studies, and conducted 59 clinical trials with more than 2500 patients participating in those trials.

Investment in research is important to the Women's, but it is also a challenge. As an essential area, we recognise it as the 'engine room' that drives improved patient outcomes. Our long history proves that research creates progress and the pursuit of new treatments and models of care benefits generations of women.

**“[Research is] the ‘engine room’ that drives improved patient outcomes.”**

Of course, we welcome support from the philanthropic and corporate sectors. A stronger research funding base will enable the Women's to deliver on its promise to make sick babies better, and provide exceptional medical and nursing care to women through all stages of their lives.

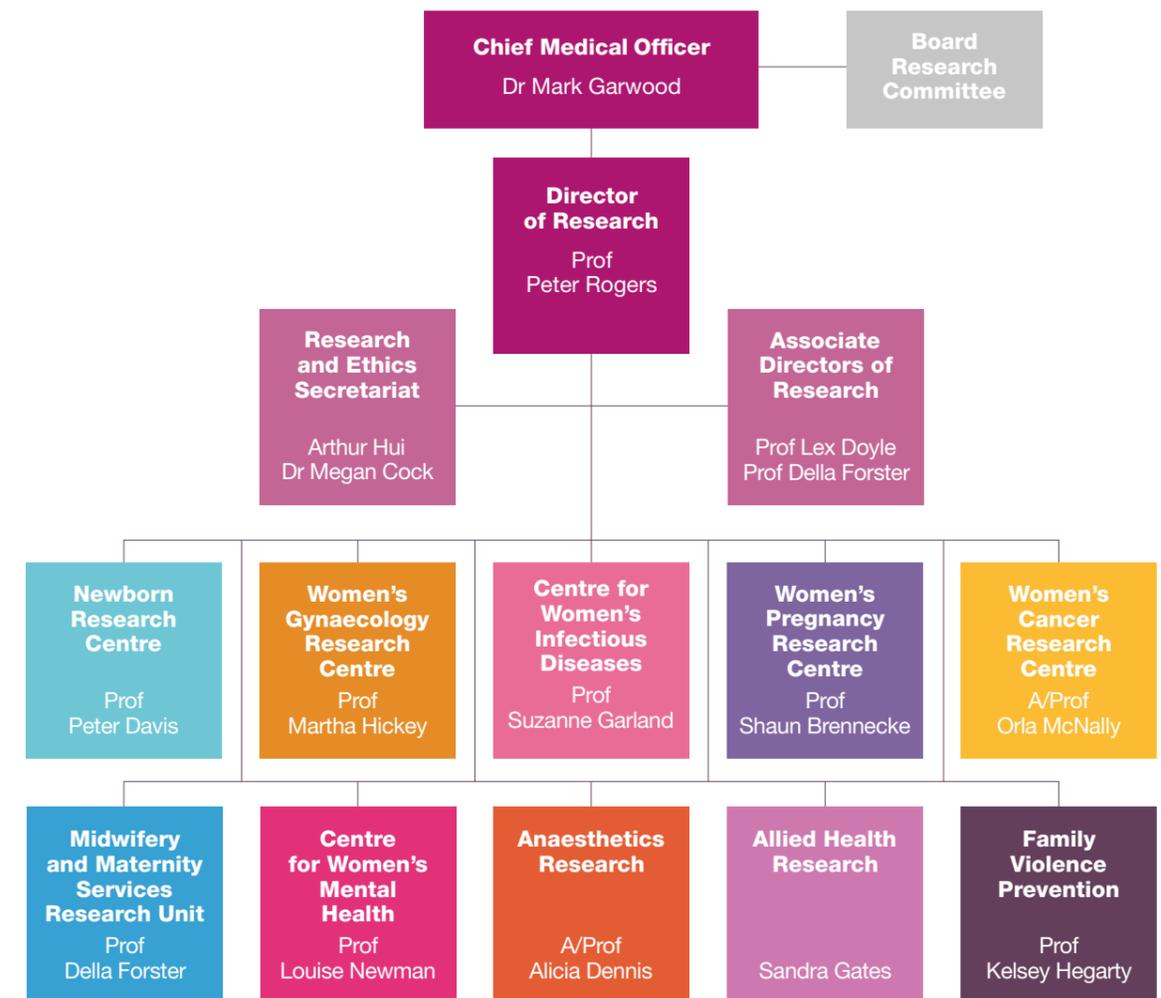
We would like to acknowledge the fundraising support of the Women's Foundation, and the many contributions from the broader hospital community to our research. We sincerely thank all those who contribute in some way, including the many different funding agencies, our research staff and collaborators, our non-research staff who support our research in so many ways, our dedicated Human Research and Ethics Committee members, and most importantly, the patients who contribute to our research effort through participation in clinical trials.

We hope you enjoy reading about our research and the impact it is having on the lives of women and newborns.

**Dr Sue Matthews**  
Chief Executive Officer

**Professor Peter Rogers**  
Director of Research

# ORGANISATIONAL CHART



## THE WOMEN'S DECLARATION

The Royal Women's Hospital has led the advocacy and advancement of women's health in Australia for 160 years.

As a tertiary level hospital and one of Australia's major teaching hospitals, we are committed to excellence and innovation to improve the health and wellbeing of women and newborns.

The Women's Declaration reflects the principles and philosophies fundamental to our hospital.

It captures the themes identified from consultation with our local community, with our staff, and with women from across Victoria.

Our Declaration reflects who we are and what we do:

- *In everything we do, we value courage, passion, discovery and respect.*
- *We recognise that sex and gender affect women's health and healthcare.*
- *We are committed to the social model of health.*
- *We will care for women from all walks of life.*
- *We will lead health research for women and newborns.*
- *We will innovate healthcare for women and newborns.*
- *We will be a voice for women's health.*



# THEN & NOW: 160 YEARS OF MEDICAL RESEARCH AT THE WOMEN'S

## Ovarian Cancer

“The key is to individualise treatment to provide patient-centred care.”



### Then: First successful surgery to treat ovarian cancer

#### Dr Richard Tracy

In 1864, Dr Richard Tracy performed our hospital's first surgery to treat ovarian cancer. This was the second successful ovariectomy operation ever done in Australia.

A pioneer in gynaecological surgery in Australia and internationally, Dr Tracy co-founded the Melbourne Lying-in Hospital and Infirmary for Diseases Peculiar to Women and Children in 1856, now the Royal Women's Hospital.

### Now: How ovarian cancer outsmarts chemotherapy

#### Associate Professor Orla McNally, Women's Cancer Research Centre

Women with ovarian cancer are now living longer as a result of greater knowledge of the disease and major advances in treatment.

Today, as a result of a world-first ovarian cancer study involving clinicians and patients from the Women's, our research provides a better understanding of the ways in which ovarian cancer outsmarts chemotherapy.

The most common type of ovarian cancer is epithelial ovarian cancer. Through the Australian Ovarian Cancer Study, it was established that there are four different sub-types of epithelial ovarian cancer. The most common of these subtypes is a high-grade serous cancer (HGSC). Head of our Women's Cancer Research Centre, researcher Associate Professor Orla McNally says HGSC accounts for 70 per cent of all ovarian cancers, and 60 per cent of ovarian cancer-related deaths, claiming approximately 80,000 women globally each year.

“The identification of four sub-types was a first step which helped us understand that ovarian cancer is a whole group of diseases. We've then been able to focus our research on why so many women have a good initial response to chemotherapy, but when it recurs, they don't have a similarly good response again,” says Associate Professor McNally.

“We examined and explained the mechanisms of this resistance to chemotherapy, and looked at a molecular level to see if we can turn that resistance 'off' so that we can get the cancer cells to be sensitive to the chemotherapy again.”

The Australian Ovarian Cancer Study revealed at least four key mechanisms by which initially vulnerable ovarian cancers go through genetic changes and become resistant to common chemotherapy. These mechanisms include cancer cells repairing damaged DNA, the 'hijacking' of a genetic switch that redirects chemotherapy drugs, and a reshaping of the molecular structure of the cancer that blocks the chemotherapy from reaching the tumour.

This new knowledge will help accelerate the discovery of targeted and individualised clinical treatments for women with chemo-resistant ovarian cancer.

Associate Professor McNally says our understanding of ovarian cancer has dramatically changed this decade. “We wouldn't have gotten this far in our understanding without women consenting to be part of clinical trials,” she says. “We believe that all women do better when research is taking place”.

“The key is to individualise treatment to provide patient-centred care.”

## Pre-eclampsia

“This test is a long awaited and very important step forward.”



### Then: Disputed treatments for pre-eclampsia, with many women developing eclampsia

Up until the mid 1900s, many pregnant women with pre-eclampsia went on to develop eclampsia, risking seizures and death.

The 1930s saw improvements in management, although treatment was in dispute around the world, varying from the ‘conservative’ approach of sedation, removal of stimulus and diet change, to delivering the baby.

### Now: New blood test helps predict likelihood of women developing pre-eclampsia

**Professor Shaun Brennecke, Women’s Pregnancy Research Centre**

Today, while eclampsia is relatively rare, and the understanding of pre-eclampsia has progressed, it is still one of the three leading causes of maternal death in pregnancy globally.

Pre-eclampsia affects one in 20 pregnant women, usually during the second half of pregnancy, or immediately after delivery of the baby. Women with pre-eclampsia have high blood pressure, fluid retention and protein in the urine. Left untreated, pre-eclampsia can lead to fetal growth impairment, early delivery, prematurity and stillbirth.

“Pre-eclampsia is a very serious condition in pregnancy, often with rapid onset and causing major health problems for both mother and baby,” says Professor Shaun Brennecke, Director of the Women’s Pregnancy Research Centre. If not detected or treated, pre-eclampsia can lead to stroke, and death.

Until now, there has been no reliable way of predicting which women will develop pre-eclampsia. In Australia, the Women’s has successfully led research into the early detection of pre-eclampsia. A major international clinical trial, called PROGNOSIS, has developed a simple, blood test that indicates whether a woman will suffer from pre-eclampsia. The Women’s Pregnancy Research Centre is the leading Australian centre involved in PROGNOSIS.

The test establishes a ‘low’ and ‘high’ result based on the measurement of two proteins that are released from the placenta in abnormal amounts in pregnant women who are likely to develop pre-eclampsia. A ‘low’ level result indicates a low risk, while a ‘high’ level indicates the likelihood of developing pre-eclampsia.

As a result, appropriate treatment paths can be reliably established: women with a positive result can be monitored and given early treatment. The test also provides relief for women who receive a negative result, in particular those who have previously had pre-eclampsia, as they now know they are unlikely to develop it again.

This biochemical ‘sFlt-1/PlGF’ ratio test has been so successful that it is being rapidly introduced into clinical practice around the world.

The test is a major breakthrough in ensuring better health outcomes for pregnant women, says Professor Brennecke. “It will significantly help refine diagnostic evaluation and streamline clinical management in maternity care services. This test is a long awaited and very important step forward.”

## Safe oxygen levels for preterm babies

“After 50 years...we’ve now got an answer that leads to increased survival of our tiniest babies.”



### Then: World-first discovery high oxygen support causes preterm infant blindness

**Dr Kate Campbell**

Joining the Women’s in 1944, neonatal paediatrician Dr Kate Campbell became a pioneer in clinical practice, teaching and research. In the 1940s, survival of preterm babies had been improving with the use of supplemental oxygen in neonatal care. In 1951, Dr Campbell made a world-first discovery that too much therapeutic oxygen in humidicribs could lead to blindness in preterm babies.

### Now: Targeting oxygen levels for preterm babies

**Professor Peter Davis, Professor Colin Morley, Professor Lex Doyle, Women’s Newborn Research Centre**

The Women’s continues to be a pioneer in neonatal medicine and an international leader in ventilation strategies for preterm babies.

