

WINTER 2022

HUDSON NEWS

"Thanks to the generosity of those who fund our research, I hope to make a real difference to the lives of countless mothers to come."

- PhD Researcher Kirstin Tindal

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PLEASE SUPPORT OUR
Women's Health
APPEAL



Director's message

Professor Elizabeth Hartland



Welcome to Hudson News Winter 2022

As I write this, Mother's Day is fast approaching and we look forward to celebrating and honouring our mothers as well as motherhood in all its forms. Becoming a mother is one of life's most amazing events, but the health consequences can be significant and lifelong. I am also aware that for many families, Mother's Day may be a complicated, sad and difficult time.

In this issue of *Hudson News*, we are proud to officially launch our Women's Health Appeal for 2022 in connection with Mother's Day, as well as continuing to highlight our world-leading research into conditions that are often overlooked by research and greatly affect women's lives.

Conditions and experiences like stillbirth, endometriosis and pelvic organ prolapse (POP) are unspoken health issues that often leave women feeling alone and frustrated.

Dr Miranda Davies-Tuck and PhD researcher Kirstin Tindal are working to reduce rates of stillbirth, which have not moved in the last 20+ years. Six babies are stillborn each day in Australia and around 20% of stillbirths remain unexplained, with Indigenous women 50% more likely to have a stillborn baby than their non-Indigenous counterparts.

Professor Caroline Gargett and Dr Caitlin Filby are actively working to improve diagnosis and treatment for endometriosis and POP that dramatically impact the ability of women to live their lives fully. Professor Gargett is at the forefront of innovations to help women living with the crippling effects of POP as a result of birth trauma. She is working equally hard to end the pain of endometriosis, and even developing new methods of vaginal reconstruction.

Her colleague Dr Caitlin Filby is tackling the challenge of finding a safe, reliable and early method of detection for endometriosis that avoids surgery, using a surprising new diagnostic tool.

At Hudson Institute, we believe that women have been silently suffering for too long with many of these under-researched conditions, so we are working to change that by translating innovative research into treatments and cures.

Medical innovation in these areas has untapped potential to improve the quality of women's lives and increase their pain-free participation in the workforce, and time with their children and families.

For people like Eliza, Jay, Keighli and Elizabeth, who you'll meet from our Endometriosis Community, our science offers hope for a better quality of life and a cure for a condition that has impacted their lives since they were teenagers.

As we work towards innovative treatments and cures, your support is key to ensuring that our scientists can solve these important challenges in women's health.

We hope you are inspired to give generously to our Women's Health Appeal, so together we can find more answers for these unspoken issues. I urge you to support our research today.

With gratitude

Professor Elizabeth Hartland
Director and CEO

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Turning an experience of stillbirth into a life's work



PhD Researcher Kirstin Tindal and Dr Miranda Davies-Tuck

Kirstin's story

At the age of 20, on a gap year from her Bachelor of Science studies, Kirstin Tindal unexpectedly became pregnant.

Around the 20 weeks mark she was aware that something was amiss, but couldn't get an appointment with her specialist for another two weeks.

As is so often the case, this expectant mother's intuition sadly proved correct, and during an ultrasound procedure she witnessed her unborn daughter's final heartbeats.

Two days later Kirstin's stillborn daughter Aurora was born.

An ending and a beginning

That moment marked both an ending and a beginning, and eight years later, Kirstin is working toward her PhD at Hudson Institute, on a project she hopes will save other women from the pain she endured.

"Every day in Australia about six babies are stillborn, and that figure has not improved for 20 years"

Kirstin Tindal

"If I could prevent one stillbirth it would be the ultimate dream goal of my career."

Turning an experience of stillbirth into a purpose

Largely as a result of her experience – Kirstin switched her studies from zoology to genetics and she's now studying menstruation as an epidemiological indicator of birth outcomes and fertility.

She's also a new mother, with two-month-old Cameron keeping her busy. But thoughts of her research, and Aurora, are never far away.

It is an area she's passionate about and it's what attracted her to Hudson Institute.

