Norman Beischer Medical Research Foundation TM

Annual Review 2024

Contents

History

The Foundation was established by Professor Norman Beischer in 1981 as the Mercy Maternity Hospital Research Foundation.

Its focus was to enable the funding of clinically based medical research, principally conducted by individuals associated with The University of Melbourne's Department of Obstetrics and Gynaecology.

The Foundation's name was changed to the Medical Research Foundation for Women and Babies in 1997. This was done to reflect its broader aim to support clinically based medical research conducted in Victoria into women's and babies' health issues, with particular focus on obstetric, gynaecological and neonatal conditions.

In 2015, after the death of Professor Beischer, the name of the Foundation was changed to the Norman Beischer Medical Research Foundation in recognition of Professor Beischer's lifelong contribution to, and participation in, medical research.

Acknowledgements

Thank you to the staff and researchers of the Hudson Institute of Medical Research, the families and patients of the Monash Medical Centre, the Mercy Hospital for Women, and The Royal Women's Hospital for agreeing to participate in the photography for inclusion in the annual review.

Norman Beischer Medical Research Foundation
ABN 26 005 864 282

Since its establishment 43 years ago, the Norman Beischer Medical Research Foundation has provided in excess of 300 research grants totalling more than $15 million in funding.

Norman Beischer Medical Research Foundation

The Norman Beischer Medical Research Foundation supports clinical research by medical practitioners, nurses, midwives and scientists engaged in the investigation of diseases and conditions that affect women and babies.

The Foundation actively supports research into obstetrics and the prevention, control and treatment of gynaecological diseases and related problems.

A key component of our support is to fund clinical and scientific research by leading and emerging researchers, and to use research to educate and inform medical practice in Australia and overseas.

Charter of Values

Honesty with each other and in all our dealings.

Rigour in the development, undertaking and reporting of research.

Transparency in disclosing and addressing conflicts of interests, the Foundation's operations, and in reporting research findings.

Fairness in the treatment of others.

Respect for everyone we deal with including, grant applicants, researchers, participants, the wider community, animals used in research, and the environment.

- Ensuring our researchers treat human participants and communities that are affected by research with care and respect, giving appropriate consideration to the needs of minority groups or vulnerable people.
- Ensure that respect underpins all decisions and actions that we take.

Recognition of the importance of including women and their babies in our research. We acknowledge the importance of including Aboriginal and Torres Strait Islander peoples, minority groups and vulnerable people in research. We support their engagement in research that affects their communities or is of particular significance to them.

Accountability for funding robust research and supporting and reporting of that research.

- We comply with relevant legislation, policies and guidelines.
- We ensure good stewardship of the resources of the Foundation and in the conduct of research.

Promotion of responsible of corporate practices.

- We promote and foster a research culture and environment that supports the responsible conduct of research.

Chair's report

As Chair of the Board, it is my great pleasure to report on the Foundation's activities in 2024.

It is our strong and stated aim to enable world-leading research in obstetrics and gynaecology to take place here in Melbourne.

The funding we have available to assign to different projects, is only as strong as the teams working on those projects. Equally, the Foundation is only as strong as the Board and those who form our various committees who are working to ensure that we can improve the lives of women, babies and infants.

We have reaped the long-term rewards from our Board renewal in 2023, with effective governance making possible the breadth of innovative projects the Foundation has overseen this year.

Two noteworthy projects were begun in 2024, spearheaded by Dr Teresa MacDonald and Dr Elena Tucker.

Dr MacDonald was awarded the Norman Beischer Clinical Research Fellowship in 2023 to develop better fetal growth detection practices. Stunted fetal growth is one of the key indicators of stillbirth, so more targeted scanning can help pregnant women and clinicians to monitor pregnancies which are at risk. Her team aims to use data they have collated this year to develop an antenatal tool which will use fetal measurements from a 20-week scan to provide an assessment of risk.

Dr Tucker's project was awarded the inaugural Norman Beischer Scientific Research Fellowship, designed to help researchers secure long-term funding and establish careers in research aligned with the Foundation's interests. The Fellowship program focuses on identifying and supporting researchers working to improve obstetric outcomes or addressing key issues in gynaecology or neonatology. Recipients are uniquely positioned to lead research with a clear, credible path to clinical application, ultimately enhancing patient care. The Fellowship enables researchers to dedicate time to their work, fostering long-term research careers.

Dr Tucker's project aims to better establish the role of genetics in premature ovarian insufficiency. Along with an early publication resulting from their discovery of a new gene variant, Dr Tucker's team hopes to discover other genes which indicate infertility. Her aim is to better understand what deficiencies might be present in women with premature ovarian insufficiency, which will provide the blueprint for a cost-effective genetic test.

We oversaw grants for projects with significant potential to improve fertility, pregnancy and infancy by reducing morbidity and mortality. The Norman Beischer Innovation Grants represent the cutting-edge of research in Australia and we are proud to outline some of these projects in this Annual Report.

This year has been marked by significant activity and progress, particularly in the Foundation's grant-making initiatives. The Board took a proactive step in ensuring strong governance and continuity by engaging an external search consultant to support the process of Board renewal. As a result, we welcomed Mrs Nicky Long and Mr Paul Broadfoot as directors, with Paul formally joining us at the start of 2024. Their addition strengthens our leadership and our Board's skill sets and enhances our ability to navigate future challenges while underpinning our ambition to be a globally recognised leader in research into obstetrics, gynaecology and neonatal health. It has been exciting to see the positive impact they have already had on the Foundation's ongoing work.

The Foundation's success is heavily reliant on the expertise and dedication of its committees. I extend my deepest gratitude to the members of the Research Committee and Fellowship Panel, whose diligent work in evaluating numerous applications ensures that only the most promising and impactful projects receive support. These committees lie at the heart of our mission, ensuring that we continue to foster groundbreaking research in areas vital to the health and wellbeing of women, babies and infants.

In these economically uncertain times, the oversight provided by our Investment Committee has been particularly commendable. Their careful management and monitoring of the Foundation's capital base has enabled us to continue funding critical research while maintaining financial stability.

I would like to sincerely thank all members of the Board and of the Board Committees for their invaluable contributions. Their dedication and voluntary efforts are critical in helping the Foundation fulfil its mission and uphold the vision of our founder, Professor Norman Beischer AO

Finally, I wish to extend my heartfelt appreciation to our Executive Director, Mr Andrew Brookes, whose steady leadership and tireless commitment have been instrumental in guiding the Foundation through a period of global uncertainty. Andrew's ability to manage diverse stakeholders while ensuring the smooth operation of the Foundation is truly commendable.

I am proud to share this brief summary of the Foundation's activities for inclusion in this annual review. With the dedication of our Board, Committees and staff, I am confident that we are well-positioned to continue advancing research that will make a lasting impact on the health of women, babies and infants.

Mr John C Fast

Non - Executive Chair

Executive Director's report

I am exceptionally proud to report on the groundbreaking clinical and scientific research which the Foundation facilitated in 2024.

Overall, this year we funded four active Research Fellowships and 12 innovation projects. Project funding for the Fellowships totalled $840,000. Our Innovation Grants, capped at $70,000 funding per project, totalled $738,350.

We oversaw Professor Lisa Hui's three-year fellowship project investigating congenital cytomegalovirus (CMV). This project's focus has been on preventing pregnancy complications and childhood disability due to CMV infection, with educational and clinical practice outputs. One of these outputs, an eLearning module accredited by the Royal Australian College of General Practitioners, has been made freely available to clinicians, with Professor Hui presenting webinars on CMV prevention for national and international audiences.

We are also seeing outcomes improve for women at risk of preterm birth as a result of 2023's Fellowship recipient Dr Clare Whitehead's fellowship project. Dr Whitehead's major output, the Platform for Adaptive Trials in Perinatal Units (PLATIPUS), is its versatility to perform multiple trials to get results more quickly. Already Dr Whitehead and her team have begun research into effective antibiotic use for mothers and newborns and the effects of caffeine in newborns to aid respiratory function.

While Associate Professor Brownfoot's fellowship finished up in December 2023, by being able to use fellowship funding to expand her team, she is well positioned to continue her world-leading research. This was recognised just recently with a $2.65 million business grant from the Australian Government through the Cooperative Research Centres Projects (CRC-P) program.

During 2024, the Foundation was again pleased to partner with Epworth Healthcare to present the annual Obstetrics and Gynaecology Symposium. The Symposium is a most informative day for healthcare professionals interested in obstetrics and gynaecology, with detailed presentations of the latest research including by clinician and scientific researchers funded by the Foundation. The Foundation was pleased to support Professor Jan Dickinson, from the University of Western Australia, to attend and to present at the Royal College of Obstetricians and Gynaecologists of Australia and New Zealand Annual Scientific Meeting as the Norman Beischer Visiting Professor. The Foundation also supported delegates to the Scientific Meeting presenting their research and work to colleagues through the ePoster Portal.

For the fifth year, the Foundation was able to continue its support of scholarships for Indigenous students studying nursing and midwifery at Deakin University thanks to the Ernest Daniel (Ernie) Williams bequest. Also, thanks to this bequest, the Foundation provided bursaries to Indigenous midwifery students studying at La Trobe University.

Investment markets remained volatile during the year amid challenging economic conditions. Global equity markets returned over 15 per cent for the year, driven by the continued strength of technology stocks. However, economic uncertainty continued, especially around inflation. There were still insufficiently convincing signals for central banks to begin cutting rates, but it seemed likely that the United States of America would soon commence reducing interest rates. Widespread geopolitical instability had an effect on investment markets.

The Foundation's net equity increased to approximately $67.2 million by the end of the financial year from approximately $64.1 million at the end of the 2022–23 financial year. I would especially like to thank our investment advisers, Drew, Walk & Co., our product managers, Willis Towers Watson, and our Investment Subcommittee, chaired by Mr Will Baylis, for their ongoing investment support and guidance.