A recent focus of research has been the level of blood oxygen to aim for in ventilating extremely preterm infants, who are born before 28 weeks gestation.

The BOOST-II trial combined Australian and United Kingdom data to provide significant new clinical evidence of safer levels of oxygen. The study found the risk of death or disability at two years of age among extremely preterm infants was five per cent higher if they had been allocated lower targeted oxygen saturation (range 85–89 per cent) than a higher targeted oxygen saturation (range 91–95 per cent).

Before these findings, neonatologists had targeted oxygen saturation across a wider range, between 85 per cent and 95 per cent. The decision about the appropriate amount of oxygen had been a difficult one, because both too much and too little can cause disability later on.

In the combined analysis of the Australian and UK trial, 48.1 per cent of the infants in the lower-target group and 43.1 per cent in the higher-target group had died or had a disability diagnosed by the age of two years.

“An astute observation by a clever paediatrician – Dr Kate Campbell – put together the first pieces of the puzzle,” says Professor Peter Davis, Director of the Women’s Newborn Research Centre. “After 50 years of not being clear on the levels of oxygen to use, we’ve now got an answer that leads to increased survival of our tiniest babies.”

A particular strength of the Women’s research program is that it is staffed by practising neonatologists.

“The questions we ask are the ones we face on a day-to-day basis,” says Professor Davis. “You see a baby struggling to breathe or struggling with uncomfortable devices and there’s a motivation to do something better.”

The strong link with parents is crucial, and most agree to participate in clinical trials. “It’s a terrifying thing to have your baby in an intensive care unit,” says Professor Davis.

“They’re very aware prematurity as a problem isn’t going to go away, and they’d like the next set of parents to have better treatments to use. That’s really inspiring. It keeps us coming to work.”

## Preterm follow up

“We want to ... understand how to improve the quality of life and health of those who survive.”



**Then: Expanded the focus of preterm neonatal care from short-term survival to longer-term outcomes.**

### Dr Bill Kitchen

Dr Bill Kitchen joined the Women's in 1965 to oversee the introduction of the emerging practice of neonatal intensive care. With more preterm babies surviving, due to the introduction of assisted ventilation in the 1970s, Dr Kitchen became concerned about their longer-term outcomes.

He began conducting follow-up studies with children born at the Women's, and other Victorian hospitals. This has become the world's most comprehensive longitudinal study into the side effects of being born premature, which continues to this day.

**Now: The Victorian Infant Collaborative Study – 25 year preterm follow-up**

**Professor Lex Doyle, Associate Professor Jeanie Cheong, Women's Newborn Research Centre**

In this latest phase of the Victorian Infant Collaborative Study (VICS), funded by NHMRC, the Women's research team is reconnecting with children born preterm 25 years ago. The goal is to understand the long-term outcomes for these babies, and whether they have ongoing health issues that could be linked to their early birth.

The study involves a statewide collaboration of all perinatal centres caring for extremely preterm, low birth weight infants. “This will be the very first wave of extremely preterm, low weight babies who have survived to adulthood,” says Associate Professor Jeanie Cheong from the Women's Newborn Research Centre. “From an epidemiological perspective, it is unparalleled.”

Although other groups have been tested over long periods, Associate Professor Cheong said the 1991/92 cohort is particularly significant. “It is the first group from the modern neonatal intensive care era that we have followed to 25 years of age. It is also the first time we were able to recruit a strong control group and the first time we captured every one of those tiniest, most immature babies to take part in the study.”

The VICS study also highlights improvements and innovations in maternal and neonatal care over this period such as the use of surfactant, improved ventilation, antenatal corticosteroids and the capacity to offer intensive care for these babies. “Survival rates have moved from less than 10 per cent in the 1970s to greater than 75 per cent by the late 1990s,” says Professor Lex Doyle, from the Women's Newborn Research Centre.

Of the 75 per cent who survive extreme prematurity or low weight births, however, one in five suffer major difficulties related to cognition, hearing, walking, speech or sight. This is compared with one in 30 children born full term at average birth weight.

“It is now crucial to understand the health challenges so we can inform policy, and support physicians who will be looking after these young adults in larger numbers”, says Associate Professor Cheong.

With preterm birth rates rising, as a result of reproductive technology, increasing maternal age and improved obstetric surveillance, the data will also support longer term public health and educational planning.

“What we want to focus on and understand is how to improve the quality of life and health of those who survive,” says Associate Professor Cheong.



# BENCH TO BEDSIDE

“Our absolute strength is quickly translating research knowledge into clinical practice and better health outcomes for our patients.”

DIRECTOR OF RESEARCH, PROFESSOR PETER ROGERS

## Probiotics in premature babies

Professor Suzanne Garland,  
Centre for Women's Infectious  
Diseases



Premature infants born at less than 32 weeks gestation have poorly developed intestinal immune defences. In full term births, the baby's intestine is rapidly colonised with healthy microbes from their mother's vaginal canal, skin surface and milk. However, in premature infants, bacteria from the intensive care environment colonises the gut instead.

Necrotising enterocolitis (NEC) is an inflammatory bowel disease that develops in approximately four per cent of preterm infants and can result in death in 25 per cent of cases. It is the second most common illness in premature babies.

At the Women's, we conducted a clinical trial that compared the daily administration of either a probiotic combination or a placebo to over 1000 premature infants born before 32 weeks gestation who weighed less than 1500g.

**"[This study] has established probiotics as a cheap, easy and safe intervention."**

We wanted to investigate whether a well balanced, adequately diverse probiotic promoted antigen tolerance, appropriate immune development, and development of gastrointestinal nervous system function.

The ProPrams trial showed a 54 per cent reduction in the incidence of NEC in very preterm infants.

"This is the world's biggest study on necrotising enterocolitis," says Professor Suzanne Garland, Director of the Centre for Women's Infectious Diseases.

"It has established probiotics as a cheap, easy and safe intervention for a very big gain."

The results have had a large impact on how premature babies are cared for in Australia. Neonatal intensive care units around the country now administer probiotics to premature infants as an accepted, routine standard of care.

### Case study

Probiotics have transformed the way we care for very preterm babies," says Associate Professor Sue Jacobs, Deputy Clinical Director of Neonatal Services at the Women's. "It's saving lives, here and around the world."

"It is a simple intervention that is acceptable for most families", she says. "We explain that it is only particular strains of probiotics, prepared specially for infants that are helpful."

"Probiotics are added to feeds once or twice a day, until the baby is 34 weeks, when the risk of NEC, or any infection, is over. It's as simple as that."

Second time mother, Liz, remembers being frightened when her daughter Amy, now in grade 2, was born preterm. "It was day by day whether Amy would make it," she says.

She was keen to participate in the trial. "We knew that the evidence-based care she was receiving was due to many premature babies before her participating in research."

"Today, you would never know she had such a challenging start to life."

## Breathing support for preterm babies

Professor Peter Davis,  
Dr Brett Manley, Dr Louise Owen,  
Women's Newborn Research  
Centre



Premature or preterm babies are those born before 37 weeks gestation. Babies' lungs are not usually fully developed at this stage, and preterm babies often require help to breathe. This problem becomes more severe with increasing prematurity.

Traditionally, breathing support is provided by a mechanical ventilator, with the baby's lungs inflated via an endotracheal tube inserted into the windpipe. The baby is cared for in a tertiary-level neonatal intensive care unit. This intervention, however, is uncomfortable for the baby and is associated with damage to its lungs and delicate airways, and makes it more difficult for parents to hold and cuddle their baby. As a result, clinicians aim to avoid mechanical ventilation by using non-invasive ventilation.

These non-invasive methods include nasal continuous positive airway pressure or nCPAP and high flow nasal cannulae.

**"The Women's is recognised as an international leader in non-invasive ventilation."**

"The nCPAP device is a step forward from an endotracheal tube," says Professor Peter Davis, the Women's Newborn Research Centre.

"However, it's cumbersome and can cause breakdown of the baby's skin round the nose."

High flow is less intrusive. It makes it easier for mothers to pick up their babies, to try breastfeeding and experience important skin-to-skin contact.

"High flow has been a popular innovation," says Professor Davis, "but it needed proper clinical trials to test whether it is as good as nCPAP in different scenarios."

The Women's newborn research team conducted a series of clinical trials and evaluated different techniques for providing non-invasive ventilation to preterm babies. The research established that non-invasive ventilation is useful in two situations. It can assist in the transition from supported breathing using the endotracheal tube, to unsupported breathing, and provide initial assistance to preterm babies whose lungs lack the compound (surfactant) which enables them to remain open.

The Women's is recognised as an international leader in non-invasive ventilation. This evidence-based work gleaned from two decades of research has changed the way preterm babies are now managed around the world.

### Case study

When first time mother Tien talks about her baby's early arrival at just 27 weeks and five days, she remembers an overwhelming mix of emotions. Her daughter Lexi weighed 1080 grams and could fit in the palm of her hand. "I was excited, but sad. She was so small."

In the neonatal intensive care unit, Lexi was ventilated for 24 hours, before shifting to the non-invasive breathing support, nCPAP, which Tien nicknamed 'scuba gear'. Lexi was on nCPAP for several weeks, before moving to high flow.

**"I was excited, but sad. She was so small."**

"The doctors are awesome. They monitor and tweak this and that," says Tien. "It's amazing what they do and how they do it."

Tien will be taking her baby home soon. Lexi has started breastfeeding and is breathing largely unassisted, as she is strong enough to suckle, breathe and swallow.

## Menopause symptoms after cancer clinic

Professor Martha Hickey,  
Women's Gynaecology  
Research Centre



Menopause symptoms after cancer is a growing area of clinical work and research. The Women's Menopause Symptoms After Cancer (MSAC) clinic was established in 2010 specifically to care for women with menopausal symptoms and a history of cancer. It is the only clinic in Victoria where menopause, mental health and cancer are treated together.

Data collected from MSAC patients have been the first to define the nature, severity and impact on quality of life of menopausal symptoms in cancer patients.

**"Menopausal symptoms can be a frequent and distressing effect of cancer treatments."**

The clinic has developed evidence-based multi-disciplinary clinical guidelines for the care of cancer patients. These have been recognised internationally as the gold-standard model of care for the management of menopausal symptoms after cancer.

"Menopausal symptoms can be a frequent and distressing effect of cancer treatments," says Professor Martha Hickey, Director of the Women's Gynaecology Research Centre.

"Our experience and research shows that cancer survivors have more severe and frequent menopausal symptoms, such as hot flushes and night sweats, than other people being treated for menopause."

These symptoms are often very challenging and unexpected, particularly for women who have undergone cancer treatment at a young age and have experienced a treatment-induced menopause. Cancer treatment may also exacerbate pre-existing menopausal symptoms.

Due to the complex nature of a cancer diagnosis and the risk of recurrence, many of the patients seen in the MSAC clinic require multidisciplinary help.

The clinic tailors each woman's program and provides a specialist team that includes gynaecologists, surgical and medical oncologists, endocrinologists, fertility specialists, sexual counsellors, the Centre for Women's Mental Health staff and specialist nurses.

### Case study

The Women's MSAC clinic helped Toni regain her quality of life after she was diagnosed and then successfully treated for breast cancer. She felt she was treated holistically, with the clinic bringing together all the specialist knowledge she needed in one place. "It was such a relief. You don't feel as alone," she says.

**"The clinic [brought] together all the specialist knowledge ... in one place."**

During breast cancer treatment, Toni had gone through a debilitating menopause. She couldn't take the commonly prescribed oestrogen-based medication, as her form of breast cancer was oestrogen-positive, and the clinic was able to provide a safer form of treatment.

Toni was referred to a psychologist, which she says was 'fantastic'. The clinic also explored other health risks, "something I might not have brought up," says Toni. "But they know what to look for."

"I'm back at full-time work for the first time in ages," she says. "I'm happy to say I'm leading a normal life."