"I would like to see menstruation more widely recognised as an important clinical resource," she says. "Too often women's menstrual issues are not even considered as a significant part of their medical history."

Kirstin's PhD project involves collecting women's own stories of their menstrual history and looking for connections to birth outcomes and fertility issues.

Advocacy for stillbirth

Away from work she is also an enthusiastic advocate for women who have experienced stillbirth and the many challenges it can create. Even something as seemingly positive as Mother's Day can be a traumatic time.

"When you feel like you've lost your motherhood, then there's this special day celebrating amazing mothers."

"Being able to turn my experience of stillbirth into a purpose is a really positive thing"

Kirstin Tindal

With baby Cameron by her side, Kirstin is looking to the future without forgetting the past – it's her way of honouring Aurora.

"My experience, from losing a child to going through another pregnancy, was very nerve-wracking, but cathartic. Thanks to the generosity of those who fund our research, I hope to make a real difference to the lives of countless mothers to come," she says.

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The best place to be

And, it seems that Kirstin Tindal is in the best possible place to conduct her research, with her PhD supervisor, Dr Miranda Davies-Tuck, excited for her to join in the work to transform the understanding of the origins of stillbirth.

Among an impressive list of achievements, Dr Davies-Tuck's impact extends as far as changing the way thousands of Australians give birth every year.

Dr Davies-Tuck's research established that women of South-Asian origin (India, Pakistan, Bangladesh and Sri Lanka) run a higher risk of stillbirth at the end of pregnancy. The rate of stillbirth at 39 weeks was equivalent to what it is for the rest of the population at 41 weeks.

She then changed clinical practice to offer earlier monitoring for women of South-Asian background to identify babies at risk of stillbirth. Evidence of fetal distress was observed in ~10% of women, triggering earlier intervention. As a result, significantly, rates of stillbirth among this group have fallen by two-thirds.

Next Steps

Dr Davies-Tuck is now focusing her attention on better understanding and preventing preterm stillbirths. "Current approaches to reduce stillbirth focus predominantly on care at the end of pregnancy and while gains are being made with reducing late stillbirth, 85% of stillbirths actually occur in the preterm period," she says.

"Discovery research focuses almost exclusively on the role of the placenta in stillbirth. However, the underlying origins of poor placental function, which underpin the most common causes for stillbirth, remain poorly understood."

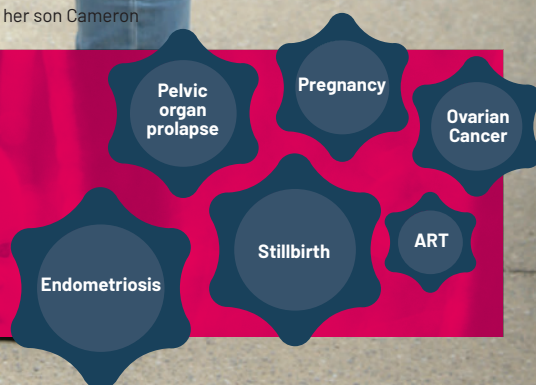
Following the award of a grant of \$84,000 from Stillbirth Foundation Australia, Dr Davies-Tuck is now working to uncover novel early drivers of stillbirth and critical steps that occur prior to the placenta forming, and will look at how the placenta may be used as a diagnostic tool for pregnancies at risk of stillbirth.