I thank the Directors and members of our various committees for their support and guidance throughout the year. Without this support, the Foundation could not undertake its vital work. I would also like to thank Mrs Heena Hilbert for her efficient operation of the Foundation's office.

Looking ahead to 2025, we are once again positioned to advance research, and the dissemination of this research, so to advance the health of women and their babies.

Mr Andrew D Brookes
Executive Director

Clinical and Scientific Research Fellowships

The Norman Beischer Clinical and Scientific Research Fellowships recognise the achievements of outstanding medical clinical and scientific researchers. Each recipient of these esteemed Fellowships is awarded $660,000 over a three-year period to support their ongoing work.

The Foundation intends to award one Clinical Research Fellowship each year and one Scientific Research Fellowship every four years. The Fellowships are aimed at those who have completed a PhD and are early- to mid-career researchers.

Applicants should have obtained their PhD less than seven years prior to the submission of an application, and researchers must be working in areas of interest to the Foundation.

Our fellowship recipients to date have been:

2024–2026	Scientific Research Fellowship	Dr Elena Tucker
	Clinical Research Fellowship	Dr Teresa MacDonald
2023–2025	Clinical Research Fellowship	Dr Clare Whitehead
2022–2024	Clinical Research Fellowship	Professor Lisa Hui
2021–2023	Clinical Research Fellowship	Associate Professor Fiona Brownfoot

2024–2026 Scientific Research Fellowship

Dr Elena Tucker

Discovering the genetic causes of premature ovarian insufficiency

Premature ovarian insufficiency is one of the most common forms of female infertility. This condition, where ovarian function ceases to make normal amounts of oestrogen or release eggs regularly, affects around four per cent of women under the age of 40 years. While there has been a considerable focus on genetics in the existing research, the genes that cause this condition are not fully understood and are only identified in less than a quarter of women experiencing issues.

Commencing in 2024, this is the first Scientific Research Fellowship that the Foundation has awarded. Dr Tucker's research is focused on discovering the genetic causes of premature ovarian insufficiency, with a view to developing effective treatment options.

She says, 'If we know which gene is causing the condition, there are things we can do. Some of the genes are associated with other risks, like cancer. If you know you're facing that, you can increase surveillance to make sure cancer is picked up early, for example, so there's a benefit to knowing.'

This year, Dr Tucker and her team published their discovery of a new genetic variant that can cause ovarian defects. They also published their study of claims that a variant in one particular gene causes premature ovarian insufficiency. Their study concluded that those claims cannot be made at this stage, as it's not a genetic cause in the way it's been reported.

The team is also studying proteins – as genes encode proteins – to better understand the impact of gene variants. Dr Tucker calls this 'multiomics, because it's not just genomics, it's proteomics as well'.

While the aim of this work is ultimately to see genetic testing become part of patient care, Dr Tucker warns that this needs to be done carefully, as many published studies overstate its significance.

The Foundation's funding has enabled Dr Tucker to employ two PhD students to work with her on this research project. She is applying for more external funding, leveraging the work already done to expand the program even further, with hopes to increase the team next year.

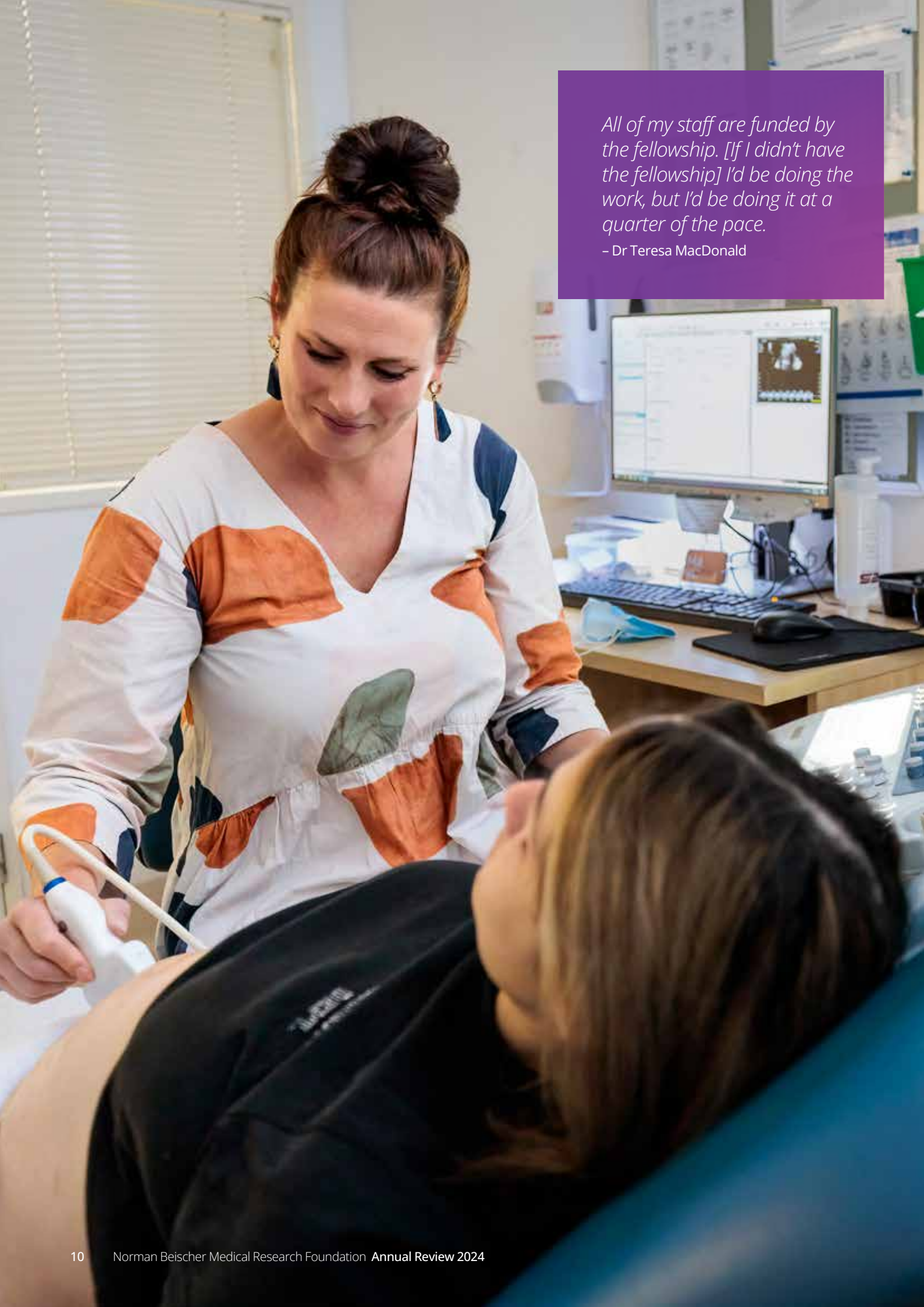
Looking towards 2025, the team hopes to apply a multiomics focus on a larger group of patients to better understand what deficiencies might be present in women with the condition.

Dr Tucker feels that female infertility is an under-appreciated, under-researched area.

'I'm hoping that with my research, we can provide answers for women. I was lucky that despite infertility issues, I was able to have my children, so I understand how heartbreaking infertility can be. Hopefully, by discovering new genetic causes, we can find treatments for women with fertility issues so they may be able to have children. I think that's a bit down the track for premature ovarian insufficiency, but we're working towards it.'

I have the capacity now to decide the exact direction of the research. Rather than having to convince a supervisor who might have a different research focus, I now get to drive the research in the direction that I feel is important.

– Dr Elena Tucker



All of my staff are funded by the fellowship. [If I didn't have the fellowship] I'd be doing the work, but I'd be doing it at a quarter of the pace.

– Dr Teresa MacDonald

2024–2026 Clinical Research Fellowship

Dr Teresa MacDonald

Detection of risk factors for stillbirth, particularly fetal growth restriction

Fetuses that are small, below the 10th percentile, have four times the risk of stillbirth than fetuses that are greater than the 10th percentile. However, current clinical care, which uses uterine height measurement and an ultrasound, only picks up 20 to 30 per cent of fetuses destined to be born small.

In 2021, the Foundation funded Dr Teresa MacDonald's project 'Assessing fetal growth to identify babies at increased risk of death and developmental disability'. It enabled Dr MacDonald and her team to curate a large dataset of pregnancies where at least two scans measuring the fetal size had been performed from mid-trimester (20 weeks gestation) on. This showed that a slowing fetal growth rate between scans was associated with increased risk of perinatal death and other adverse outcomes, and that slowing growth between 28 and 36 weeks was associated with placental dysfunction.

Dr MacDonald says, 'The Norman Beischer Clinical Research Fellowship funding has meant I've been able to hire a research midwife, a research assistant, a casual biostatistician and another casual research assistant to drive our work to reduce stillbirth.'

'We've got two plans of attack', she says. 'On one hand, we want to find small babies better. On the other hand, we want to find babies who are at risk of stillbirth even though they're not small, because we suspect that a big subset of those have a placenta that's not working well for them, but for whatever reason, they haven't crossed that threshold to become small.'

Dr MacDonald has submitted a paper to *BioMed Central Medicine* on how slow the fetal growth must be to raise issues, looking at the equivalent of losing 30 centiles over four, eight, 10, 12 and 16 weeks. Once that paper is accepted for publication, Dr MacDonald says the next step is to turn this data into a usable clinical tool.

'My aim is to really focus on the design and get a clinical tool into the clinic. I hope to get the mid-pregnancy scan data analysis done by at least January or February next year. We also want to look at whether any of the other things we can measure in the fetus are better predictors of actual estimated fetal weight. For instance, we are comparing blood-based biomarkers and growth velocity with body fat in babies that have had growth scans. The best predictor of future pregnancy risk at a 20-week scan could then be incorporated into the clinical tool.'

Dr MacDonald's aim for the tool is, 'that with every single growth scan performed, an assessment of fetal growth velocity will become commonplace, with better detection of fetuses at risk of stillbirth or other poor outcomes, so clinicians can manage these pregnancies to reduce the risks.'