## A new model of care after surgery for early endometrial cancer

Associate Professor Orla McNally,  
Women's Cancer  
Research Centre



Endometrial cancer is the most common invasive gynaecological cancer in Australia and its incidence is rising. In 2014/15, it represented 40 per cent of all gynaecological cancer cases at the Women's.

Current standard practice at many hospitals brings women back for hospital review for five years post definitive surgery. This involves a clinical review and examination focused on cancer recurrence; however, it does not address the co-morbid diseases that impact on quality of life and are more likely to lead to early death. Equally, regular reviews are not detecting recurrent disease.

Our data show that 90 per cent of women treated for early stage endometrial cancer have health conditions such as obesity, hypertension and diabetes that pose greater morbidity and mortality risks than cancer recurrence, says Associate Professor Orla McNally, Director of the Women's Cancer Research Centre.

**"This model of care better supports women ...and creates greater capacity for hospitals."**

In 2014, the Women's developed, implemented and evaluated a new model of survivorship care for women diagnosed with early endometrial cancer. The research explored the impact of a consultant-to-nurse-led survivorship clinic with early discharge back to primary care (GP) to assess the holistic needs of women following treatment of early stage endometrial cancer.

This model of care demonstrated better identification of health care needs, improved health care management plans, better educated and empowered patients, improved communications and referrals between hospitals, GPs and services, and led to very high acceptability and satisfaction rates for women and GPs.

With survivorship after cancer treatment increasing and, as a result, an associated further burden on health care settings, this research provides a valid, alternative care paradigm that supports women in a primary care setting, and creates greater capacity for hospitals to function as specialist clinics.

### Case study

After 12 months of ignoring vague symptoms as she nursed her terminally ill husband, Annie vividly remembers the phone call telling her there was good news, and bad news. Yes, it was endometrial cancer, but it was caught early, and it was curable. "I was very grateful," she says.

Annie was treated successfully at the Women's with a hysterectomy (including the removal of the uterus, fallopian tubes and ovaries). She travelled from her regional home for a check-up at the Women's and was offered our new model of care. "The hospital suggested I work with my local GP and they'd send all relevant information to her."

**"I'm feeling really comfortable with my total health plan now."**

The health focus for Annie was on pelvic floor strengthening, dietary advice and psychological support, which Annie valued. "I was really struggling with this health shock and losing my husband. It all rolled into one."

The support of her GP and psychologist, closer to home, was transformational, says Annie. "I'm feeling really comfortable with my total health plan now."

## Caseload midwifery model of care – COSMOS

Professor Della Forster,  
Midwifery and Maternity  
Services Research Unit



In line with national and global trends, the rate of caesarean section in Victoria has gone up significantly in recent years. From 1985 to 2000, caesarean sections doubled from 15 per cent to 30 per cent of all births, and by 2011 had slightly increased again. While there was mounting evidence of the many adverse side effects associated with caesareans, very few interventions successfully addressed this trend.

At the same time, there was an international move to implement midwife-led models of maternity care, but without proven evidence of their safety and efficacy.

The Women's conducted an NHMRC-funded trial, known as COSMOS, to compare the effect of caseload midwifery care with standard midwifery care on a range of clinical and psychosocial outcomes. Caseload midwifery is where women have continuity of care from a known midwife during pregnancy, labour, birth and postpartum.

**“Caseload midwifery care resulted in fewer caesarean deliveries, sick babies or interventions.”**

The results were unequivocal: caseload midwifery care resulted in fewer caesarean deliveries, less sick babies or interventions, and greater satisfaction for women and midwives.

This work led to the introduction of the COSMOS program at the Women's. It consists of small teams of midwives who individually support a woman through her pregnancy, at the birth, and afterwards at home with the baby.

COSMOS midwife Amber Gibson says the program builds women's knowledge and confidence. “The women get to know us and trust us,” she says.

Under the COSMOS program, a midwife supports the woman to establish labour at home. Once admitted to hospital, the midwife stays with the woman until she has delivered her baby. The woman usually goes home within 24 hours with the midwife visiting daily or calling until feeding is established and the baby is gaining weight.

“COSMOS normalises pregnancy and birth and its continuity of care helps women build their confidence,” says Amber Gibson. “Women absolutely love it. We wish more women could access this program. It's the way of the future.”

### Case study

For first-time mother, Hilde, a low risk pregnancy meant she was eligible to join the COSMOS program.

Hilde says she was thrilled. “I was able to really connect with Amber, my midwife, and she understood what I wanted; she focused on the healthy and natural aspects of being pregnant.”

Hilde says the program built her confidence. “Amber met me where I was. She didn't push anything on to me. She kept saying: ‘I know you're going to come in and do great.’”

**“I wish every woman could have the same experience. I felt so in control.”**

Hilde stayed home until labour was well established, and in hospital, chose the birthing pool to deliver baby Benjamin. “It was just the most amazing feeling,” says Hilde.

The next morning, Hilde was ready to go home. “I knew if I needed help I could call, and that Amber would be visiting me at home the first few days after leaving the hospital.”

“I wish every woman could have the same experience,” she says. “I felt so in control.”

# WOMEN'S NEWBORN RESEARCH CENTRE



**“Birth is usually a time of joy and hope. When things go wrong, the consequences for the child, their family and society are enormous. Our job is to undertake research that gives all babies the best possible start to life.”**

DIRECTOR, PROFESSOR PETER DAVIS

## Key to our work in the Women's Newborn Research Centre is the simple motto we all stand by, 'making babies better.'

To achieve this we are trying to give all babies, irrespective of their size and maturity at birth, the best chance of growing into healthy adults.

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

Research in the delivery room is a difficult task because of the often chaotic and stressful environment. Nevertheless, we have demonstrated that it is possible to do high-quality studies and discover new ways of monitoring and treating newborn babies.

### Director

Professor Peter Davis

### Deputy Director

Dr Jennifer Dawson

## RESEARCH SUMMARY

Clinical trials:	30
Publications:	68
Grants funding held:	\$4,500,000
Grants funding spent at the Women's:	\$1,500,000

### Key publications

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## RESEARCH HIGHLIGHTS



### Understanding depression and anxiety symptoms in parents of very preterm infants during the newborn period.

#### Dr Carmen Pace

The newborn period is highly stressful for parents following the birth of very preterm babies, who are born at less than 30 weeks gestation. With a baby weighing only 1000g, in a neonatal intensive care unit, parents naturally fear for their baby's wellbeing and survival. It is known that mothers experience heightened depression and anxiety following very preterm birth, but how these symptoms evolve during the first months after birth has not been studied.

In the first hours and days after birth, fathers are often faced with the dual responsibility of caring for their partner and being the primary point of contact with their child. To date, research has also not explored how fathers adjust following very preterm birth.

**"The rate of depression and anxiety in mothers and fathers was very high following [preterm] birth"**

To understand how depression and anxiety evolve, we followed 113 mothers and 101 fathers of 149 very preterm infants admitted to the neonatal intensive care unit at the Women's.

The rate of depression and anxiety in mothers and fathers was very high following birth (up to 40 per cent) and declined significantly during the first 12 weeks after birth. However, it still remained above expected levels at six months. Mothers and fathers showed similar rate of depression and anxiety over the first six months.

"Fathers showed high rates of depression and anxiety, similar to those experienced by mothers. There is less awareness of the challenges faced by fathers and, consequently, often only limited support was provided to them," says Dr Carmen Pace.

"It is important that fathers not be overlooked after birth of very preterm infants."

"It is now clear that many mothers and fathers need extra support shortly after the birth of their very preterm infant," says Dr Pace.

### Moral distress for health professionals within neonatal and pediatric intensive care units.

#### Dr Trisha Prentice

Neonatal intensive care units (NICUs) and paediatric intensive care units (PICUs) are high pressure environments where lifesaving technologies and treatments are provided to very vulnerable babies.

However, the burden of treatment versus the limited perceived benefits for some infants can cause moral distress for healthcare professionals working in these settings. Moral distress refers to the anguish that arises when a health professional makes a clear judgment about what they think is in a patient's best interests but feels unable to act accordingly.

Dr Trisha Prentice, a Neonatal Research Fellow at the Women's, conducted a systematic review of moral distress experienced by nursing and medical professionals within NICUs and PICUs.

"Interestingly, moral distress is generally reported as occurring because a provider feels they are 'doing too much'," says Dr Prentice.

The most common themes identified were the overly burdensome and disproportionate uses of technology, perceived not to be in a patient's best interest, and a sense of powerlessness to act.

The study found that concepts of moral distress are expressed differently. In nursing literature, for example, emphasis is often placed on the emotional or psychological component. Nurses express voicelessness and powerlessness within the constraints of the medical system. In medical literature, moral distress is more commonly described in terms of dilemmas or ethical confrontations.

Moral distress continues to affect the care of paediatric and neonatal intensive care patients. It leads to burnout and problems in retaining the experienced staff required to look after our sickest babies. The next step is to investigate interventions that alleviate moral distress.

"This research will lead to better understanding of the stress many professionals experience in this field, and the supports we all need," says Professor Peter Davis.



# CENTRE FOR WOMEN'S INFECTIOUS DISEASES

“The Centre for Women's Infectious Diseases' research aims to discover the causes of various infectious diseases of mothers and babies, develop new diagnostics and cures for diseases, and interventions for better health in the long term.”

DIRECTOR, PROFESSOR SUZANNE GARLAND

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 cancer, 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.

#### Director

Professor Suzanne Garland

#### Senior Scientist

Professor Sepehr Tabrizi

## RESEARCH SUMMARY

Clinical trials:	1
Publications:	44
Grants funding held:	\$3,200,000
Grants funding spent at the Women's:	\$800,000

### Key publications

1. Garland SM, Stanley M, Brotherton J, Moscicki AB, Bhatla N, Kaufmann AM, Sankaranarayanan R, Palefsky J on behalf of IPVS, IPVS Policy Statement on safety of HPV Vaccines. *Papillomavirus Research* 2016;9–10.
2. Garland SM, Kjaer SK, Munoz N, Block SL, Brown DR, DiNubile MJ, Lindsay BR, Kuter BJ, Perez G, Dominiak-Felden G, Saah AJ, Drury R, Das R, Velicer C, Impact and effectiveness of the quadrivalent human papillomavirus vaccine: a systematic review of ten years of real-world experience, *Clinical Infectious Diseases* 2016;63(4):519–527.
3. Subasinghe AK, Mguyen M, Wark JD, Tabrizi SN, Garland SM, Targeted Facebook advertising is a novel and effective method of recruiting participants into a human papillomavirus vaccine effectiveness study, *JMIR Res Protoc* 2016;5(3):e154.
4. Molano M, Tabrizi SN, Garland SM, Roberts JM, Machalek DA, Phillips S, Chandler D, Hillman RJ, Grulich AE, Jin F, Poynten M, Templeton DJ, Cornall AM on behalf of the SPANC Study Team, CpG Methylation Analysis of HPV16 in laser capture microdissected archival tissue and whole tissue sections from high grade anal squamous intraepithelial lesions: a potential disease biomarker, *PLOS One* 2016;11(8):e0160673.
5. Garland SM, Paavonen J, Jaisamram U, Naud P, Salmeron J, Chow SN, Apter D, Castellsague X, Teixeira JC, Skinner SR, et al., for the PATRICIA Study Group, Prior human papillomavirus (HPV)–16/18 AS04-adjuvanted vaccination prevents recurrent high grade cervical intraepithelial neoplasia after definitive surgical therapy: Post-hoc analysis from a randomised controlled trial, *International Journal of Cancer* 2016;139(12):2812–2826.