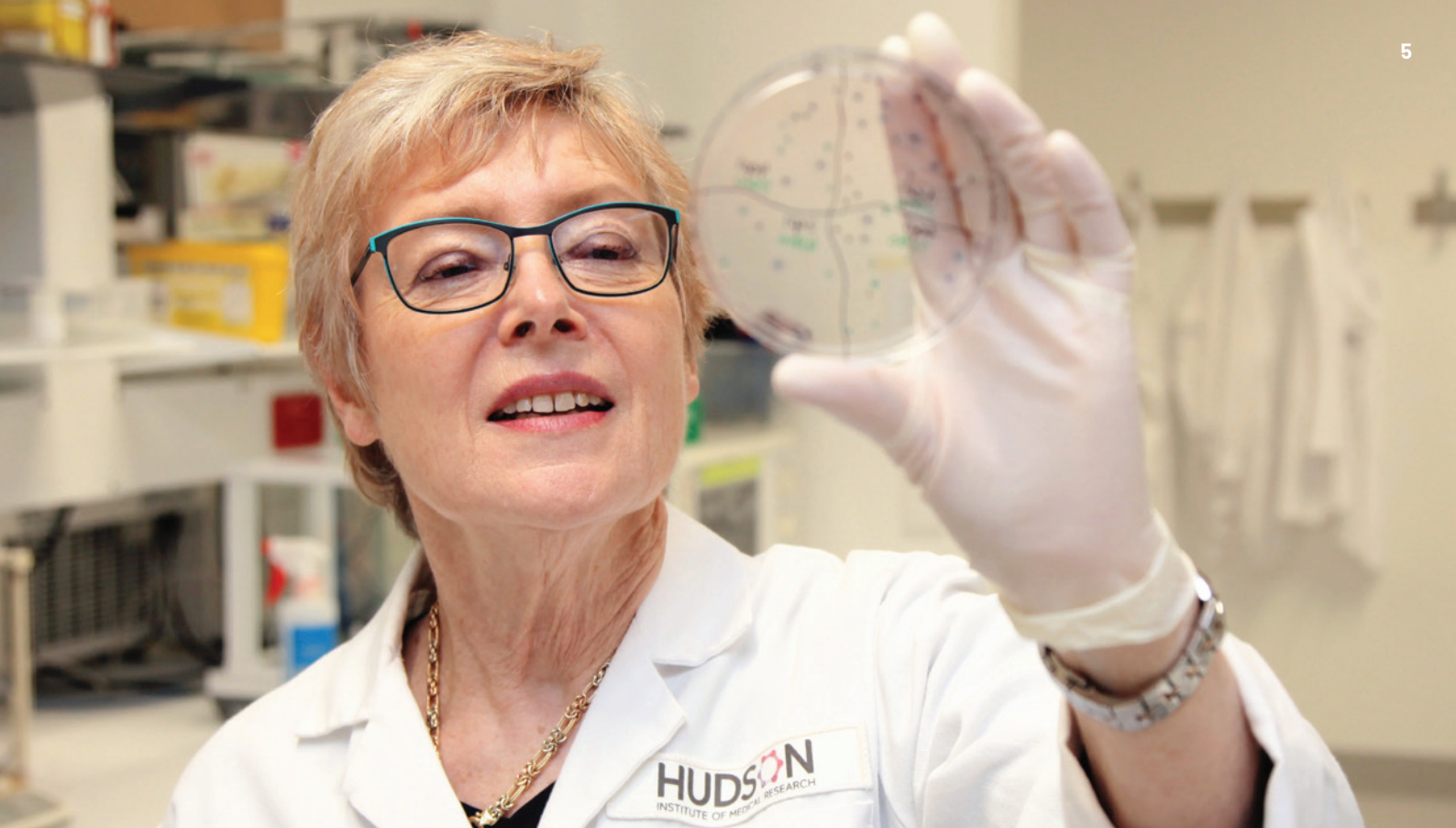


PhD Researcher Kirstin Tindal and her son Cameron

Help us support further research into stillbirth so the risk and rate of stillbirth in Australia is lowered.

**WOMEN'S HEALTH AT
HUDSON INSTITUTE**





Professor Caroline Gargett

Professor Caroline Gargett: giving women back their lives

Whether it's working to help women living with the crippling effects of pelvic organ prolapse (POP), end the pain of endometriosis, or even developing new methods of vaginal reconstruction, Professor Gargett is at the forefront.

But that's not enough for this world-renowned researcher – she is also a mentor to young scientists and a collaborator with numerous institutions on further groundbreaking research.

Recent highlights

Among her highlights of the past 12 months was being the key international member of a team awarded the prestigious \$US 1 million Magee Prize for their work on identifying vaginal stem cells to use with new biomaterials, to repair tissue loss in women with compromised vaginal structure and function.