2023–2025 Clinical Research Fellowship

Dr Clare Whitehead

Researching better outcomes around preterm births

Every year, globally, about 15 million babies are born preterm and about one million of them die as a result of prematurity complications. In Australia, nearly nine per cent of all births occur before 37 weeks. Those babies born at the earliest gestations are most at risk of both short- and long-term health complications.

In 2023, the Foundation awarded funding of $600,000 to Dr Clare Whitehead, head of the PLATIPUS, to lead a world-first trial which investigates how best to care for mothers at risk of preterm birth and their babies after birth.

The PLATIPUS program is using an innovative trial design to simultaneously answer questions about care in pregnancy and for babies in the neonatal unit, which is a much more efficient and cost-effective way to gather better evidence to improve care sooner.

Dr Whitehead explains, 'We're trying to improve the long-term outcome by looking at all the different things along the journey that might happen to a mother and a preterm infant to affect their health later on. Over the last 20 years, we haven't really had any advances in stopping preterm births and the numbers of them have remained the same. The difference is that now we have more survivors.'

The Foundation's funding has enabled Dr Whitehead to dedicate her time to the project, apply for external funding for project extensions and build her team. She acknowledges that the project so far wouldn't have been possible without the support from the Norman Beischer Clinical Research Fellowship.

There are two trials planned for the PLATIPUS program in 2025. The first is the Preterm Rupture of Membranes Optimising Antibiotic Trial, which aims to identify the best antibiotics to give pregnant women whose waters have broken early, under 37 weeks. To this point, there have been trials comparing antibiotics versus no antibiotics, but not any which meaningfully compare different antibiotic choices.

The second trial, called BabyCCINO, will assess babies born under 32 weeks who receive caffeine as a respiratory stimulant.

Dr Whitehead says, 'We don't know the best dose of caffeine to give. We'll be doing a trail to compare the different doses given to babies born at less than 32 weeks and who need help with breathing to find the ideal dose.'

The more patients that are recruited to the PLATIPUS program, the more data that accumulates.

As Dr Whitehead points out, 'With more global collaborations, networks and platform ideas, things will become much more efficient and we'll be able to give answers to families quicker.'

The only way I can dedicate my time to the project is with the salary support that I get from the fellowship. It's enabled me to devote time to PLATIPUS, to ensure that all these other aspects of it have come to fruition. That wouldn't have been possible without the Norman Beischer fellowship.

– Dr Clare Whitehead

Having this funding and being able to do this work has really raised my profile as the national leader in this field. I've had multiple invited talks for national conferences. It's also helped me form new collaborations, including with the Cerebral Palsy Alliance, who are equal partners in this work. That's been a really good thing to come out of this fellowship.

– Professor Lisa Hui

2022–2024 Clinical Research Fellowship

Professor Lisa Hui

Tackling a common and preventable pregnancy virus

Congenital cytomegalovirus (CMV) is a cause of disabilities such as deafness, intellectual disability and cerebral palsy. Every year in Australia, about one in 200 babies are born with a CMV infection, making it the most prevalent infectious and preventable condition. Approximately 90 per cent of those babies are completely healthy. However, about 10 per cent of those babies (approximately one in 2,000), will have some kind of long-term health problem.

In 2022, the Foundation awarded funding of $600,000 to Professor Lisa Hui to implement a three-year medical research and education program focused on preventing pregnancy complications and childhood disability due to CMV infection.

In partnership with the Cerebral Palsy Alliance, Mercy Health, Austin Health, CMV Australia and others, Professor Hui and her team have developed a multifaceted program for CMV. The program has three components – successfully launching an eLearning education module on CMV for general practitioners, performing a systematic review of clinical practice guidelines and policies on serological screening for CMV during pregnancy, and conducting an audit of current practices in general practice for serological screening in pregnancy at the Mercy Hospital for Women.

The funding enabled the appointment of a postdoctoral physiotherapist as the senior study coordinator, a general practitioner to work on the education program, a research midwife, some medical students and a junior medical officer to conduct research, and a PhD student specialising in maternal fetal medicine, with a Master of Business Administration, to support the serological screening project.

Until recently, if a pregnant woman became infected with CMV, there was no proven therapy available to prevent the virus passing across the placenta to the unborn baby. In 2021, a clinical trial showed that antiviral medication, valaciclovir, reduced the risk of fetal infection after first trimester maternal infection from 48 per cent to 11 per cent. Professor Hui's pilot serological screening program will include the option of valaciclovir therapy for women with confirmed infection.

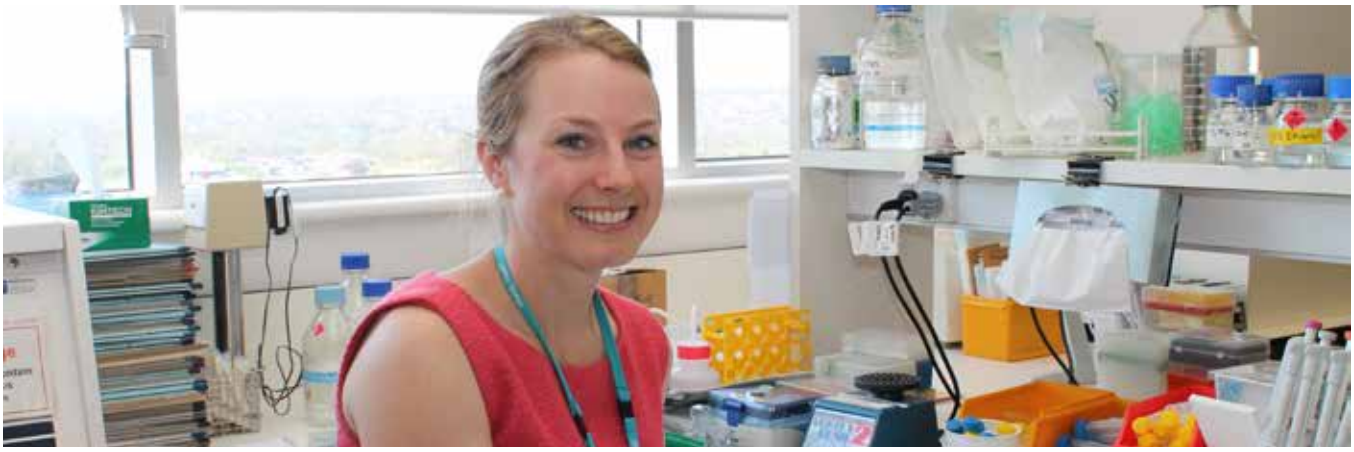
'We're getting a lot of clinical referrals outside of the program to discuss antivirals', says Professor Hui. 'We'll need to understand what the long-term impacts of using the antiviral therapy are.'

The CMV project has the potential to be nationally scalable and progress to a large prospective cohort study. The overarching vision is to create the required body of evidence to drive future national health policy on CMV prevention.

Professor Hui says, 'I love working in obstetrics with women at a really special phase of their life, when they're really engaged and interested in their health. Fetal medicine is one of the new frontiers. We've only had the tools to study the baby before birth in the last few decades with ultrasound and genetics, so it's great to be in a field where knowledge is rapidly accelerating.'

2021–2023 Clinical Research Fellowship

Associate Professor Fiona Brownfoot



A world-first device aimed at reducing stillbirths

In Australia, stillbirth is a devastating complication affecting one in 130 pregnancies, with high rates of stillbirth remaining unchanged for decades. Currently, technologies that can detect fetal distress just before stillbirth are intermittent, which means the critical moment of fetal distress when a lifesaving delivery could be performed is often missed.

In 2021, Associate Professor Fiona Brownfoot became the first recipient of the Norman Beischer Clinical Research Fellowship, when the Foundation awarded her funding of $600,000 to head a fetal biomedical engineering laboratory to develop a device to reduce stillbirth and cerebral palsy.

For Associate Professor Brownfoot, the funding allowed her to set up the laboratory and hire a multidisciplinary team of 10 clinicians, scientists and engineers, who have all focused on trying to improve outcomes for women with the highest morbidity and mortality.

Over the three years of the funded project, there were three themes to the team's work. They explored ways to improve placental dysfunction, looked at novel devices for monitoring and detecting fetuses at risk of stillbirth, and assessed the use of artificial intelligence to better diagnose fetal asphyxia from cardiotocography traces. Of those, the main theme the team focused on was to develop fetal monitoring technology that could be used by pregnant women in hospital, with the possibility for at-home fetal monitoring.

Associate Professor Brownfoot explains. 'We've developed a wearable device that uses the electrical activity of the baby's heart. It involves a sensor patch that can be easily placed by the mother and can pick up the fetal heartbeat with very good accuracy, with hardware that's smaller and lighter than an iPhone. It doesn't get confused and there isn't signal dropout if the mother or the fetus move. This can be used in the clinic, as well as in labour, allowing women to be more mobile without the risk of not picking up issues correctly.'

The Foundation's funding has since enabled Associate Professor Brownfoot to successfully apply for other grants to continue this work. Most recently, she and the team have been granted $1 million of commercial funds and a Commonwealth Government grant of $2.65 million to develop a commercial-grade prototype of the wearable fetal monitoring device. Once that is done, regulatory clinical trials can commence and then, when the device has been through the approval process, it will be ready for sale.

Associate Professor Brownfoot says, 'I could not be more grateful to the Foundation. It's allowed us to progress this device to get it towards the clinic. Hopefully, it helps drive research and translation of products in obstetrics and fuels growth of the med-tech market in Melbourne, which is something not many people are doing.'

For the team, the vision for the future is to develop a smartwatch for pregnant women that can provide continuous monitoring and computerised detection of fetal asphyxia.

[The fellowship] really was the stepping stone for me to have my own laboratory and to be able to expand to be a multidisciplinary team, including scientists and engineers as well as students. I hope that it will lead to a more vibrant medical device ecosystem in Melbourne.