## RESEARCH HIGHLIGHTS



### Monitoring the success of the National HPV Vaccination program

**Professor Suzanne Garland, Dr Dorothy Machalek**

As part of the National HPV Vaccination Program funded by the Commonwealth Department of Health, the Women's is conducting the IMPACT Human Papilloma Virus (HPV) surveillance program. IMPACT is tracking the prevalence of HPV infection over time to measure the success of the vaccination program and inform public health policy.

Over the last three years, the IMPACT program has recruited more than 3000 people to provide samples for HPV testing and contribute to a short demographic and health behaviour survey.

"Preliminary data from this program have indicated huge reductions in HPV prevalence in women up to the age of 35 years," says Professor Suzanne Garland. "This reduction is largely due to high coverage of the HPV vaccine delivered by the 2007-2009 national school-based program."

"The program has also observed reductions in HPV in young, unvaccinated men, which suggests a high level of herd or community protection has been achieved by a female only vaccination program," says Dr Dorothy Machalek.

**"Preliminary data from this program have indicated huge reductions in HPV prevalence in Australia."**

The current vaccine protects against two types of HPV, which cause 70 per cent of cervical cancers. The five next most common types of HPV are responsible for an additional 20 per cent of cervical cancers worldwide. A next generation HPV vaccine that protects against all of these common types of HPV with 97 per cent efficacy has been registered in Australia.

"Should the next generation HPV vaccine replace the current vaccine in the national program, the IMPACT program at the Women's will be perfectly placed to monitor the efficacy of this next generation HPV vaccine," says Professor Garland.

### Prevalence and severity of menstrual pain: Young female health initiative

**Professor Suzanne Garland, Professor John Wark**

Collaborative studies led by the Women's and Melbourne Health are using Facebook advertising to engage and recruit females aged 16-25 years into the Young Female Health Initiative (YFHI). In these studies we are aiming to define the prevalence of various health issues in a generalisable population.

The team is investigating linkages between five health domains: health behaviours, sexual and reproductive health, metabolic and cardiovascular health, bone and joint health, mental health and reproductive health data. Our research has involved collecting extensive online questionnaires, as well as comprehensive clinical data from more than 700 young women.

"What we have collected is unique," says Professor John Wark. "This breadth of data on this age group of women has never been gathered before."

Professor Suzanne Garland says while dysmenorrhoea or painful menstruation is a common symptom of menses, little is known about its severity or attitudes towards its management in young women. The YFHI study is being used to investigate this.

**"This breadth of data on this age group of women has never been gathered before"**

The study found that 88 per cent of participants described the prevalence of dysmenorrhoea with most women indicating they experienced moderate to severe pain, with a significant adverse impact on daily activities. However, only one in three of these young women report having consulted a health care provider about their pain.

"This indicates the need for general practitioners to be more astute about providing accurate information about dysmenorrhoea to young females," says Professor Garland.

# WOMEN'S GYNAECOLOGY RESEARCH CENTRE



**"Improving women's physical and emotional health, benefits the whole community. Our researchers have advanced understanding of the causes and management of a wide range of common problems in women's health, using an integrated, multidisciplinary and patient-focused approach."**

DIRECTOR, PROFESSOR MARTHA HICKEY

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

Our research has directly improved patient care in prevention, diagnosis and management of a wide range of conditions affecting women's gynaecological health.

### Director

Professor Martha Hickey

### Deputy Director

Professor Peter Rogers

### Associate Director

Dr Jane Girling

## RESEARCH SUMMARY

Clinical trials:	2
Publications:	44
Grants funding held:	\$2,100,000
Grants funding spent at the Women's:	\$1,000,000

### Key publications

1. Girling JE, Lockhart MG, Olshansky M, Paiva P, Woodrow N, Marino JL, Hickey M, Rogers PAW. Differential gene expression in menstrual endometrium from women with heavy menstrual bleeding. *Reproductive Sciences* 2016;24(1):28–46.
2. Hickey M, Marino JL, Braat S, Wong S. A randomized, double-blind, crossover trial comparing a silicone versus water-based lubricant for sexual discomfort after breast cancer. *Breast Cancer Research and Treatment* 2016;58(1):79–90.
3. Holdsworth-Carson SJ<sup>†</sup>, Zhao D<sup>†</sup>, Cann L, Bittinger S, Nowell CJ, Rogers PA. "Differences in the cellular composition of small versus large uterine fibroids." *Reproduction* 2016;152(5):467–80. <sup>†</sup>Co-first authors.
4. Holdsworth-Carson SJ<sup>†</sup>, Fung JN<sup>†</sup>, Luong HT, Sapkota Y, Bowdler LM, Wallace L, Teh WT, Powell JE, Girling JE, Healey M, Montgomery GW, Rogers PA. "Endometrial vezatin and its association with endometriosis risk." *Human Reproduction* 2016;31(5):999–1013. <sup>†</sup>Co-first authors.
5. Jayasinghe Y, Rangiah C, Gorelik A, Ogilvie G, Wark J, Hartley S, Garland SM. Primary HPV DNA based cervical cancer screening at 25 years: Views of young Australian women aged 16–28 years. *Journal of Clinical Virology* 2016;76:S74–S80.

## RESEARCH HIGHLIGHTS



### Understanding menopause symptoms after cancer treatment

**Dr Jennifer Marino, Professor Martha Hickey**

Menopause symptoms after cancer (MSAC) is an evolving area of clinical practice and research.

Menopausal symptoms and sexual problems are a common effect of cancer and its treatment that can adversely impact on a woman's relationships, self-esteem, and happiness. Women often find it difficult to discuss these issues with their health care providers.

**"We need to understand the prevalence and causes ... to help shape treatment programs"**

Sexual inactivity among female cancer survivors was highlighted by the Women's at the Australasian Menopause Society Congress in late 2016, where MSAC clinical research fellow Dr Jennifer Marino was presented with the Barbara Gross Award in recognition of her groundbreaking work.

"We need to understand the prevalence and causes of sexual problems in female cancer survivors, to help shape treatment programs for them," says Dr Marino.

Dr Marino found that more than one quarter of women who had a partner were not sexually active following cancer treatment. Compared to partnered women who were sexually active, women cancer survivors were more dissatisfied with their sex lives, felt less attractive and more self-conscious about their appearance. Rates of vaginal dryness and pain with intercourse did not differ between sexually active and inactive women, suggesting that interventions to improve sexual function need to take a multifaceted approach.

The research was conducted with patients at the Women's and the MSAC clinic at the King Edward Memorial Hospital in Perth (KEMH). It forms part of a body of work about sexuality after cancer by Dr Marino, Professor Martha Hickey, and colleagues at the KEMH.

"The Women's MSAC clinic personalises programs to suit the individual needs of each woman, using an integrated, multidisciplinary clinical team," says Professor Hickey.

### Understanding the genes that increase risk of endometriosis

**Dr Jane Girling, Dr Sarah Holdsworth-Carson, Professor Peter Rogers**

Endometriosis is a common gynaecological condition affecting up to ten per cent of reproductive aged women in our community. Women with this disorder experience severe menstrual period pain, chronic pelvic pain and fertility problems.

With a strong heritable component to endometriosis, women with family members who have endometriosis are at a higher risk of developing the disorder. A group of genes linked with increased risk of endometriosis have previously been identified. We are now investigating what these genes do in a woman's body, and how they contribute to the initiation and progression of endometriosis.

**"Women want an answer for endometriosis. Our team is working hard to provide that."**

The endometriosis research team has developed the largest database of its kind containing genetic, molecular, clinical and symptom information from more than 600 women with and without endometriosis. The database is now sufficient to enable the team to study subgroups of patients with different symptoms.

"Identifying subgroups is essential if we are to work out how a specific risk gene contributes to specific symptoms such as menstrual period pain or infertility," says Dr Jane Girling.

This research will better explain the mechanisms responsible for endometriosis. "Ultimately, our goal is to use this information to improve diagnostic and therapeutic options available to women with the disorder," says Dr Girling.

"Women want an answer for endometriosis. Our team is working hard to provide that."



# WOMEN'S CANCER RESEARCH CENTRE

“Our multidisciplinary gynaecological cancer team of clinicians and scientists ensures our bench-to-bedside research is key to improving outcomes in cancer care.”

DIRECTOR, ASSOCIATE PROFESSOR ORLA MCNALLY

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

As a multidisciplinary team, our research needs to consider the different gynaecological cancers, uterine, ovarian/fallopian tube, cervical and vulval. We also focus on the precancerous 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 we recruit women where possible to clinical trials at the Women's but also collaboratively through the VCCC Parkville Clinical Trials Unit, exploring all aspects of the clinical journey.

#### Director

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

## RESEARCH SUMMARY

Clinical trials:	16
Publications:	15
Grants funding held:	\$520,000
Grants funding spent at the Women's:	\$420,000

#### Key publications

1. Alsop K, Thorne H, Sandhu S, Hamilton A, Mintoff C, Christie E, Spruyt O, Williams S, McNally O, et al., A community-based model of rapid autopsy in end-stage cancer patients. *Nat Biotechnol* 2016;34(10):1010–1014.
2. Black, C., et al., Uterine Papillary Serous Carcinoma: A Single-Institution Review of 62 Cases. *Int J Gynecol Cancer* 2016;26(1):133–40.
3. Samardzija C, Luwor RB, Quinn MA, Kannourakis G, Findlay JK, Ahmed C coalition of Oct4A and  $\beta$ 1 integrins in facilitating metastasis in ovarian cancer. *BMC Cancer* 2016;16:432.
4. Jayasinghe YL1, Bhat R, Quinn M, Wrede CD, Tan JH. Findings and Outcomes in a Prevacination Cohort of Women Younger Than 25 Years Attending a Tertiary Colposcopy Service. *J Low Genit Tract Dis* 2016;20(3):224–9.
5. Sultana F, English DR, Simpson JA, Drennan KT, Mullins R, Brotherton JM, Wrede CD, Heley S, Saville M, Gertig DM. Home-based HPV self-sampling improves participation by never-screened and under-screened women: Results from a large randomized trial (iPap) in Australia. *Int J Cancer* 2016;139(2):281–90.

## RESEARCH HIGHLIGHTS



### iPAP: Home-based HPV self-sampling improves participation by never screened women

**Mr David Wrede**

Renewed guidelines for cervical cancer screening will be introduced across Australia in late 2017. The new method of proposed screening will see women starting to be screened, from the age of 25 instead of 18, consistent with WHO recommendations. The new plan will use human papillomavirus (HPV) testing conducted five yearly rather than Pap tests every other year.

The new HPV test allows for self-sampling and could increase participation of women in the screening process.

"We know there are barriers for some women to have a Pap test," says Mr Wrede, Lead of the Dysplasia Unit at the Women's. "These include fear of examination, not finding the right doctor, or a previous negative experience."

The iPap study is a clinical trial to determine whether HPV self-sampling increases participation in cervical screening by never and under-screened women.

"HPV self-sampling improves cervical screening which will significantly improve women's health outcomes."

As part of the study, letters were sent to never and under-screened women with 7,120 women invited to participate invited to participate in the self-sampling study. A further 1,020 women received reminder letters for a regular Pap test (control group). The self-sampling group also received a self-sampling kit consisting of a swab and instructions.

In a group of never or under screened women, more women (1 in 5) returned their swab test (self-sampled) or had a Pap test, compared to 1 in 17 women previously. The study also showed that most women whose samples tested positive for HPV had appropriate clinical follow-up.

"The iPap study shows that HPV self-sampling improves participation in cervical screening for never and under-screened women," says Mr Wrede. "And that most women with HPV detected then have appropriate clinical investigation."

### Improving models of care for women with cancer

**Associate Professor Orla McNally**

The Women's Cancer Research Centre develops evidence-based, patient-centred models of care to improve outcomes for women with endometrial and ovarian cancer. "We place the patient at the centre of our model of care and the option to participate in research is embedded within the care plan for every patient," says Associate Professor Orla McNally.