Their truly multinational project is entitled 'Vaginal Stem Cells: the missing link in vaginal reconstruction'.

Prof Gargett is world-renowned for discovering stem/progenitor cells in human

and mouse endometrium, the highly regenerative lining of the uterus, thereby establishing a new field of research in reproductive biology.

"Having worked on developing tissue engineering constructs for supporting the prolapsed vagina, I knew how important this new area of research would be," she says.

"This important research is for women born without a vagina or who have lost much of it via life-saving surgery – it is to give them their lives back."

International recognition

At Hudson Institute, Prof Gargett is now applying these breakthroughs to common gynaecological disorders, with a research group comprising a new group leader and her team, three postdoctoral scientists, three support staff and six students.

Her international standing in endometriosis research was recently recognised by the Endometriosis Foundation of America (EndoFound), which named her among the inaugural members of its Scientific Advisory Board.

She is also on the International Scientific Committee of the Fondation Pour la Recherche sur l'Endométriose in France.

POP research

None of this is slowing her work on POP, and a recent collaboration with engineers and a urogynaecologist from Monash University is showing great promise.

Using smart technology and bioengineering, the team is developing a smart pessary to monitor and selectively stimulate the pelvic floor muscles.

"The device is smart because not only will it assist supporting prolapsed pelvic organs, but also in strengthening weakened pelvic floor muscles," Prof Gargett says.

The ring-shaped device includes an array of sensors that monitor and profile the pelvic area, and a stimulator that helps with muscle toning.

The device uses intelligent sensing and signal processing techniques, along with 'stimulators', to rehabilitate pelvic floor muscles as well, to alleviate symptoms of POP.

It's hoped the device will undergo clinical trials for the first time in 2023.

In the meantime, Prof Gargett will be keeping herself busy, and keeping Hudson Institute at the forefront of women's health research.



Dr Caitlin Filby

Dr Caitlin Filby: tackling endometriosis on two fronts

The ultimate goal of this research is to find a safe, reliable and early method of detection that avoids the need for surgery.

With the average time between symptom onset and diagnosis currently 7-10 years, earlier detection is crucial, but so is better care for people living with the condition.

Dr Caitlin Filby is tackling both those challenges with creativity and innovation, and the key lies in something that's usually disposed of as waste.

Dr Filby believes menstrual fluid could provide much earlier diagnosis and also, potentially, clues to the best forms of treatment for each sufferer.

She is one of a number of researchers at Hudson Institute who are taking a closer look at menstrual fluid as a valuable tool for diagnosis and treatment testing.

Her research showed that from one period to the next the composition of a woman's menstrual fluid is relatively stable, allowing them to establish a baseline for testing.

"We would love to be able to offer women a simple and painless menstrual fluid test to confirm their suspicions of endometriosis," Dr Filby says.

"A non-invasive menstrual fluid test would help uncover the undiagnosed population of women with endometriosis, allowing girls and women to access healthcare early and prevent disease progression."

But the benefits of her research don't stop there – she has teamed up with a world leader in bioengineering, Professor Linda Griffith, to extend her endometrial 'organ-on-a-chip' using organoids obtained non-invasively from menstrual fluid.

"Endometrial organoids are miniature organs in a dish that model the endometrial tissue that forms endometriosis lesions and so they can help us understand the response of the endometrium to different medications, both existing and new drugs," she says.

"Because different women can respond differently to the same treatment, menstrual fluid organoids may allow us to determine a

treatment pathway tailored to each woman's specific symptoms, prior to surgery."

"They could one day allow women to 'try before you buy' – the ability to non-invasively test a range of different medications in a dish in the lab before commencing treatment using the medication most suited to them," Dr Filby says.

This endometriosis research is supported by The Ritchie Centre human tissue bank – an archival and virtual resource that collects tissue samples with minimal impact on the participants. These samples are well documented, with both participants and surgeons completing a comprehensive endometriosis questionnaire.

Tissues include endometriosis lesions and hysterectomy endometrium, which can be stored for future analysis, or used for generating endometrial epithelial organoids.