– Associate Professor Fiona Brownfoot

2024 Innovation Grants

Innovation Grants from the Foundation provide funding to support highly innovative research projects with the potential for significant clinical impact.

These projects may lead to major grant applications with institutions such as the National Health and Medical Research Council and the Medical Research Future Fund.

Applicants need to define their objectives and test hypotheses in any area of obstetric, gynaecological or neonatological conditions.

Generally, Innovation Grants are for one-year research projects for amounts of up to $70,000 ($65,000 in 2023).

Topic

Development of an obstetric growth centile calculator and app

Institution

The Mercy Hospital for Women
The University of Melbourne

Amount funded

$51,125

Researchers

Dr Natasha Pritchard
Prof. Susan Walker
Dr Emerson Keenan
Prof. Stephen Tong
Dr Anthea Lindquist
Dr Richard Hiscock

Identifying babies that are small is a critical objective of pregnancy care. Small babies are at risk of many complications during pregnancy and birth, the most serious of which is stillbirth. A primary way of finding small babies during pregnancy is to estimate their weight using ultrasound. This weight is then plotted on a growth centile chart, which provides a percentile that compares the baby to others of the same gestational age.

If the fetus is classified below the 10th centile, this acts as a key trigger to increase monitoring during pregnancy, and to offer interventions such as induction of labour or a caesarean section. The chart that is used to classify the baby's size is therefore critically important, with substantial impacts on pregnancy care.

Unfortunately, many different growth centile charts are used within Australia. These different growth standards can lead to wildly discrepant classifications for the same infant, for example, fifth centile compared to 35th centile. This means that simply performing an ultrasound at two different locations within Australia can change the centile attributed to a fetus, which can alter the entire trajectory of pregnancy for the mother and baby. If the wrong chart is used, some pregnancies that are at high risk of complications will not receive the monitoring that they need. Other low-risk pregnancies could experience unnecessary interventions.

Over the past four years, the researchers have performed a series of rigorous investigations to help identify the 'optimal' growth standard to use in an Australian obstetric population. They have combined this research with international guidelines to come up with the key elements of an obstetric growth standard that we believe should be used.

These include:

- using a growth standard that is adjusted for the average birthweights of an Australian population (as the average birthweight in other countries can be very different)
- using a growth standard that compares to healthy babies still inside the mother's womb (as babies born preterm are often smaller than average and so are not a good comparator)
- providing the option of a sex-specific growth standard (if the sex is known during pregnancy), as we know that male and female babies are different sizes even before birth
- adjusting for each day of pregnancy, rather than each week of pregnancy, as babies can grow a lot throughout each week.

The study aims to:

- incorporate the elements above to create the 'optimal' growth standard for use in an Australian population
- design and publish an app that can be used on computers and smartphones, so that the growth standard can be adopted into clinical practice
- validate the growth centiles calculator, by applying it to a large, statewide dataset of all Victorian births over a 10-year period and comparing it to other older obstetric growth charts
- audit its use in real-life ultrasound data from the Mercy Hospital for Women.

Topic

Safety of antidepressants in pregnancy: desperate need for a three-year prospective trial

Institution
Monash University

Researchers
Prof. Jayashri Kulkarni AM
Dr Eveline Mu
Dr Qi Li
Mr Anthony de Castella

Amount funded
$70,000

Major depression in women during their childbearing years is extremely common, and has an associated high morbidity and mortality. As a result, the use of antidepressant medications during pregnancy is widespread. Making decisions about using antidepressants during pregnancy can be difficult. We need to balance helping the mother's mental health with ensuring the developing baby's wellbeing. While antidepressant use in pregnancy may be considered a risk to the health of the developing infant, stopping treatment also carries the risk of harm to the mother, including severe maternal depression relapse and, at times, suicidality.

Recent evidence suggests, however, that the risks of antidepressant intake during pregnancy for the baby are small or non-existent, and the risk of poor maternal and baby outcomes are small to medium. This information is misleading and concerning, as these studies do not give us a clear indication of the long-term effects. The study aims to change that by tracking mothers throughout their pregnancy, and their children, for three years after antidepressant use during pregnancy.

Many studies look at short-term outcomes, but we are missing the bigger picture. This study will explore the lasting effects of antidepressant use during pregnancy. By following mothers and children for three years, it is possible to see how these medications impact the child as they grow.

The researchers will work with pregnant women who are taking antidepressants, compared to those who are not. They will follow both groups during pregnancy to three years after childbirth, measuring the children's development, behaviour and how they learn. They will also check how mothers are doing mentally. By conducting the study across three years, the researchers will be able to track any developmental differences and identify issues that may appear later on.

The results of the study will inform women and their doctors about the safety of antidepressants in pregnancy. The results will provide evidence-based advice about pregnant women who need antidepressants. This study aims to better understand the impact of medication taken during pregnancy on the development of the baby. The information will be provided to health practitioners and the general public.

In particular, the researchers want to empower women to collaboratively make informed decisions with their doctors about the safest treatment for them and their babies. The findings will be used to create guidelines for treating pregnant women, including by policymakers who will be able to use the findings to shape regulations about using antidepressants during pregnancy.

Topic

Combating the rise of congenital syphilis in Australia through novel approaches to diagnosis

Institution

The Peter Doherty Institute for Infection and Immunity

Amount funded

$70,000

Researchers

Dr Shivani Pasricha
Dr Chuan Kok Lim
Dr Eloise Williams
Jacqueline Prestedge
Prof. Marcus Chen
Ms Rebecca Wigan

Syphilis is on the rise in Australia, having increased by 358 per cent in the past decade, indicating that current measures of outbreak control are inadequate. Caused by the sexually transmitted bacterium, *Treponema pallidum*, if left untreated, syphilis can cause severe morbidity, including infection of the eye and brain, and transmission from mother to baby (congenital syphilis).

Since 2015, there have been increased infections among females and heterosexual men, disproportionately increasing among Aboriginal and Torres Strait Islander communities, leading to congenital syphilis re-emerging as a public health concern. Globally, syphilis causes 7.7 per cent of all avoidable stillbirths, with congenital syphilis also causing miscarriage, premature labour, neonatal death, and growth and developmental disorders in infants.

Timely and accurate diagnosis can prevent congenital syphilis, with early detection in pregnancy providing a nearly 100 per cent chance of preventing mother-to-child transmission, whereas treatment of a newborn is less effective. Therefore, the best strategy to eliminate congenital syphilis is to focus on timely, accessible diagnostic methods.

Syphilis testing is recommended for all pregnant women and repeat testing is recommended for people at increased risk of syphilis in pregnancy, such as those with multiple sexual partners, injecting drug users and women of Aboriginal or Torres Strait Islander origin, to prevent congenital syphilis. Current testing methods for syphilis and congenital syphilis rely on serological diagnosis (using blood samples collected intravenously from patients). This method of sample collection requires a large volume of blood to be collected by a trained healthcare worker in a clinical setting, which can be painful and cumbersome.

Globally, poor engagement in antenatal care, including missed clinic visits, is a common reason why some women with syphilis during pregnancy are not diagnosed, leading to congenital infection and neonatal death. This disproportionately affects women who are socioeconomically disadvantaged.

Dried blood spots (DBS) are a less invasive form of blood sampling that can be collected by pricking the finger, heel or toe with a lancet. The blood drops are then spotted onto specially manufactured filter paper. The use of self-collected DBS has gained traction globally, as the method is easy to deploy to remote communities and outside traditional healthcare settings.

DBS is commonly used for diabetes monitoring of glucose levels and as a blood collection method for infants. It will be more tolerable for women requiring repeated syphilis testing throughout pregnancy due to risk factors associated with congenital syphilis. The proposition is that self-collected DBS will be an acceptable sample type for the diagnosis of syphilis infections, in conjunction with existing, highly accurate laboratory tests.

A wholistic understanding of the laboratory, clinical and patient workflows as proposed in this project provides a robust evaluation of DBS as a self-collection method for syphilis diagnosis. Assessing the accuracy and feasibility of self-collected samples could lead to major advances in public health for infectious diseases, and benefit a wide demographic, including pregnant women in rural and remote communities.

Overall, this approach would advantage our public health system by diagnosing and treating syphilis early, helping to preventing congenital syphilis and other complications among pregnant women.

Past Grant Update

Guaranteeing the health of mothers and babies at risk of haemolytic disease of the newborn (2021– 2023)

Support from the NBMRF has allowed me to develop a new area of research on the naturally occurring human antibody repertoire, in the context of haemolytic disease of the fetus and newborn. It has also facilitated a new collaboration between WEHI and Australian Red Cross Lifeblood, which will be important for clinical translation of our work.

– Ian Wicks, Professor

Topic

The endometriosis artificial intelligence (AI) study: developing novel deep learning AI methods to better detect pelvic endometriosis

Institution
The Mercy Hospital for Women
The University of Melbourne

Amount funded
$69,180

Researchers
Dr Debjyoti Karmakar
A/Prof. Fiona Brownfoot
Prof. Marimuthu Palaniswami
Mr Yuchong Yao
Dr Kate Stone
Ms Dorothy McGinnes
Dr Lenore Ellett

Endometriosis, a condition impacting millions of women around the globe, often lurks in the shadows. Despite its widespread nature, getting a precise diagnosis is difficult. Many women go misdiagnosed or not diagnosed at all, leading to unnecessary suffering. Imagine waiting for an entire year, anxious and in pain, only to be given a diagnosis that might not even be right or timely. This scenario is not only distressing for the patients, but also places undue stress on healthcare systems and creates a financial strain.

The vision is simple yet transformative: use the power of cutting-edge AI to analyse ultrasound imaging – a common medical imaging technique – to accurately diagnose endometriosis. Instead of resorting to surgery, the researchers believe AI can provide answers faster and with less physical burden on women presenting with symptoms such as distressing pelvic pain.