Women diagnosed with ovarian cancer are more likely to have the gene variations of BRCA1 and BRCA2, which are also associated with breast cancer. Current Australian practice is for women diagnosed with ovarian cancer to be referred to a separate familial cancer clinic and a subsequent appointment arranged with genetic counsellors.

Our new model of care introduces a genetic counsellor into the gynaecology oncology team to meet with patients shortly after their ovarian/fallopian tube cancer diagnosis. This streamlines the patient's genetic counselling with their cancer treatment. It enables earlier identification of any gene mutation, which may influence treatment, as well as informing other family members so they can consider testing and ultimately take measures to reduce their own risk of developing cancer.

There has been an important and growing interest in a holistic approach to care following cancer treatment as many people survive longer. For women with endometrial cancer follow-up has historically focused on the disease and not on the broader health of the woman. Women who have been treated for endometrial cancer are much more likely to die from a disease other than cancer, and so it is extremely important that we see the cancer diagnosis for these women as an opportunity to address their other health issues. Through a multidisciplinary research project involving primary care doctors, surgeons, nurses, dietician, physiotherapists and consumers, we developed a holistic model of care in a one stop survivor clinic.

"The benefits of these new models of care are immense," says Associate Professor McNally. "They are providing women with the knowledge to make informed choices about their health and wellbeing and are more effectively ensuring that all of their interrelated health needs are taken into consideration."

# WOMEN'S PREGNANCY RESEARCH CENTRE



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

DIRECTOR, PROFESSOR SHAUN BRENNECKE

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, pre-eclampsia, fetal growth restriction, gestational diabetes and preterm labour.

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

#### Director

Professor Shaun Brennecke

#### Deputy Head of Research

Dr Bill Kalionis

### RESEARCH SUMMARY

Clinical trials:	3
Publications:	41
Grants funding held:	\$170,000
Grants funding spent at the Women's:	\$150,000

#### Key publications

- Hughes K, Kane SC, Araujo Junior E, Da Silva Costa F, Sheehan P. Short cervical length as a predictor of spontaneous preterm birth in high-risk pregnancy – current knowledge. *Ultrasound in Obstetrics and Gynaecology* 2016;48(1):7–15.
- McNamara HC, Kane SC, Craig JM, Short RV, Umstad MP. A review of the mechanisms and evidence for typical and atypical twinning. *Am J Obstet Gynecol* 2016;214(2):172–91.
- Qin SQ, Kusuma GD, Al-Sowayan B, Pace RA, Isenmann S, Pertile MD, Gronthos S, Abumaree MH, Brennecke SP, Kalionis B. Establishment and characterization of fetal and maternal mesenchymal stem/stromal cell lines from the human term placenta. *Placenta* 2016;39:134–136.
- Panagodage S, Juen Yong HE, Da Silva Costa F, Borg AJ, Kalionis B, Brennecke SP, Murthi P. Low-Dose Acetylsalicylic Acid Treatment Modulates the Production of Cytokines and Improves Trophoblast Function in an in Vitro Model of Early-Onset Preeclampsia. *Am J Pathol*. 2016;186(12):3217–3224.
- Zeisler H, Chantraine F, Vatish M, Staff AC, Sennström M, Olovsson M, Brennecke SP, Stepan H, Allegranza D, Dilba P, Schoedl M, Hund M, Verlohren S. Predictive Value of the sFit-1:PIGF Ratio in Women with Suspected Preeclampsia. *The New England Journal of Medicine* 2016;374(1):13–22.

### RESEARCH HIGHLIGHTS



#### Can preterm birth be prevented by a cervical pessary?

Associate Professor Ricardo Palma-Dias, Dr Penny Sheehan

Preventing preterm birth, the leading cause of neonatal and infant death and disability, is a priority for research teams worldwide.

At the Women's, a team led by Associate Professor Ricardo Palma-Dias and Dr Penny Sheehan, joined nine international research centres to investigate the potential benefits of using a cervical pessary as a preventative intervention for women with a short cervix. This condition is associated with an increased risk of preterm birth.

"There was a possibility that a cervical pessary could help prevent preterm birth in this high risk group," says Associate Professor Ricardo Palma-Dias. However, the evidence was not clear, which is why it was important to clinically examine this intervention in a large number of patients.

"Research needs to continue to understand the cause for preterm birth."

A clinical trial with 935 pregnant women across nine countries, including patients from the Women's, was undertaken.

The trial investigated the theory that a rubber pessary could support the cervix and reduce pressure on the cervical canal from the developing fetus.

Despite promising results from earlier studies, this study showed that placement of a cervical pessary in pregnant women with a short cervix did not result in lower rates of preterm birth. "The study concluded that there was no significant difference," says Associate Professor Palma Dias.

This result illustrates the importance of large clinical trials in providing evidence for new therapies and the importance of waiting for the results of such trials before the widespread adoption of new treatments.

#### A new way of diagnosing gestational diabetes

Dr Tom Cade

Up to eight per cent of women will develop gestational diabetes during pregnancy, which can have serious health implications for mother and baby.

A change in diagnostic testing was recommended by the World Health Organisation, due to new research data on the relationship between glycaemia and pregnancy outcomes.

Head of the Women's Diabetes Clinic, Dr Tom Cade, is undertaking research on gestational diabetes and changes to the way it is diagnosed.

"The aim of the research is to assess whether the new criteria for gestational diabetes results in better maternal and neonatal outcomes and if the change is economically beneficial to public health," says Dr Cade.

"Research on gestational diabetes is vital if we are to improve women's health outcomes."

The research compares all women seen through the Women's Diabetes Clinic in 2014 treated under the old diagnostic system and all those who attended from 2016 under the new system.

"Gestational diabetes is one of the big three conditions of pregnancy along with preterm birth and pre-eclampsia that affect large numbers of patients," says Dr Cade.

"As well as causing suffering to women and babies, it poses a large cost and workload burden on the health system."

"Research on gestational diabetes is vital if we are to improve women's health outcomes as well as efficiencies in the health system," he says.

Results of the study will be available in late 2017 and Dr Cade said he hoped the research would indicate whether some women identified early as at risk of gestational diabetes would benefit from treatment as simple as dietary and lifestyle modification.



# CENTRE FOR WOMEN'S MENTAL HEALTH

**“There is growing recognition that an emotionally healthy life starts in infancy.”**

**DIRECTOR, PROFESSOR LOUISE NEWMAN**

The Centre for Women's Mental Health was established in 2007 to provide clinical services, undertake research and provide 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 menopause, and issues in sexual health. Programs in early parenting and dealing with postnatal mood disorder and anxiety are being evaluated. The centre offers support where social factors such as family violence, substance misuse and refugee status impact wellbeing and psychological health.

**Director**  
Professor Louise Newman

## RESEARCH SUMMARY

Clinical trials:	1
Publications:	18
Grants funding held:	\$670,000
Grants funding spent at the Women's:	\$500,000

### Key publications

1. Bryant C, Cockburn R, Plante AF, Chia A. The psychological profile of women presenting to a multidisciplinary clinic for chronic pelvic pain: high levels of psychological dysfunction and implications for practice. *Journal of Pain Research* 2016;9(9):1049–1056.
2. Newman L, Judd F, Olsson CA, Castle D, Bousman C, Sheehan P, Pantelis C, Craig JM, Komiti A, Everall I. Early origins of mental disorder – risk factors in the perinatal and infant period. *BMC Psychiatry* 2016;16, 270.
3. Stafford L, Komiti A, Bousman C, Judd F, Gibson P, Mann GB, Quinn M. Predictors of depression and anxiety symptom trajectories in the 24 months following diagnosis of breast or gynaecological cancer. *The Breast* 2016;26:100–105.
4. Tatnell R, Hasking P, Newman L, Taffe J, Martin G. Attachment, Emotion Regulation, Childhood Abuse and Assault: Examining Predictors of NSSI Among Adolescents. *Archives of Suicide Research* 2016;11:1–11.
5. Unkenstein AE, Bryant CA, Judd FK, Ong B, Kinsella GJ. Understanding women's experience of memory over the menopausal transition: subjective and objective memory in pre-, peri-, and postmenopausal women. *Menopause* 2016;23(12):1319–1329.

## RESEARCH HIGHLIGHTS



### The BEAR Project: improving the health of mothers and their babies

**Professor Louise Newman**

A healthy start to emotional life begins in infancy. Having a positive relationship and secure attachment to her child helps a mother manage stressful situations and improves the emotional health of the child.

BEAR (Building Early Attachment Resilience) is a research project that looks at effective ways to support parents and their babies before and after birth.

The BEAR project targets pregnant women with risk factors such as anxiety and depression, and a background of attachment difficulties. Through BEAR, women can attend MindBabyBody, an antenatal group program that focuses on transition to parenthood and managing anxiety.

**“Women who attended the programs demonstrated fewer depression and anxiety symptoms”**

MindBabyBody teaches mindfulness meditation to women at risk of postnatal depression. Women may also attend Parenting with Feeling, a postnatal mother/infant group program aimed at improving the mother's relationship with their infant. The Parenting with Feeling program also teaches mothers with mental health issues how to better interact with their baby.

The BEAR project is a collaboration between the Women's, University of Melbourne, Resilience Australia and Mental Health Foundation Australia and is funded by Liptember.

More than 100 women have enrolled in the study to date. So far, the centre has delivered eight MindBabyBody programs and eight Parenting with Feeling programs. In addition, training sessions have been delivered to Women's staff to allow them to co-facilitate group programs.

“There is growing recognition that an emotionally healthy life starts in infancy,” says Professor Louise Newman.

“Early findings of the study show women who attended the programs demonstrated fewer depression and anxiety symptoms.”

### Educational intervention to support parents with cancer who have young children

**Dr Lesley Stafford**

Parental cancer impacts the entire family. Parents with cancer have high rates of anxiety and depression, and their children are at increased risk of poor psychosocial outcomes, as a result of parental distress and poor family communication.

“Parents express concerns about the impact of cancer on their children and report a lack of professional guidance in meeting their children's needs,” says Dr Stafford, Senior Clinical Psychologist, Oncology. “Accessible interventions for parents affected by cancer are lacking”.

A two-year program of research at the Women's will develop and pilot test a brief psycho-educational intervention to support parents with cancer who have young children.

The Enhancing Parenting in Cancer (EPIC) intervention aims to increase parenting confidence, decrease parental psychological morbidity and stress and enhance children's psychosocial adjustment to parental cancer.

A two-year program of research at the Women's will develop and pilot test a brief psycho-educational intervention to support parents with cancer who have young children.

The EPIC intervention aims to increase parenting confidence, decrease parental psychological morbidity and stress and enhance children's psychosocial adjustment to parental cancer.

The intervention will comprise an audiovisual resource, a question prompt list, and a telephone call to review, consolidate and provide additional resources or supports.

The target population of the intervention comprises adult cancer patients and their partners who have children aged three to 12. Participation is open to all parents with any form of cancer.

“The research will provide evidence based intervention tools to assist parents during a difficult time,” says Dr Stafford.

# MIDWIFERY AND MATERNITY SERVICES RESEARCH UNIT



**“Creating healthy communities and societies starts with healthy mothers and babies – our vision is to ensure the best pregnancy and birth outcomes for the women in our care, and to be leaders in maternity care innovation and reform.”**

DIRECTOR, PROFESSOR DELLA FORSTER

## The Midwifery and Maternity Services Research Unit is dedicated to exploring the care we provide to women attending the hospital in pregnancy or childbirth to ensure it is the highest quality evidence-based care.

As part of this, we actively seek the views of women and staff on aspects of their experience. We develop new approaches to care provision, for example, around models of care, or how to improve breastfeeding outcomes, and test these in randomised controlled trials.

We also focus on building research capacity among midwives, nurses and allied health clinicians.