All these technologies come together to create a vision of a day – hopefully in the near future – when endometriosis is detected earlier and treated better.



Have you considered what your legacy could achieve with a gift in your Will?

Leaving a gift in your Will to Hudson Institute will allow us to power new and innovative treatments and cures for this and future generations.

Our team is here to help with any queries. Please contact Connie Honaker at

t: + 61 450 524 565 | e: connie.honaker@hudson.org.au



Associate Professor Michael Gantier and PhD researcher Alexandra McAllan with the group from Fire Rescue Victoria with novelty cheque representing their donation.

Firefighters Charity Fund supports BRCA1 gene sequencing

On 16 March we were delighted to welcome a group from Fire Rescue Victoria, who are generously supporting our research into the BRCA1 or BRCA2 mutations via the Firefighters Charity Fund.

The group from the Policy and Planning Department visited the Nucleic Acids and Innate Immunity Laboratory run by Associate Professor Michael Gantier and the Medical Genomics Facility run by Dr Trevor Wilson PhD, where they were able to see the technology and science behind the project they are supporting.

Funds from this donation are being put towards the cost of performing a sequencing experiment of gene samples (a small RNA sequence of samples with BRCA1 mutations), with the aim of defining novel biomarkers linking uncharacterised mutations with breast cancer development and progression. This will support the research of PhD student Alexandra McAllan

who is supervised by Associate Professor Michael Gantier.

Previously, our laboratory discovered that molecular variations exist within microRNAs, which when analysed markedly increase their accuracy in disease prognosis. This donation will allow for further research into microRNAs and BRCA1 mutations more specifically.

As Dave Harris, Acting Assistant Chief Fire Officer, reflected, “We are excited that this donation will assist In Alex’s research, and feel that any work that will reduce the likelihood of cancer-related illness is worth supporting.”

The BRCA1 and BRCA2 genes are key tumour suppressor genes that are normally expressed in breast or ovarian tissue, where they work to repair DNA damage and prevent tumours from forming. In women with a mutation in the BRCA1 gene, this DNA damage cannot be repaired, meaning they are at a much greater risk of developing breast and ovarian cancer.



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L-R: Eliza Hart, Jay Brennan, Keighli O'Brien and Elizabeth Riordan

Our Endometriosis Community shares messages of hope back with us

"We take the rope and pull each other out"

Eliza Hart, endometriosis community member

When members of our endometriosis community responded to our request for stories at the start of this year, common themes of pain, frustration, doctors not taking them seriously and long journeys to diagnosis were all present. However, what shone through in all the stories were messages of resilience, hope, persistence, and of the power of community.

As Eliza Hart said, "When I was going through pre-anxiety about surgery, beautiful messages of support and solidarity came from my online community, and they pulled me out of the mud when I was going through that. It's not heavy – you've got this beautiful group of people who are willing to help, who

you have solidarity with. We take the rope and pull each other out."

When asked what their hope for research like ours was, people living with endometriosis had a wealth of ideas. Eliza Hart mentioned that she would like to see the research impact diagnosis, which would trickle down to any practitioner interacting with women presenting with symptoms of endometriosis.

Elizabeth Riordan expressed hope that the research would increase awareness and education, earlier diagnosis, better and alternative pain management methods. She also spoke about the need for a cure.

Jay Brennan reflected on her experience in a regional area, and hoped that more resources can be provided to regional health professionals around pain, endometriosis and the mental health

effects that stem from this condition. She also hoped that more support will be provided for employers around this health issue and how it impacts employees, as well as the need for less stigma overall.

Lastly, Keighli O'Brien spoke about the need for increased gender inclusivity when speaking about those affected by endometriosis and the need for more research that will investigate the genetics of endometriosis and hereditary linkages among family members.

To sign up for our newsletters specific to these areas of research, please visit:
hudson.org.au/endometriosis/

You can help improve the lives of women everywhere by supporting our Women's Health Appeal today.

PhD researcher Kirstin Tindal with baby Cameron

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Neelima and baby Arjan

"Your contribution will make a real difference to people's lives."

Professor Elizabeth Hartland
Director and CEO

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