The research is targeted towards women who display symptoms that hint at endometriosis. These symptoms often manifest as relentless pelvic pain or troubles related to fertility. Traditionally, a method called laparoscopy, paired with examining tissue samples, has been the gold standard for diagnosing this condition. This tried-and-true method serves as our benchmark, which we will compare with our AI performance.

A team of experts has already been refining the standards we will use in the AI set-up. By training their advanced deep learning algorithm on specific ultrasound images, the hope is to outdo the diagnostic accuracy currently achieved by human experts. The team's extensive research will also spotlight the most significant features in these ultrasound images and explore how different patient factors might influence the AI accuracy.

By matching the AI results with feedback from patients and subsequent ultrasound scans, the team also intends to craft a holistic understanding of the diagnosis. This approach could potentially provide enormous relief to a woman, knowing that she can get an accurate diagnosis without undergoing surgery. The researchers hope that the AI-driven diagnostic tool can quickly determine the presence of endometriosis, saving precious time, conserving medical resources and, most importantly, sparing patients from undue suffering, stress and invasive procedures.

This approach also intends to describe features that indicate the need for surgeons to attend for surgical management of deeper or more advanced endometriosis, thus avoiding incomplete treatment and surgical complications.

Past Grant Update

Improving patient-focused research in endometriosis: development and validation of a tool to measure Most Bothersome Symptom for clinical trials in endometriosis (2021)

The grant enabled us to do research to develop a new questionnaire for measuring outcomes in clinical trials of endometriosis treatments. We have published/summited three papers from the grant so far, with a further one which will include the questionnaire within it – free to be used by endometriosis researchers around the world.

– Sarah Lensen, Senior Research Fellow

Topic

Investigating the most effective heart rate detection methods for premature babies in the first minutes of life

Institution
The Royal Women's Hospital

Amount funded
$55,048

Researchers
Dr Elizabeth Baker
Dr Kari Holte
Prof. Claus Klingenberg
Dr Rebecca Szabo
Ms Tatiana Zecher
Prof. Peter Davis
A/Prof. Marta Thio

This study aims to evaluate a new method of monitoring the heart rate of a preterm baby (born between 26- and 31-weeks' gestation) immediately after birth. The study will compare current gold standard tests with the NeoBeat MiniTM, a reusable and consumable-free heart rate monitor that simply and quickly wraps around a baby's chest.

Preterm babies often require lifesaving support in the first minutes of life as they adapt to conditions outside the womb. The need for resuscitation and response to these lifesaving interventions are guided by the newborn's heart rate. A low heart rate at five minutes is associated with a fourfold increase in risk of death for babies born at less than 32 weeks' gestation.

A rapid and reliable method of measuring the newborn's heart rate is critical. However, standard heart rate monitoring methods have limitations, including a delay in detecting heart rate, challenges in application during resuscitation and availability in low-resourced settings.

The NeoBeat Mini, a new Therapeutic Goods Administration approved device, adapts existing electrocardiogram (ECG) technology into a small portable device that is quick and easy to apply around a preterm baby's abdomen. Though approved for use, the device has not been validated in clinical settings. The Royal Women's Hospital, and its international collaborators, aim to test if the NeoBeat Mini, compared with existing methods, accurately and quickly measures a preterm baby's heart rate.

If accurate, the NeoBeat Mini may provide many advantages over current methods of heart rate monitoring, and aid clinicians in those first minutes after a baby is born to provide critical lifesaving care.

Past Grant Update

Assessing fetal growth to identify babies at increased risk of death and developmental disability (2021)

This grant funded the work that allowed me to first secure a Stillbirth CRE Future Leaders' Fellowship and then helped me to secure an NHMRC EL1 Fellowship and the 2024–2026 Norman Beischer Clinical Research Fellowship. These have given me financial independence and security for my research salary and program.

– Dr Teresa MacDonald, Obstetrician/Gynaecologist; Clinician Scientist Research Fellow

Topic

A pilot feasibility randomised controlled trial investigating the effect of viral transmission mitigation measures on the incidence of preterm birth in high-risk pregnant women

Institution
Monash University

Researchers
A/Prof. Atul Malhotra
Prof. Ben W Mol

Amount funded
$70,000

Preterm birth occurs when a baby is born before 37 weeks of pregnancy. It occurs in approximately nine per cent of Australian pregnancies, and is in quantity and severity the most important issue in obstetric care in Australia and worldwide. Prevention of preterm delivery is therefore a major perinatal research priority.

During the COVID-19 pandemic, it had been unexpectedly observed that there was an association between COVID-19 mitigation measures (community lockdowns in particular) and rates of preterm birth. At Monash Health, the largest maternity provider in Victoria, the team observed during stage 3 and stage 4 lockdowns (in 2020), with significant restriction of movement and human social contact, a 30 per cent reduction in both spontaneous and medically indicated preterm birth, and a delay in delivery for those who still deliver preterm.

Hypotheses on the mechanism include reduced rates of infection due to other viruses and pathogens, and reduced movement outside the home setting. In a more detailed analysis, we reported that this effect of mitigation measures during lockdown is strongest in women with previous preterm birth. The researchers have also found that the effect mainly occurs due to less spontaneous preterm labour in these women.

The research team's observations during the pandemic, in combination with their track record in the prevention and treatment of preterm birth, provide a unique opportunity to further study this phenomenon. The researchers now need to translate these observations into interventions that could potentially help women at risk of preterm birth. In this project, the team proposes an innovative, randomised clinical trial in which they will evaluate whether an intervention in pregnancy mimicking COVID-19 infection transmission mitigation measures will reduce preterm birth rates in pregnant women with previous preterm birth.

The researchers have designed a trial for a pregnancy intervention based on COVID-19 mitigation measures. It will contain advice for reduced activity, less social contacts, hand washing and wearing a facemask when in public. In short, they will randomise 100 women with previous preterm birth (the highest risk group) for a six-week intervention or care without restrictions as usual. The primary outcome will be delivery before 34 weeks.

This pilot feasibility project will evaluate whether this pregnancy intervention for women at a high risk of preterm birth is feasible, and whether it has the potential to result in an improved preterm birth outcome for these women. The team's strong track record in research in preterm birth and in clinical trials provide, in combination with this unique finding of reduced preterm birth, an enormous opportunity in the battle to reduce preterm birth in Australia and globally.

Past Grant Update

World-first trial of sulforaphane to improve placental and vascular function in women with preeclampsia (2021)

Both Norman Beischer grants have significantly contributed to my track record for securing external medical research funding and was also integral for my successful NHMRC ECR fellowship back in 2019. Both grants have led to our three current clinical trials and the completion of one more. Together, these trials have been providing substantial evidence to support the concept that a broccoli sprout extract is a potential adjuvant therapy for preeclampsia and COVID-19.

– Sarah Marshall, Research Fellow

Topic

Adenomyosis in pregnancy: can we see it and does it change?

Institution
The Mercy Hospital for Women

Amount funded
$25,015

Researchers
Dr Samantha Mooney
Dr Vanessa Ross
A/Prof. Martin Healey
A/Prof. Ricardo Palma-Dias
Dr Debbie Nisbet
Dr Sofie Piessens
Dr Kate Stone
Dr Tristan McCaughey
Dr Clair Shadbolt
Dr Natalie Yang
Dr Stephen Esler
Dr Marsali Newman
Dr David O'Keefe
Prof. Peter Rogers

Adenomyosis is a condition where the lining cells of the uterus (the 'endometrium') are present within the muscular layer. This results in thickening and potential scarring of the muscular layer of the uterus. In recent studies, adenomyosis has been associated with an increased risk of troubles becoming pregnant, and complications during a pregnancy. However, there is very little evidence explaining why adenomyosis may be associated with these complications, including miscarriage, preterm birth, and high blood pressure conditions in pregnancy. A further complication reported to be associated with uterine adenomyosis is placenta accreta spectrum (PAS), where the placenta attaches too deeply to the uterine wall.

As a foundation for investigation of the links between adenomyosis and pregnancy outcomes, the researchers plan to perform a suite of descriptive studies.

The research team will perform a prospective observational study using high-quality ultrasound techniques to observe the appearance of the uterine muscle in patients with adenomyosis who become pregnant. Patients will be invited to participate if they attend for an early pregnancy ultrasound and have previously had a non-pregnant ultrasound demonstrating features that are strongly suggestive of adenomyosis. Participants will then undergo an additional ultrasound six months postpartum to again assess the uterine muscle for features of adenomyosis.

The team will conduct a retrospective cohort study across two major obstetric hospitals in Melbourne. A common indication for magnetic resonance imaging (MRI) in pregnancy is for the investigation of abnormal placenta, for example, PAS. It is hypothesised that patients with PAS have an increased likelihood of adenomyosis on their pregnancy MRI.

Patients who have previously undergone MRI in pregnancy and been diagnosed with PAS will have their MRIs reviewed, with specific mention of features that suggest adenomyosis. This will be an observational study reporting the ability to see features of adenomyosis in pregnant patients undergoing MRI in pregnancy for investigation of PAS. In this same cohort, some patients will have undergone caesarean section with hysterectomy (as is often required treatment for PAS). The histology of this subgroup will be reviewed to describe the prevalence of adenomyosis in this cohort. Similarly, many of this cohort will have had a pre-pregnancy and/or early pregnancy ultrasound at one of the two study centres. The images of this subgroup will be retrospectively reviewed by one of the study experts and categorised according to the presence of certain features of adenomyosis.

Past Grant Update

Investigating a potential point of care test for neonatal sepsis (2019)

Being part of this project has provided me with excellent research experience across my PhD, and has been a great avenue for me to develop interest and expertise in neonatal infections. This has brought some wonderful opportunities, including work with several national and international organisations for improving neonatal sepsis detection and care.