### Director

Professor Della Forster

### RESEARCH SUMMARY

Clinical trials:	0
Publications:	15
Grants funding held:	\$330,000
Grants funding spent at the Women's:	\$140,000

### Key publications

- Forster D, McLachlan H, Davey M-A, Biro M, Farrell T, Gold L, Flood M, Shafiei T, Waldenström U. Continuity of care by a primary midwife (caseload midwifery) increases women's satisfaction with antenatal, intrapartum and postpartum care. The COSMOS randomised controlled trial. *BMC Pregnancy Childbirth* 2016;6(18).
- McLachlan H, Forster D, Davey M-A, Farrell T, Flood M, Shafiei T, Waldenström U. The effect of primary midwife-led care on women's experience of childbirth: results from the COSMOS randomised controlled trial. *BJOG* 2016;123(3):465–474.
- Johns H, Amir L, McLachlan L, Forster D. Breast pump use amongst mothers of healthy term infants in Melbourne, Australia: a prospective cohort study. *Midwifery* 2016;33 82–89.
- De Bortoli J, Amir L. Is onset of lactation delayed in women with diabetes in pregnancy? A systematic review. *Diabet Med* 2016;33(1):17–24.
- Dawson K, McLachlan H, Newton M, Forster D. Implementing caseload midwifery: exploring the views of maternity managers in Australia – a national cross-sectional survey. *Women Birth* 2016;29:214–222.

### RESEARCH HIGHLIGHTS



### Clinical midwives leading research projects at the Women's.

Robyn Matthews, Rebecca Hyde, Fleur Llewelyn, Professor Della Forster

Two large research projects at the Women's are being led by our clinical midwives, ensuring that the research is embedded in the clinical setting, and driven by what matters to clinicians and women accessing our services.

The first study, EXPERT, explores the views and experiences of nurses and midwives at the Women's. It examines how nurses and midwives feel about working at the hospital, and the factors they consider important when thinking about expertise and skill mix. It also measures levels of satisfaction and burnout. There is very little evidence available internationally on these topics. Evidence is currently being analysed from responses received from 672 nurses and midwives.

**"[The study] examines how nurses and midwives feel about work ... and measures levels of satisfaction and burnout."**

Robyn Matthews and Rebecca Hyde have led the work, along with Fleur Llewelyn and Della Forster. Robyn Matthews has enrolled in a research higher degree using the EXPERT study as her focus.

The second study, Your Views Matter, explores the views and experiences of parents who have had a baby admitted to the Women's Newborn Intensive Care Unit. Based on a survey sent to approximately 1,000 parents when their babies reach six months of age, this study is a collaboration between our research unit, staff from the Newborn Intensive Care Unit and consumers.

"Understanding the experiences of parents of infants admitted to Neonatal Services at the Women's provides the evidence to improve the care we provide," says Professor Della Forster.

This study is a good example of how the Women's places patients and consumers at the heart of everything we do.

### Implementing continuity of midwifery care for Aboriginal and Torres Strait Islander women – a research translation project

Professor Della Forster

In Australia, maternal mortality, low birth weight, preterm birth, perinatal death and infant mortality are substantially higher for Aboriginal and Torres Strait Islander mothers and babies. Strategies to improve outcomes are urgently needed.

Caseload midwifery provides continuity of care from a known midwife during pregnancy, labour, birth and postpartum. It is considered to be the gold standard in maternity care, and is associated with better clinical and psychosocial outcomes.

"Unfortunately, few Aboriginal women have access to this model of care," says Professor Della Forster.

"Our research aims to improve the health of Aboriginal mothers and babies by embedding a sustainable caseload model specifically for Aboriginal women."

One regional (Goulburn Valley Health) and three metropolitan hospitals (the Women's, Mercy and Western Health) will implement and proactively offer caseload midwifery to Aboriginal women and non-Aboriginal women having Aboriginal babies.

The research project will measure clinical outcomes, caseload uptake, economic impact, and explore the acceptability of the model to Aboriginal women. Models will be developed iteratively, be site specific and will enhance, rather than replace current systems. While each of the sites has an existing caseload model, until now Aboriginal women have not been proactively offered caseload care.

The research team (which includes Aboriginal and non-Aboriginal investigators) is working with the Aboriginal hospital teams and community-based organisations to implement this new model of care. Engagement with all key stakeholders including the project's Aboriginal Advisory Committee and the Victorian Aboriginal Community Controlled Health Organisation is critical.



# ALLIED HEALTH RESEARCH CENTRE

“Our multi-disciplinary allied health team is working to prevent, diagnose and treat a range of conditions and illnesses to provide the best patient outcomes.”

DIRECTOR, SANDRA GATES

Allied health and clinical support services research is one of the newer research centres at the Women’s and is continuing to develop.

Research in this area involves work pertaining to single allied health disciplines as well as collaboration with other Women’s research centres and services.

There are four major departments that contribute to allied health research. They are pharmacy, nutrition and dietetics, social work and physiotherapy. Each of these areas is concerned with exploring various clinical conditions and participates in clinical research to determine evidence based interventions and treatment for patients.

The Women’s pharmacy department and the Pauline Gandel Women’s Imaging Centre also play a pivotal role in research conducted by other services. Without their participation various research projects at the Women’s would not be possible.

**Director** Sandra Gates

## RESEARCH SUMMARY

Clinical trials (recruited):	1
Clinical trials (involved in):	18
Publications	15
Grants funding held:	\$16,000
Grants funding spent at the Women’s:	\$30,000

## Key publications

1. Ter M, Halibullah I, Leung L, Jacobs S. Implementation of dextrose gel in the management of neonatal hypoglycaemia. *J Pediatr Child Health* 2016 Nov.
2. Spittle A, Treyvaud K. The role of early developmental intervention to influence neurobehavioral outcomes of children born preterm. *Semin Perinatol* 2016; 40 (8): 542–548.
3. Olsen JE, Brown NC, Eeles AL, et al. Early general movements and brain magnetic resonance imaging at term-equivalent age in infants born <30weeks’ gestation. *Early Hum Dev* 2016;101:63–68.
4. Spittle AJ, Olsen J, Kwong A, Doyle LW, Marschik PB, Einspieler C, Cheong J. The Baby Moves prospective cohort study protocol: using a smartphone application with the General Movements Assessment to predict neurodevelopmental outcomes at age 2 years for extremely preterm or extremely low birth weight infants. *BMJ Open* 2016;6(10).
5. Lee A, Belski R, Radcliffe J, Newton M. What do pregnant women know about the healthy eating guidelines for pregnancy? A web-based questionnaire. *Maternal Child Health J* 2016; 20(10): 2179–2188.

## RESEARCH HIGHLIGHTS



### 'Baby Moves' smartphone app for the early detection of cerebral palsy.

**Associate Professor Alicia Spittle, Dr Joy Olsen**

Motor problems, ranging from clumsiness to cerebral palsy, are some of the most common adverse outcomes in children born preterm. Early detection and intervention for infants at high risk of cerebral palsy can result in better health outcomes.

Associate Professor Alicia Spittle, physiotherapist, and Dr Joy Olsen, occupational therapist, have developed a smartphone app called "Baby Moves" that can be used by the parents of preterm babies at home to assist in the early detection of motor problems. Approximately 250 extremely preterm babies and 250 full term infants will be recruited into the research project, which is part of the VICS study (Victorian Infant Collaborative Study) a longitudinal exploration of people born preterm.

**"Early detection of cerebral palsy will mean better health outcomes"**

Parents download the app on their smartphone prior to leaving the Women's. When their baby is three months corrected age, they use the app to record their baby's movements for three minutes. The video is sent via a secure platform for clinical review by a trained health professional using a tool known as the General Movements Assessment. Infants who have motor problems identified using the General Movements Assessment, are further assessed by the allied health team at the Women's and a management plan is developed in conjunction with the family.

"Currently, the average age of diagnosis of cerebral palsy is 19 months," says Associate Professor Spittle.

"Using our app we aim to detect infants at an increased risk of cerebral palsy or other developmental impairments at just three months and thus commence intervention much earlier."

### Exploring pregnancy nutrition knowledge and behaviours or practices among pregnant women and antenatal care providers in Australia.

**Dr Amelia Lee**

Nutrition plays an important role in maternal and infant health during pregnancy. Recent Australian evidence, however, shows that dietary intake of pregnant women does not meet current national recommendations.

The aim of this study was to explore nutrition education practices of antenatal care providers (including doctors and midwives) and the understanding of pregnant women about healthy eating guidelines.

This study found that women and the health providers caring for them knew of the importance of folic acid and its role in preventing neural tube defects, abstaining from alcohol during pregnancy, and identifying sliced meats and feta cheese as high Listeria risk foods. However, women and providers both had limited knowledge of the importance and need for iodine during pregnancy, the core food group recommendations for pregnant women, other than fruit, weight gain recommendations, identifying other high Listeria risk foods and identifying high mercury containing fish.

While most clinicians reported giving nutritional advice, few women reported receiving it, and subsequently relied on the internet. Health care providers said they relied on dietitians and print resources to update their nutrition knowledge.

This study also found that not knowing enough about healthy eating guidelines for pregnancy made it challenging for most women to consume diets that would meet their nutritional needs and created a barrier for antenatal care providers to giving nutrition advice.

"The findings highlight the need for targeted nutrition education for pregnant women and their health care practitioners," says Dr Amelia Lee.

Opportunities exist to implement healthy eating sessions for pregnant women, either face to face or online, for example. For providers, nutrition education training modules could be developed and offered as part of continuing professional development.



# ANAESTHETICS RESEARCH CENTRE

**"Anaesthesia is the silent and unrecognised modern wonder of the world. Pregnancy and childbirth have been revolutionised by anaesthesia, which saves lives and reduces maternal suffering."**

**DIRECTOR, ASSOCIATE PROFESSOR ALICIA DENNIS**

## The goal of the Department of Anaesthetics' Obstetric Anaesthesia Research Program is to achieve optimal maternal health before, during and after birth with the goal of reducing maternal suffering and death.

The department addresses the problem of high blood pressure in pregnant women and obstetric critical illness.

We are establishing an internationally recognised clinical research program in obstetric haemodynamics and cardiovascular medicine, heart ultrasound (transthoracic echocardiography) in pregnant women, and in cardiac magnetic resonance.

Our innovative studies increase understanding of heart function and structure in pregnant women and the cause of pre-eclampsia. In our recently published unified theory of pre-eclampsia, we suggest that there are a number of factors that contribute to pregnant women developing high blood pressure.

### RESEARCH SUMMARY

Clinical trials:	4
Publications:	9
Grants funding held:	\$120,000
Grants funding spent at the Women's:	\$60,000

### Key publications

1. Dennis AT, Hardy L. Defining a reference range for vital signs in healthy term pregnant women. *Anaesthesia and Intensive Care* 2016; 44(6): 752–757.
2. Dennis AT, Mulligan S. Analgesic requirements and pain experience after caesarean section under neuraxial anaesthesia in women with pre-eclampsia. *Hypertension in Pregnancy* 2016; 35(4):520–5282.
3. Dennis AT. Science, Sex and Society – Why maternal mortality is still a global health issue. *Anaesthesia* 2016;71(9):1003–7.
4. Dennis AT. Valvular heart disease in pregnancy. *International Journal of Obstetric Anaesthesia* 2016;25(1):4–8.
5. Tan PCF, Dennis AT. High flow humidified nasal pre-oxygenation in pregnant women. *Anaesthesia* 2016;71:847–488.

Through our focused bedside testing of pregnant women with pre-eclampsia we have gained a dynamic and unique insight into this condition.