– Naomi Spotswood, Neonatologist

Topic

Tumour necrosis factor inhibition: a new frontier in preeclampsia therapeutics

Institution

The University of Melbourne
The Mercy Hospital for Women

Researchers

Dr Natasha de Alwis
Prof. Natalie Hannan
Dr Natalie Binder
Dr Alina Roman

Amount funded

$69,964

Preeclampsia is a serious and deadly complication of pregnancy, taking the lives of over half a million babies and 70,000 mothers every single year. In pregnancies complicated by preeclampsia, poor oxygen supply causes the placenta to be in a state of stress, which initiates the prolonged release of toxic inflammatory and damaging factors into the maternal circulation. These toxins spread throughout the body causing major injury to the mother's blood vessels and major organs, especially the cardiovascular system. As such, preeclampsia is a leading cause of maternal and neonatal death and long-term disability worldwide, with disease burden being highest in developing nations where obstetric and neonatal care is not readily accessible. Unfortunately, there is no effective treatment for preeclampsia; current clinical practice is to prematurely deliver the placenta and baby to save the mother. Urgent development of therapies for preeclampsia is desperately needed.

In this study, the researchers will investigate the potential of the anti-inflammatory medication, infliximab to treat preeclampsia. Infliximab works by inhibiting the action of a key toxic inflammatory mediator, tumour necrosis factor (TNF). It is commonly used in the clinical treatment of chronic inflammatory conditions such as rheumatoid arthritis and inflammatory bowel disease. TNF is elevated in preeclampsia and directly contributes to the inflammatory environment of this insidious disease, making TNF an excellent target for treatment.

Specifically, the team will investigate the potential of repurposing TNF inhibitor infliximab to treat preeclampsia in their laboratory models of human pregnancy. They will assess whether infliximab can reduce injury to the placenta and blood vessels, and closely examine the passage of infliximab through the placenta to the fetus. This study will uncover whether blocking these toxic factors released from the stressed placenta might be an effective way to treat preeclampsia.

Importantly, infliximab is currently used clinically in pregnant women with underlying inflammatory conditions, and is generally considered safe for use in pregnancy. As a result, researchers envisage expedited translation of our findings into human clinical trials in pregnant women. Concurrent to this project, the team and clinical collaborators will be performing small clinical cohort studies to investigate the action of infliximab in cohorts of pregnant women at risk of/or diagnosed with preeclampsia.

Together, this preclinical laboratory and clinical trials data will provide key information regarding the safety and efficacy of infliximab to treat preeclampsia. The team would then initiate a large-scale international clinical trial to validate the effectiveness of these drugs in different pregnant cohorts. If successfully translated, infliximab could be an exceptional first step towards treating a pregnancy complication that has existed for millennia, but has never had an effective treatment – potentially saving hundreds of thousands of lives every year and preventing long-term injury in many more.

Past Grant Update

Placental-released early pregnancy serum biomarkers of preeclampsia (2020)

Preliminary data has enabled subsequent successful grant applications of more than $1.5 million, including an NHMRC Ideas Grant. These grants and preliminary data also contributed to my successful promotion from Level B to Level C, and multiple invitations to present this research at local and international conferences (Society for Reproductive Investigation, Society for Reproductive Biology, Australian and New Zealand Placental Research Association, Stillbirth Centre for Research Excellence).

– Ellen Menkhorst, Senior Research Fellow in Reproductive Biology

Topic

Can biomarker and ultrasound grading detect fetal inflammation in pregnancies affected by chorioamnionitis (choriobug pilot)?

Institution
Monash Children's Hospital

Amount funded
$66,567

Researchers
Dr Scott Stansfield
Dr Carmel Walsh
A/Prof. Kirsten Palmer
A/Prof. Samuel Forster
Prof. Marcel Nold

Chorioamnionitis affects between one and four per cent of all pregnancies. It is a serious pregnancy condition in which the placenta and membranes surrounding the unborn baby become inflamed, usually as the result of bacterial infection. It is a major contributor to preterm birth; approximately one-third of births before 34 weeks are associated with chorioamnionitis (in Australia, this equates to over 2,700 babies a year). For these newborns, in addition to the significant sequelae of prematurity, there is the risk of significant complications including infection in the blood, pneumonia, severe lung disease, and inflammation of the brain and spinal cord. Chorioamnionitis is also a risk to the mother, as it may result in significant illness with fevers, tachycardia, and pain. If unrecognised or untreated, it may lead to sepsis – a potentially life-threatening condition.

The risk of chorioamnionitis is increased in pregnancies with predisposing complications, including preterm prelabour rupture of membranes, recurrent bleeding, and short cervix. Although these risk factors are well defined, there is currently no readily available test to confirm the diagnosis of chorioamnionitis. Instead, the diagnosis is clinically determined by assessment of a myriad of markers or waiting for overt chorioamnionitis to manifest. This carries great risk of sepsis for the mother and child. In addition to the challenge of accurately establishing a diagnosis, antibiotics (which are the mainstay of treatment), do not cross the placenta well or penetrate the fetal membranes, resulting in inadequate treatment and ongoing risk to the unborn baby.

Consequently, the diagnosis of chorioamnionitis always leads to expediting birth, to ensure the optimal antibiotic treatment for both mother and newborn. Studies of the placenta and membranes of preterm babies reveal the presence of chorioamnionitis even in the absence of clinical signs. This is known as subclinical chorioamnionitis. This is a significant concern for clinicians, as our research has shown that preterm babies born in the setting of subclinical chorioamnionitis demonstrate inflammatory changes that pre-dispose them to severe lung disease. Unfortunately, there is no current method to assess the degree of inflammation in the unborn baby, or to accurately detect subclinical chorioamnionitis. As a result, clinicians face the conundrum of either waiting until clinical signs of chorioamnionitis develop, despite knowing that undetected chorioamnionitis increases the risk to the newborn, versus early delivery, whereby preterm birth in the absence of these inflammatory processes also carries the risks of prematurity to the newborn resulting in unintended harm.

This project aims to identify biomarkers that enable the early identification and staging of chorioamnionitis to better inform timing of birth decisions. The researchers plan to use innovative minimally invasive techniques to assess pregnant women at a high risk of chorioamnionitis, and correlate these with histopathology findings of the placenta and membranes, and with the clinical outcome for mothers and babies. The potential significance of this work is profound – accurate diagnosis of chorioamnionitis will allow clinicians to reduce the risk of severe infections for mothers and babies and prevent unintended harm of prematurity that arises when clinicians get the diagnosis wrong or due to subclinical chorioamnionitis.

Topic

Predicting unplanned mother and newborn hospital admissions in the first year of life: a big data and machine learning partnership with Safer Care Victoria

Institution
The University of Melbourne

Amount funded
$69,080

Researchers
Melvin Marzan
A/Prof. Lisa Hui
Prof. Andrew Wilson
Karrie Long
Prof. Mark Umstad
Dr Jake Valentine

Childbirth is a profound life experience for families. Yet, it is not without its challenges from both personal and societal perspectives. This project is dedicated to making this journey safer for mothers and babies and cost-effective for the Victorian healthcare system. One of the most dramatic and sustained impacts of the COVID-19 pandemic is the reduction in hospital length of stay for both mothers and newborns.

No Victorian study has yet explored the potential health and economic trade-offs from the shortened length of stay. The research team's recent work with Safer Care Victoria has exposed unintended consequences of shorter length of stay, including an increase in unplanned readmissions of newborns for feeding problems and suspected infections. An unplanned hospital admission is hugely disruptive for young families as well as costly for the health system.

This project proposes to harness the power of big data, predictive analytics, and machine learning, to transform the way care for new mothers and babies by providing personalised risk assessment of unplanned readmissions. This will enable the research team to identify those who might benefit from additional support, for example, through inpatient services, domiciliary midwife care, or community health services.

To make this happen, the team will tap into the richness of healthcare information contained in the statewide maternity data collections. These records will be linked to hospital and emergency admission datasets, Medical Benefits Schedule (MBS) and the Pharmaceutical Benefits Scheme (PBS). The data will be teamed up with advanced epidemiological and statistical modelling and machine learning. By supplying the models with data from thousands of birth records, hospital readmission records, healthcare utilisation through the PBS and MBS schedules, computers can be trained to predict if a mother or baby might need extra medical attention in the year after birth.

Machine learning can apply its computational power to routinely collected datasets to achieve better care for mothers, babies, and families. If the team can predict unplanned readmissions, they can step in with the right care, at the right time, for the right patient. This could prevent unnecessary trips to the hospital, save time, money, and – most importantly – ensure better health outcomes for young families. This project envisions a Victorian healthcare system that doesn't just wait for problems to happen, but actively prevents them. This means better healthcare decisions, resources used wisely, and happier families, as emphasised in the Victorian Government's Targeting Zero program. The project aims to give families peace of mind, knowing that the best care is there when they need it.

Past Grant Update

A Collaborative Maternity and Newborn dashboard (CoMaND) for the COVID-19 pandemic: real-time monitoring of perinatal services performance indicators and health outcomes in Victoria (2020 and 2022)

It established me as a leader during the COVID-19 pandemic, and resulted in a Safer Care Victoria fellowship and commissioned government reports on the COVID-19 pandemic impacts on maternal and newborn outcomes and health service utilisation. I have since been appointed to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity, and Chair of the CCOPMM Research and Reporting Subcommittee. I have also been promoted to Full Professor in 2024, in part due to the research leadership I showed during the pandemic. I was also invited to be part of a global collaboration on perinatal outcomes during the pandemic, leading to a high impact publication.

– Professor Lisa Hui, Maternal Fetal Medicine Specialist, Clinical Academic

Topic

Asphyxial injury and the Delivery of Oxygen after REsuscitation (the ADORE study)

Institution
The Mercy Hospital for Women
Murdoch Children's Research Institute

Amount funded
$52,421

Researchers
Dr Shiraz Badurdeen
Prof. Peter Davis
A/Prof. Susan Donath
A/Prof. Margarita Moreno-Betancur
Ms Kate Francis
Prof. Jeanie Cheong
A/Prof. Sue Jacobs
A/Prof. Hamish Graham
Prof. Stuart Hooper
Prof. Graeme Polglase

Collaborators contributing data
Prof. Helen Liley (Aus)
Dr Rakesh Rao (USA)

Birth asphyxia is the result of a critical shortage of oxygen supplying the brain before and during birth. Despite improvements in obstetric care, birth asphyxia affects three in every 1,000 births in Australia and over one million births per year worldwide. Damage to the baby's brain from birth asphyxia leads to a condition called hypoxic-ischaemic encephalopathy (HIE). HIE is a leading cause of childhood death and lifelong disability, including cerebral palsy, epilepsy and intellectual difficulties. Despite the enormous health and economic burden, there have been no new treatments for HIE over the last decade.

Oxygen is the most commonly used drug during newborn resuscitation. Too little oxygen is harmful but the latest research in the laboratory found that following resuscitation, the baby's brain is extremely vulnerable to receiving too much oxygen. Excessive oxygen damages the brain's mitochondria, which are the cell's powerhouse. This triggers the key pathways responsible for additional brain injury that typically follows the initial injury at birth from asphyxia. Based on these laboratory discoveries, the team looked at their own historical data of babies with HIE. The preliminary findings showed that high oxygen levels within two hours of birth increased the chances of death or disability at two years of age.

The aim to confirm the findings in a world-first study, creating a large, combined dataset of babies with HIE. Latest statistical methods will be applied to analyse data from babies who participated in four international research studies over the last 10 years. In line with ethical recommendations, the team will be making best use of existing high-quality, consistently measured data that research participants have already provided.

Specifically, the aim is to examine whether early exposure to high oxygen levels (measured using a blood test within two hours after birth) increases the risk of death or disability (measured at two years of age) in babies born at ≥35 weeks' gestation with moderate-to-severe HIE.

To achieve this, the researchers will combine the expertise of our diverse team of statisticians, clinicians, and scientists. Individual data from approximately 1,300 babies from studies in the USA and Australia. The combined dataset will be analysed using cutting-edge 'causal inference' statistical methods. These methods are essential to accurately answer the question because they adjust for biases that distort the true cause-and-effect relationship between high oxygen exposure and death/disability. Therefore, the team will be able to find out whether avoiding excess oxygen in babies with HIE could reduce the risk of death and disability.

This research may open a new avenue of treatment for babies with HIE, for whom the chances of a poor outcome remain unacceptably high. Unlike new drugs or devices, the implementation of our findings to clinical care will be quick. Getting oxygen right will become a priority in the care of these vulnerably babies, both in Victoria and around the world.

Topic

Calming the immature gut: establishing the first biomarkers for necrotising enterocolitis

Institution

The Hudson Institute of Medical Research

Amount funded

$69,950

Researchers

Prof. Claudia Nold
Dr Marcel Nold
Dr Ina Rudloff
Dr Steven Cho
Dr Ramesh Nataraja
Dr Maurizio Pacilli

In Australia, up to 11 per cent of babies are born prematurely and approximately 3,000 infants (1.6 per cent) are born very preterm (prior to 32 weeks' gestation). While medical advances have significantly improved their survival, sadly, these babies are at risk of diseases of prematurity, such as necrotising enterocolitis (NEC). NEC is a devastating disease in which parts of the baby's gut become increasingly inflamed and porous, which is fatal for the newborn.

Early clinical symptoms of NEC are non-specific, making an early diagnosis difficult. Once NEC can be diagnosed with certainty, affected infants are often in an advanced disease state with disastrous damage to their gut that can lead to serious complications and death within hours. With a mortality rate of up to 65 per cent, NEC is one of the most common causes of death in extremely premature infants between 15 and 60 days of life. Those who survive often face long-term consequences such as disability, epilepsy and poor growth.

Currently, clinicians cannot predict which babies are at risk of developing NEC and unfortunately, once the disease is diagnosed there are no direct, safe and effective treatments available. Moreover, measures considered to lower a baby's risk of developing the disease (such as breast- instead of formula-feeding) or that support healing of the gut (including bowel rest [that is, intravenous administration of nutrition instead of oral feeding] and antibiotics to eradicate pathologic gut bacteria that might contribute to NEC) are largely ineffective once the disease is in an advanced stage.

Since 2012, the team has worked on advancing knowledge in this field, aiming to develop new diagnostic and therapeutic strategies. The researchers have started to collect and safely store blood samples from preterm babies at different time points (including days one, seven, 14, 21 and 42 of life, and day of discharge from hospital) and recorded their clinical data.

While some of these babies developed normally without any diseases of prematurity, others were later diagnosed with NEC. In this study, samples from day one and day seven of life (that is, before any of the babies had NEC) will be subjected to cutting-edge tests that screen for the presence and abundance of blood protein markers (7,000 per sample) in the very low blood volumes (approximately 0.5 ml) available from preterm babies for research purposes.

The comprehensive data generated by this test will be used to identify differences in the blood of babies that later developed NEC compared to those that did not, laying the foundation for the identification of the very first biomarkers for NEC, detectable in the babies' blood before they get sick. Such biomarkers would be invaluable as in the future they could be used to easily screen all preterm babies by performing a simple blood test, informing clinicians whether or not babies are at risk of developing the disease. Simple changes in the care of those babies could potentially prevent the disease, ultimately making a real difference to the lives of our tiniest patients and their families in Australia and worldwide.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Our Board

Mr John C Fast

BEc (Hons), LLB (Hons), F FIN, MAICD, Fellow of Monash University

Non-Executive Chair

John has been a Non-Executive Director since 1984 and is an economist and lawyer. He is the current Executive Chair of Seawick Pty Ltd.

Previously, John was one of the most senior executives at BHP (BHP). His role included central involvement in the development and implementation of the strategy that resulted in the reconstruction and repositioning of BHP as the world's leading diversified resources company and with the major transactions that gave effect to that strategy. He was BHP's Chief Legal Counsel and Head of External Affairs (with overall group responsibility for BHP's worldwide political and country risk), and a member of the Office of Chief Executive, its most senior management committee as well as its Investment Review Committee.

Before joining BHP, John was the senior commercial partner specialising in mergers and acquisitions at the law firm Arnold Bloch Leibler. John is a former member of the Australian Government's Takeovers Panel and consults to a number of private and public companies on country and political risk, governance, succession and strategy.

He is a Non-Executive Director of ESL Support Pty Ltd, BT Assurance Systems (Aust) Pty Ltd, Learning Base Pty Ltd and The Development Studio Pty Ltd.

He is Deputy Chair of the Advisory Board to the Centre for Legal and Regulatory Studies at the Faculty of Law at Monash University.

He was formerly the founding Chair of National Indigenous Education Foundation Ltd and a former Non-Executive Director of The Australian Brandenburg Orchestra, Investa Listed Funds Management Limited and of The Gandel Group Pty Ltd.

Ms Sandra Fairchild

BCom (Hons), CA, MAICD

Non-Executive Deputy Chair | Non-Executive Director

Sandra has been a Director since 2013. She is an accountant and an experienced commercial business builder. Sandra is Chief Executive Officer of Axima Pty Ltd.

As CEO of Axima, she has operational and commercial oversight of the Australian and China operations of the group. The company's integrated logistics service provision comprises a footprint of 10 sites, five warehouses and annual revenue of over $200 million.

During her time at Axima, Sandra has led and successfully implemented a mergers and acquisitions agenda that has seen the business grow from a boutique local freight forwarder and customs agency to an international freight, transport and third-party logistics fulfilment business. She steered the company through an aggressive global expansion program, delivering a network of wholly owned offices through China and the United States.

Sandra was also a Senior Manager at Arthur Andersen. Her experience there included audit services, corporate finance, strategic planning, activity-based costing as well as general operational consulting and business process improvement.

Sandra is a member of the Logistics Association of Australia and the Large Format Retail Association.

Associate Professor David G Allen

MBChB, MMed (O&G), FCOG(SA), FRANZCOG, CGO, PhD

Non-Executive Director and Chair of the Research Committee

David has been a Non-Executive Director since 2017 and Chair of the Research Committee. Prior to this he was company Secretary and a member of the Research Committee.

David has worked as a Gynaecological Oncologist at the Mercy Hospital for Women and the Peter MacCallum Cancer Centre since 1994. He was appointed Associate Professor, Department of Surgery, University of Melbourne in 2004, as well as Clinical Associate Professor in the Department of Obstetrics and Gynaecology, University of Melbourne in 2013.

David also worked as the Chief Medical Officer at Mercy Health from 2007 to 2020 and was previously the Director Medico Legal at Mercy. He has been a member of the Quality and Safety Monitoring Committee for the National Cervical Screening Program (NCSP) in Australia (Department of Health and Ageing) and is now a member of the NCSP Clinical Advisory Group. He is member (and Past President) of the Australian Society for Colposcopy and Cervical Pathology and has been on the Board of the International Federation for Cervical Pathology and Colposcopy. David is also on the Board of the Australian Society for Gynaecological Oncologists.

Previously he was Chair of the Governance Committee of the North Eastern Integrated Cancer Service (2005–2010), and Chair of the Victorian Co-operative Oncology Group Executive Committee, Centre for Clinical Research in Cancer at the Cancer Council of Victoria (2007–2009).

David is a member of journal editorial boards and a peer reviewer for a number of international journals. He has also been an examiner for certification in Gynaecological Oncology at the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG).

Ms Anne E Beischer

B.Bus, CPA, GAICD

Non-Executive Director

Anne has been a Director since 2017 and is a member of the Finance and Research Subcommittees.

Anne is an accountant working with family businesses and had previously worked for the Foundation as the Finance Manager from 2002 to 2014. She worked closely with the founder, Professor Norman Beischer, in managing the corpus and operations of the Foundation.

Anne took on the Chief Executive Officer role after Norman's death, stepping down from that position in February 2017. Anne's prior experience includes being a Senior Manager at Pricewaterhouse Coopers in internal audit and business advisory services, and a Corporate Auditor at Dun & Bradstreet Corporation.