### Director

Associate Professor Alicia Dennis

### RESEARCH HIGHLIGHTS



### Cardiovascular fitness screening and prediction of disease in women in late pregnancy.

Associate Professor Alicia Dennis

Pre-eclampsia is the most common cardiovascular complication of pregnancy and is a leading cause of maternal morbidity and mortality worldwide. More than 75 per cent of pre-eclampsia cases occur after the 36th week of pregnancy. In this study, our goal was to examine the role of cardiovascular fitness in the development of pre-eclampsia. We wanted to explore whether testing fitness during pregnancy could be a useful screening tool and predictor of disease in women in late pregnancy.

At the Women's, we designed and led a three-centre international study to examine the use of the Six Minute Walk Test in pregnant women. This test measures the speed and distance walked in six minutes.

The test was performed at three hospitals (the Women's in Melbourne, Chelsea and Westminster Hospital, London, and Mowbray Maternity Hospital, Cape Town) by a total of 300 healthy late pregnancy women having their first baby.

This study, the largest of its kind in the world, measured the distance the women walked as well as heart rate, blood pressure, oxygen levels and respiratory rate before and after exercise.

We found that the average distance walked was approximately 490 metres and the average walking speed was five km/hr. Nearly 50 per cent of women recovered to their baseline heart rate within five minutes.

This study was the first to measure heart rate recovery after exercise in pregnant women and to determine the average healthy walking speed in late pregnancy. This simple assessment of walking speed can enable us to identify women with breathing and heart problems, who may walk slower during this test, earlier in pregnancy and commence treatment and monitoring to improve their condition.

These results will now form the basis of future work examining cardiovascular fitness, prediction of disease and intervention in women in late pregnancy.

### Monitoring heart structure in women with pre-eclampsia using non-invasive techniques

Associate Professor Alicia Dennis

Pre-eclampsia, or maternal high blood pressure, affects one in 20 pregnancies. It is the most common reason to be admitted to an intensive care unit during pregnancy, and is responsible for 20 per cent of all maternal deaths.

The complications of high blood pressure during pregnancy include kidney and heart failure, breathing problems and stroke, and are directly related to heart function and changes in blood flow.

"These innovative techniques will enable clinicians to more easily identify [women] at risk of pre-eclampsia"

At the Women's, we are monitoring the heart function in women with pre-eclampsia using non-invasive technologies including ultrasound, transthoracic echocardiography and cardiovascular magnetic resonance.

These innovative techniques allow us to accurately image the heart and assess changes in heart structure and function. These non-invasive techniques are proving feasible and acceptable in healthy pregnant women and in women with pre-eclampsia.

Our ongoing work, using these safe methods of investigation, will improve our understanding of changes to the cardiovascular system during pre-eclampsia. It will also lead to better monitoring and use of different medications to reduce complications in pre-eclampsia.



# CENTRE FOR FAMILY VIOLENCE PREVENTION

“Family violence has a major impact on the health and wellbeing of women, children, wider family networks and society as a whole. This new Family Violence Prevention Centre at the Women’s has at its core, early intervention as a catalyst for preventing violence against women and children.”

DIRECTOR, PROFESSOR KELSEY HEGARTY

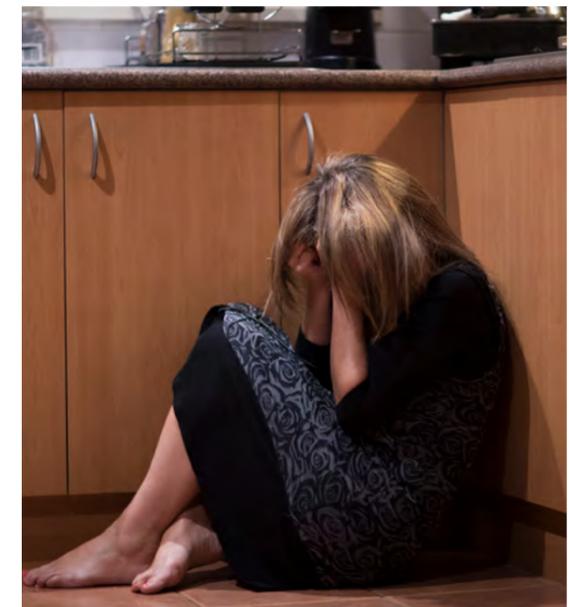
Launched in September 2016, this new research centre focuses on improving the safety, health and wellbeing of women and their families experiencing family violence.

Led by Professor Kelsey Hegarty, the centre brings together a team of interdisciplinary researchers including clinicians, social scientists, statisticians, early career researchers and students.

The centre will:

- co-design and test health interventions, including use of technologies, for identification, early intervention and responses for women of all ages and backgrounds
- further develop an effective, evidence-based systematic family violence model of workplace care and support for employees
- engage in knowledge translation activities to disseminate findings to practitioners and policy makers
- work collaboratively to promote knowledge exchange and build research capacity in the area of family violence across the hospital and in the community.

The centre aims to become a hub for the development of innovative interventions including identification tools, early intervention and therapeutic responses to assist women experiencing family violence. Novel technological responses to promote access to help for women, children and men will be further developed.



“The centre aims to become a hub for innovative intervention development ... and to build the evidence base for best practice in hospitals.”

Health practitioners are crucial to early intervention given their pivotal role in family violence identification, safety assessment, and response and referral capacity. The World Health Organization recommends a broad systems-based approach to enable sustained change in health practitioner behaviour.

Evaluation of educational and health system interventions in the complex hospital setting will support Women’s staff to undertake this challenging work and provide statewide leadership in mentoring other health services.

A key strategy of the centre is to connect with survivors and practitioners in different areas at the Women’s, provide evidence to inform strategy and to collaborate with national and international stakeholders, including the World Health Organization to ensure the centre will build the evidence base for best practice in hospitals.

This research will support services to successfully develop the skills of health professionals in identifying and responding to family violence through training and clinical practice improvements.

**Director**  
Professor Kelsey Hegarty



# RESEARCH HIGHLIGHTS

“At the Women’s we are creating an environment of research excellence where our people can undertake and publish cutting edge studies that change lives and outcomes for women and newborns.”

DIRECTOR OF RESEARCH, PROFESSOR PETER ROGERS

## RESEARCH STUDENT COMPLETIONS

### Doctor of Philosophy (PhD)

Allinson L, PhD, Uni Melb. *Neurobehavioural Development of Infants Born <30 weeks’ Gestational Age Between Birth and One Year Corrected Age*. Supervisors: Spittle A, Doyle L.

Gerber K, PhD, Uni Melb, *End of life decision making*. Supervisor: Bryant C.

Gunatillake T, PhD, Uni Melb. *The role of placental heparin sulphate proteoglycans in the pathogenesis of pre-eclampsia*. Supervisors: Said J, Brennecke S.

Lee A, PhD, La Trobe Uni. *Exploring pregnancy nutrition knowledge and behaviours among pregnant women and antenatal care providers in Australia 1 day per week*. Supervisors: Belski R, Gasparini E.

Samardzija C, PhD, Uni Melb. *The role of embryonic stem cell factor Oct4A in epithelial ovarian cancer*. Supervisors: Nuzhat A, Findlay J, Quinn M.

Yong H, PhD, Uni Melb. *Characterisation of maternal pre-eclampsia susceptibility genes*. Supervisors: Keogh R, Kalionis B, Murthi P, Brennecke S.

### Bachelor (Honours) Students

Aicken M, BMedSc, Notre Dame. *Maternal outcomes in the presence of low lying / marginal placenta previa*. Supervisors: Brennecke S, Palma Dias R.

Allingham C, BSc(Hons), Uni Melb. *Development and evaluation of a novel, electronic, fertility preservation decision aid for parents of children with cancer at The Royal Children’s Hospital, Melbourne*. Supervisors: Peate M, Jayasinghe Y, Kemertzis M, Gillam L.

Bahn J, BSc (Hons), Uni Melb. *Cytokine expression profiling and function of decidual mesenchymal stem cells from aging term placentae*. Supervisors: Kalionis B, Georgiou HM, Kokkinos M.

Colgrave E, BSc(Hons), Uni Melb. *Evaluating risk genes for endometriosis*. Supervisors: Holdsworth-Carson S, Girling J.

Gebrehiwot P, BSc (Hons), Uni Melb. *Timing of Cord Clamping (TOCC)*. Supervisors: Dawson J, Davis P.

Hand M, BSc(Hons), Uni Melb. *Development and evaluation of a fertility preservation electronic support tool for paediatric clinicians*. Supervisors: Jayasinghe Y, Peate M, Kemertzis M, Gillam L.

Jayasuriya S, BSc(Hons), Monash Uni. *Decision regret regarding fertility preservation in the paediatric, adolescent and young adult cancer population*. Supervisors: Jayasinghe Y, Peate M, Kemertzis M, Gillam L, Downie P.

Muralli A, BSc (Hons), Uni Melb. *Effect of skin-to-skin contact compared with incubator care on cerebral oxygenation in preterm infants on respiratory support (NIRS)*. Supervisors: Dawson J, Davis P.

### Scholarly Selective MD students

Chollangi T, SSMD, Uni Melb. *Placental vitamin D levels in normal and fetal growth restricted pregnancies*. Supervisors: Brennecke S, Georgiou HM, Murthi P.

Forbes M, SSMD, Uni Melb. *An evaluation of Cooke’s catheters for induction of labour*. Supervisors: Brennecke S, Du Plessis K.

Hardy L, SSMD, Uni Melb. *Defining a reference range for vital signs in healthy term pregnant women*. Supervisor: Dennis A

Huiyan S, SSMD, Uni Melb. *Outcomes following previability prelabour premature rupture of membranes (PPROM)*. Supervisor: Sheehan P.

Kamania J, SSMD, Uni Melb. *Immediate birth – an analysis of babies undergoing time critical birth in a tertiary referral obstetric hospital*. Supervisor: Dennis A

Knox B, SSMD, Uni Melb. *Gestational trophoblastic disease and preeclampsia*. Supervisor: Dennis A

Paxton E, SSMD, Uni Melb. *The Six Minute Walk Test in term pregnant women*. Supervisor: Dennis A

Ward P, SSMD, Uni Melb. *Does fetal death of the leading twin increase the risk of adverse outcome in a twin pregnancy?* Supervisors: Umstad M, Reidy K.

Warren M, SSMD, Uni Melb. *Immediate birth – an analysis of women undergoing time critical birth in a tertiary referral obstetric hospital*. Supervisor: Dennis A

Wookey A, SSMD, Uni Melb. *Placental vitamin D levels in normal and fetal growth restricted pregnancies*. Supervisors: Brennecke S, Georgiou HM, Murthi P.

### Medicine

Ferguson K, MBBS Research project, Deakin Uni. *Prostaglandin (PGE1) in very preterm infants with congenital heart disease*. Supervisors: Manley B, Davis P.

# PUBLICATIONS

A total of 255 papers were published in peer reviewed medical journals by the Women's in 2016. 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 are 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 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 2016 publications is available on the Women's website at <https://www.thewomens.org.au/>.

Australia B-I, United Kingdom Collaborative G, Tarnow-Mordi W, Stenson B, Kirby A, Juszczak E, et al. Outcomes of Two Trials of Oxygen-Saturation Targets in Preterm Infants. *The New England Journal of Medicine*. 2016;374(8):749–60.

Alsop K, Thorne H, Sandhu S, Hamilton A, Mintoff C, Christie E, et al. A community-based model of rapid autopsy in end-stage cancer patients. *Nature Biotechnology*. 2016;34(10):1010–4

Ford-Gilboe M, Wathen CN, Varcoe C, MacMillan HL, Scott-Storey K, Mantler T, et al. Development of a brief measure of intimate partner violence experiences: the Composite Abuse Scale (Revised)-Short Form (CASR-SF). *BMJ Open*. 2016;6(12):e012824.