Mr Paul Broadfoot

GAICD, MBA (H. Hons), B.Eng (Chem) Hons

Non-Executive Director

Paul has extensive experience in multinational 'business to business' corporations, having worked with major companies such as Akzo Nobel, Ingredion and ICI. He spent seven years in Asia-Pacific in Head of Strategy and Director roles based in Bangkok and Singapore. In these positions, Paul oversaw high-growth business units, managing portfolios ranging from emerging opportunities to divisions with revenues in the hundreds of millions. His expertise spans industries including food, chemicals, pulp and paper, and medical components.

An authority on business strategy, Paul is the author of Xcelerate, a groundbreaking book on how to drive disruption through business model innovation. Written from an Australian perspective, Xcelerate draws on research into the longevity of over 5,000 ASX 200-listed companies over the last 40 years.

Since transitioning from his corporate career in 2012, Paul has been an owner and director of three management consulting firms, specialising in business turnarounds, financial performance improvement, and mergers and acquisitions. He has facilitated strategy workshops for hundreds of CEOs and board members and is an experienced conference speaker. Additionally, Paul owns a food manufacturing business.

Paul's passion lies in helping organisations achieve superior governance, stronger financial performance, accelerated growth and enhanced value. This is particularly relevant in a rapidly changing world influenced by factors such as climate change, technological advancements and evolving economic trends.

He holds an MBA from the University of Chicago, where he graduated with a perfect 4.0 GPA. He also holds a Bachelor of Chemical Engineering and is a graduate of the Australian Institute of Company Directors.

Mrs Nicky Long

B Nurs, Grad Dip Marketing, MBA

Non-Executive Director

Nicky Long joined Guide Dogs Victoria as CEO in April 2023 with an impressive track record in the disability and non-profit sectors. She has a deep passion and commitment to 'for purpose' efforts.

Prior to commencing with Guide Dogs Victoria, Nicky was CEO of Expression Australia and held roles in the healthcare, pharmaceutical (CSL and GlaxoSmithKline) and not-for-profit sectors – including Inaugural CEO of Maddie Riewoldt's Vision and board positions with The Royal Women's Hospital Foundation, The Snowdome Foundation and Soap Aid, all with a focus on paradigm shifts in health and medical research.

Nicky was a Board Member of the St Kilda Football Club Foundation and is currently an Independent Non-Executive Director of the Priceline Sisterhood Foundation.

Nicky is a member of 'Mentor Walks Australia', and a member of the mentor program at St Kilda Football Club for AFLW players. She was a finalist in the 2020 Telstra Business Women's Awards for Victoria – for purpose and social enterprise. Nicky is also an Ambassador for the Australian Ballet.

Dr Bernadette White

MBBS, FRCOG, FRANZCOG, Grad Dip Arts

Non-Executive Director

Bernadette graduated from The University of Melbourne and trained in obstetrics and gynaecology at the Mercy Hospital for Women and the Royal Hampshire County Hospital in the United Kingdom.

On returning to Melbourne, Bernadette was appointed as a consultant at the Mercy Hospital and continued to work at the hospital for all her professional career, eventually as the Clinical Director of Obstetrics. She also had a busy private practice in obstetrics and gynaecology, as well as extensive experience in medicolegal reports and impairment assessment.

Bernadette has a long association with RANZCOG including roles as a training supervisor, examiner, examination coordinator, chair of the Victorian Training Accreditation Committee, member of the College Council and Honorary Treasurer.

Between 2001 and 2016 Bernadette was a member of the Victorian Medical Board and then the Victorian Board of the National Medical Board, including sitting on the Board's Health Committee and chairing one of the Notification Committees.

More recently, Bernadette has ceased clinical practice, completed a Graduate Diploma in Arts and is enrolled in a Masters in International Relations, commencing July 2023.

Mr Andrew D Brookes

BA MAICD

Executive Director and Chief Executive Officer

Andrew has been the Executive Director of the Foundation since 2021 and Chief Executive Officer since February 2018.

He is also the Chair of Trust for Nature, a Director of G W Vowell Foundation, Holmesglen Foundation, The Melbourne Grammar School Foundation and McNally Family Foundation. He is a former Chair of Relationship Matters Counselling and Mediation Services.

Andrew is a Committee Member of the Royal Melbourne Hospital Foundation, a member of the Walter and Eliza Hall Institute's (WEHI) Advocacy and Support Board Committee and a Community Representative on the Australian and New Zealand College of Anaesthetists Research Committee. He is a Council Member of the Australian Youth Orchestra.

Previously Andrew held the positions of Chief Executive, Helen Macpherson Smith Trust and the Colonial Foundation.

Prior to being in the philanthropic sector, Andrew spent 22 years in financial services at the Colonial Group in a variety of roles.

Committees of the Board

Directors

Mr John Fast (Chair)
Associate Professor David Allen
Ms Anne Beischer
Mr Paul Broadfoot
Ms Sandra Fairchild
Mrs Nicky Long
Dr Bernadette White
Mr Andrew Brookes

Finance Risk and Audit Committee

Ms Anne Beischer (Chair)
Mr Paul Broadfoot
Ms Sandra Fairchild

The Finance, Risk and Audit Committee is a Committee of the Board and is responsible for oversight of, and advice and recommendations to, the Board of Directors on financial management (including asset management), risk management (including compliance management) and external audit. The Committee is scheduled to meet twice in a financial year and as necessary.

Investment Subcommittee

Mr Will Baylis (Chair)
Ms Anne Beischer
Ms Sandra Fairchild
Mr Hugh Murray

Investment Advisor: **Drew, Walk and Co**

Investment Manager: **Willis Towers Watson**

The Investment Subcommittee is a Committee of the Finance, Risk and Audit Committee and is responsible for the oversight of the portfolio, and the management of external investment managers. The Committee makes recommendations to the Board, which retains the ultimate responsibility for investment management. The Committee meets four times in a financial year.

Research Committee

Associate Professor David Allen (Chair)
Associate Professor Megan Di Quinzio
Professor Jock Findlay AO
Associate Professor Harry Georgiou
Associate Professor Peter Grant OAM
Professor Gab Kovacs AM
Associate Professor Martha Lappas
Mrs Nicky Long
Dr John Negri
Dr Peter Wein
Dr Bernadette White

The Research Committee is a Committee of the Board and is responsible for reviewing grant applications submitted. The Committee makes recommendations to the Board of Directors for projects to be funded. The Committee meets twice in a financial year and as necessary.

Fellowship Panel

Emeritus Richard Larkins AC (Chair)
Associate Professor David Allen
Mr John Fast
Professor Jock Findlay AO
Professor Gab Kovacs AM
Mrs Nicky Long
Dr Bernadette White

The Fellowship Panel is responsible for reviewing fellowship applications submitted and interviewing candidates. The Panel makes recommendations to the Board of Directors for the fellowship to be awarded. The Panel meets twice in a financial year.

Nomination and Remuneration Committee

Ms Sandra Fairchild (Chair)
Mr John Fast
Dr Bernadette White

The purpose of the Nomination and Remuneration Committee is to assist the Board and its committees in ensuring that they retain an appropriate structure, size and balance of skills to support the strategic objectives and values of the Foundation. The Committee assists the Board by considering and recommending appointments to committees of the Board (including itself) and admission to membership of the Foundation. The Committee also assists the Board by reviewing and making recommendations in respect of the remuneration policies and employment framework for staff. The Committee meets as necessary.

Financial Information 2024

Comprehensive Income

For the Year ended 30 June 2024

	30 Jun 2024	30 Jun 2023
INCOME		
Revenue	131,576	512,658
Other Income	206	2,678
LESS EXPENSES INCURRED		
Contracted Staff	244,455	224,374
Research Grants	1,738,350	1,401,716
Right-of-use Depreciation	23,635	23,635
Lease Interest	619	860
Other Expenses	177,705	153,620
TOTAL EXPENSES INCURRED	2,184,764	**1,804,205**
PROFIT/(LOSS) FOR THE YEAR	(2,052,982)	**(1,288,869)**
OTHER COMPREHENSIVE INCOME (NET OF INCOME TAX)		
Movements for financial assets	5,124,497	2,161,360
TOTAL OTHER COMPREHENSIVE INCOME (NET OF TAX)	**5,124,497**	**2,161,360**
COMPREHENSIVE INCOME FOR THE YEAR	**3,071,515**	**872,491**

Norman Beischer Medical Research Foundation is a Company Limited by Guarantee and is regulated by The Australian Charities and Not-For-Profits Commission.

Financial Position

As at 30 June 2024

	30 Jun 2024	30 Jun 2023
CURRENT ASSETS		
Cash and Cash Equivalents	475,377	340,260
Trade and Other Receivables	103,010	485,043
TOTAL CURRENT ASSETS	**578,387**	**825,303**
NON-CURRENT ASSETS		
Security Deposit	2,789	2,789
Right-of-use Assets	39,389	15,757
Financial Assets	66,733,479	63,390,706
TOTAL NON-CURRENT ASSETS	**66,775,657**	**63,409,252**
TOTAL ASSETS	**67,354,044**	**64,234,555**
CURRENT LIABILITIES		
Trade and Other Payables	4,594	4,554
Lease Liabilities	23,513	16,789
Provision for annual leave	57,050	42,713
Other Liabilities	4,755	0
TOTAL CURRENT LIABILITIES	**89,912**	**64,056**
NON-CURRENT LIABILITIES		
Lease Liabilities	16,789	0
Provision for long service leave	17,071	11,743
TOTAL NON-CURRENT LIABILITIES	**33,860**	**11,743**
TOTAL LIABILITIES	**123,772**	**75,799**
NET ASSETS	**67,230,272**	**64,158,757**
Reserves	15,309,077	10,184,580
Retained Profits	51,921,195	53,974,177
TOTAL EQUITY	**67,230,272**	**64,158,757**

Norman Beischer
Medical Research
Foundation ™

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