Giffard PM, Brenner NC, Tabrizi SN, Garland SM, Holt DC, Andersson P, et al. Chlamydia trachomatis genotypes in a cross-sectional study of urogenital samples from remote Northern and Central Australia. *BMJ Open*. 2016;6(1):e009624.

Hegarty KL, Tarzia L. Perinatal depressive symptoms preceded by mental health problems. *Lancet* (London, England). 2016;387(10014):125–6.

Knight AK, Craig JM, Theda C, Baekvad-Hansen M, Bybjerg-Grauholm J, Hansen CS, et al. An epigenetic clock for gestational age at birth based on blood methylation data. *Genome Biology*. 2016;17(1):206.

McLachlan H, Forster D, Amir L, Cullinane M, Shafiei T, Watson L, et al. Supporting breastfeeding In Local Communities (SILC) in Victoria, Australia: a cluster randomised controlled trial. *BMJ Open*. 2016;6(2):e008292.

Monson BB, Anderson PJ, Matthews LG, Neil JJ, Kapur K, Cheong JL, et al. Examination of the Pattern of Growth of Cerebral Tissue Volumes From Hospital Discharge to Early Childhood in Very Preterm Infants. *JAMA Pediatrics*. 2016;170(8):772–9.

Nicolaides KH, Syngelaki A, Poon LC, Picciarelli G, Tul N, Zamprakou A, et al. A Randomized Trial of a Cervical Pessary to Prevent Preterm Singleton Birth. *The New England Journal of Medicine*. 2016;374(11):1044–52.

Pace CC, Spittle AJ, Molesworth CM, Lee KJ, Northam EA, Cheong JL, et al. Evolution of Depression and Anxiety Symptoms in Parents of Very Preterm Infants During the Newborn Period. *JAMA Pediatrics*. 2016;170(9):863–70.

Roberts CT, Owen LS, Manley BJ, Froisland DH, Donath SM, Dalziel KM, et al. Nasal High-Flow Therapy for Primary Respiratory Support in Preterm Infants. *The New England Journal of Medicine*. 2016;375(12):1142–51.

Spittle AJ, Olsen J, Kwong A, Doyle LW, Marschik PB, Einspieler C, et al. The Baby Moves prospective cohort study protocol: using a smartphone application with the General Movements Assessment to predict neurodevelopmental outcomes at age 2 years for extremely preterm or extremely low birthweight infants. *BMJ Open*. 2016;6(10):e013446.

Wheeler CM, Skinner SR, Del Rosario-Raymundo MR, Garland SM, Chatterjee A, Lazcano-Ponce E, et al. Efficacy, safety, and immunogenicity of the human papillomavirus 16/18 AS04-adjuvanted vaccine in women older than 25 years: 7-year follow-up of the phase 3, double-blind, randomised controlled VIMIANE study. *The Lancet Infectious Diseases*. 2016;16(10):1154–68.

Zeisler H, Llurba E, Chantraine F, Vatish M, Staff AC, Sennstrom M, et al. Predictive Value of the sFlt-1:PIGF Ratio in Women with Suspected Preeclampsia. *The New England Journal of Medicine*. 2016;374(1):13–22.

# RESEARCH FUNDING

## National Health and Medical Research Council (NH&MRC) Grants 2016

### Centre for Clinical Research Excellence

Doyle LW, Davis P, Anderson P, Hunt R, Cheong J, Jacobs S, Roberts G, Spittle A, Thompson D, Dawson J. Centre for Research Excellence in Newborn Medicine. \$2,500,000; 2014–2018

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

### Partnership Grants

McLachlan H, Forster D, Kildea S, Freemantle C, Browne J, Jacobs S, Oats J, Donath S, Newton M, Chamberlain C. Improving the health of Aboriginal mothers and babies through continuity of midwife care. \$1,496,531.75; Dec 2015–2020

Teede H, Butler R, Robinson M, Vincent A, Anderson J, Tregloan L, Hart R, Hickey M. Early menopause: Implementation research using the experiences and perspectives of women and health professionals to Translate evidence into practice. \$390,074; 2016–2018

### Program Grants

Kaldor J, Garland SM, Fairley C, Law M, Grulich A. Discovery & translation of interventions to control sexually transmitted infections and their consequences. \$10,000,000; 2015–2019

### Project grants

Brown S, Nicholson J, Hegarty K, Mensah F, Gartland D, Woolhouse H, Hiscock H. Turning points: breaking intergenerational cycles of intimate partner abuse and social adversity. \$1,267,769; 2013–2017

Brown S, Gartland D, Giallo R, Herrman H, Glover K, Riggs E, Yelland J, Mensah F, Hegarty K, Casey S. The Childhood Resilience Study: building the evidence to reduce health inequalities across the lifecourse. \$1,030,579; 2014–2017.

Cheong J, Doyle L, Wark J, Cheung M, Irving L, Burnett A. Impact of extreme prematurity or extreme low birthweight on young adult health and well-being: The Victorian Infant Collaborative Study (VICS) 1991–92 Longitudinal Cohort. \$725,496; 2016–2018

Craig J, Theda C, Cheong J, Davis PG. Defining epigenetic predictors of long-term outcomes of preterm birth. \$398,872; 2015–2016

Crosbie, J. A computerised treatment planning system for synchrotron radiotherapy trials at the Australian Synchrotron Imaging & Medical Beamline. \$624,537; 2014–2016

Dargaville P, Kamlin O, Davis P. Randomised controlled trial of minimally invasive surfactant therapy in preterm infants 25–28 weeks gestation on continuous positive airway pressure. \$1,172,977; 2013–2017

Gunn J, Mihalopoulos C, Hegarty K, Williams A, Sterling L, Chondros P, Davidson S. A randomised trial of a clinical prediction tool for targeting depression care (Target-D). \$907,227; 2014–2017

Hickey M, Mitchell G, Wark J, Meisser B. What happens after surgical menopause (WHAM). \$495,335; 2013–2017.

Hooper S, Davis P, TePas A, Kitchen M. Optimising non-invasive ventilation at birth for preterm infants. \$735,912; 2016–2019

Hooper S, Wallace M, Polglase G, Kitchen M, Flemmer A, Thio M. Improving the neonatal transition in infants with a congenital diaphragmatic hernia. \$551,644; 2016–2018

Manley B, Buckmaster A, Davis P, Wright I, Owen L, Arnold G. Improving breathing support for newborn infants in non-tertiary centres: The HUNTER Trial. \$1,203,844; 2016–2019

Owen L, Manley B, Roberts C, Davis PG. Optimising early respiratory support for preterm infants: the HIPSTER trial. \$676,478.14; 2016–2018

Poynten M, Grulich A, Templeton D, Jin J, Tabrizi SN. Serological responses to anal HPV infection: Characterising the natural history of anal HPV. \$220,000; 2015–2017

Rogers P, Montgomery G, Girling J. Identification and function of genes that increase risk for endometriosis. \$1,180,912; 2016–2019

Spittle A, Anderson P, Doyle L, McGinley J, Clark R, Thompson D, Lee K, Cheong J. Motor trajectories of children born <30 weeks' gestation from birth to 5 years: early predictors and functional implications. \$668,387; 2016–2019

Tingay D, Davis PG. Volumetric vs pressure-defined ventilation strategies at birth. \$590,504; 2014–2016

Valley A, Castle P, Saville M, Brotherton J, Mola G, Lavu E, Kariwiga G, Kelly A, Cornall A, Simms K. Point-of-care HPV-DNA testing for cervical cancer screening in high-burden, low-resource settings. \$891,184.03; 2016–2019

## Personal support

Boland R. Career Development Award: Evaluating regionalised perinatal care in Victoria. \$132,667; 2015–2018

Cheong J. Early Career Fellowship: Aberrant brain development and long-term outcomes in high risk newborns. \$179,782; 2013–2016

Davis PG. Practitioner Fellowship: Improving the health of newborn infants. \$551,432; 2014–2018

Dennis A. Early Career Fellowship. Myocardial structure and function in pre-eclampsia using cardiac magnetic resonance and echocardiography. \$187,322; 2016–2019

Hickey M. Practitioner Fellowship: Advancing and promoting midlife health for women. \$452,004; 2014–2018

Jacobs S. Early Career Fellowship: Neurodevelopmental outcomes after novel interventions in newborn infants. \$182,299; 2014–2017

Kamlin O. Early Career Fellowship: Improving neonatal transition for compromised infants and minimising lung injury. \$182,298; 2014–2017

Kane S. Postgraduate Scholarship: Maternal ophthalmic artery doppler waveform analysis in the assessment and management of pre-eclampsia. \$90,628; 2015–2017

Manley B. Early Career Fellowship: Breathing easier: optimising non-invasive ventilation of preterm infants. \$258,605; 2015–2018

Owen L. Early Career Fellowship: Right from the start: improving respiratory support for preterm infants from their first breath to independent breathing. \$258,605; 2015–2018

Paiva, P. Early Career Development Fellowship: Understanding the mechanisms underlying major female reproductive disorders. \$361,540; 2011–2016

Rozen G. Postgraduate Scholarship: Uterine function following radiotherapy. \$120,671; 2015–2017

Spittle AJ. Early Career Fellowship: Improving neurodevelopmental outcomes of preterm infants. \$299,569; 2013–2016

Spittle AJ. Career Development Fellowship. Early detection and intervention for infants at high risk of motor impairments. \$419,180; 2016–2019

Thio M. Career Development Fellowship. Improving respiratory transition and outcomes of newborn infants. \$262,251; 2016–2019

# A DREAM COMES TRUE



Jodie was 23 and in her first year of teaching when she was diagnosed with follicular lymphoma in late 2009.

Jodie and her husband, both teachers, had always hoped to have children. Jodie says the cancer diagnosis was devastating. “I was hopeful I’d survive, but what if I can’t have kids? Our lives revolve around children,” she says.

Jodie was referred to the Women’s Dr Kate Stern for fertility preservation. “We were in the right place at the right time,” she says. When an IVF cycle to collect eggs for freezing was unsuccessful, Jodie was invited to join a clinical research trial on ovarian tissue grafting.

This process sees healthy ovarian tissue removed and stored, and then reimplanted after the person gets the medical all clear post cancer treatment. In Jodie’s case, a section of one ovary was placed in storage. “It was a bit of whirlwind, and then it was time to deal with the cancer,” she says.

Jodie had chemotherapy, radiotherapy and a bone marrow transplant. In 2013, when she was in remission, she had the stored ovarian tissue grafted near the ovary, and also in the abdominal wall.

After five cycles of IVF, Jodie became pregnant with Evie, now two, from the ovarian tissue grafted onto the abdominal wall. “It sounded so far-fetched to be able to grow eggs again from tissue that had been in the freezer,” says Jodie. “And even more unbelievable that it was through tissue not even where it should be, in the normal way.”

For Jodie and her family there is a sense of disbelief at how far medical research has come.

“It’s amazing to think about the possibilities, where things are going, and what is possible. It was a hard journey to achieve our dream of parenthood, but it has definitely been worth it,” says Jodie.

Jodie’s participation in this research program at the Women’s will hopefully support women and families into the future, and Jodie is grateful to have had access to the trial and its remarkable doctors. “We can’t thank them enough,” she says.

## DONATING TO THE WOMEN’S

Your donation will support quality research at the Women’s, now and into the future, so dreams come true for more women like Jodie who, along with many infants, too often face incredible health challenges.

**To donate, please visit [thewomens.org.au](http://thewomens.org.au), contact Jan Chisholm at the Women’s Foundation on 1300 194 955 or email [jan.chisholm@thewomens.org.au](mailto:jan.chisholm@thewomens.org.au) to discuss how you can also make a real difference to the lives of women and newborns.**

## Board Research Committee

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## Acknowledgement of traditional owners

The Royal Women's Hospital acknowledges and pays respect to the Kulin Nations, the traditional owners of the country on which our sites at Parkville and Sandringham stand.

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