

SUMMER 2025

HUDSON NEWS



Tiny patients, big breakthroughs

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**Support breakthroughs for the
smallest patients with a gift before
31 December 2025.**



Director's message

Professor Elizabeth Hartland AM



As we approach the end of the year, I am inspired by our dedicated researchers who continue to push the boundaries of discovery, translating science into hope for patients and families.

In this edition of Hudson News, you'll meet baby Elias, born preterm at just 22 weeks and 5 days. Thanks to medical research, Elias is now thriving after 140 days in hospital with no long-term health complications. His family's story highlights the vulnerability of preterm babies and is a real-world example of how discovery science and its translation to patients can change outcomes.

Our work in newborn health is deepening our understanding of how early-life inflammation shapes long-term health. Our teams have shown that inflammation before birth can cause lasting harm to the developing brain, reinforcing the urgent need for new interventions to protect babies born too early.

Dr Rob Galinsky, who leads our Perinatal Inflammation and Neurophysiology group, has identified specific infections during pregnancy that can damage the fetal brain, which provides valuable insight into the best care for babies like Elias.

This year has brought other remarkable advances across our Institute. Associate Professor Sam Forster and colleagues uncovered hundreds of previously unknown viruses that infect the bacteria in the human gut, opening new possibilities for engineering the human microbiome to create living biotherapeutics.

And in the fight against childhood cancer, our scientists are pioneering antibody-based approaches to treat paediatric glioma, one of the most devastating brain cancers. With new funding secured, this research brings us closer to therapies that could change the trajectory of these young lives.

These achievements reflect the breadth of Hudson Institute's mission: from discovery science to clinical translation, from the earliest moments of life to the challenges of chronic disease. None of this progress would be possible without the dedication of our researchers, the commitment of our partners, and the generosity of our supporters.

As summer approaches, we look ahead with optimism. The discoveries we make today are the foundation of tomorrow's cures. With your continued support, we will keep working to turn fragile beginnings into brighter futures for more children like Elias.

Thank you for your support this year. I wish you a joyful festive season and a bright new year.

With gratitude,

Professor Elizabeth Hartland AM
Director and CEO

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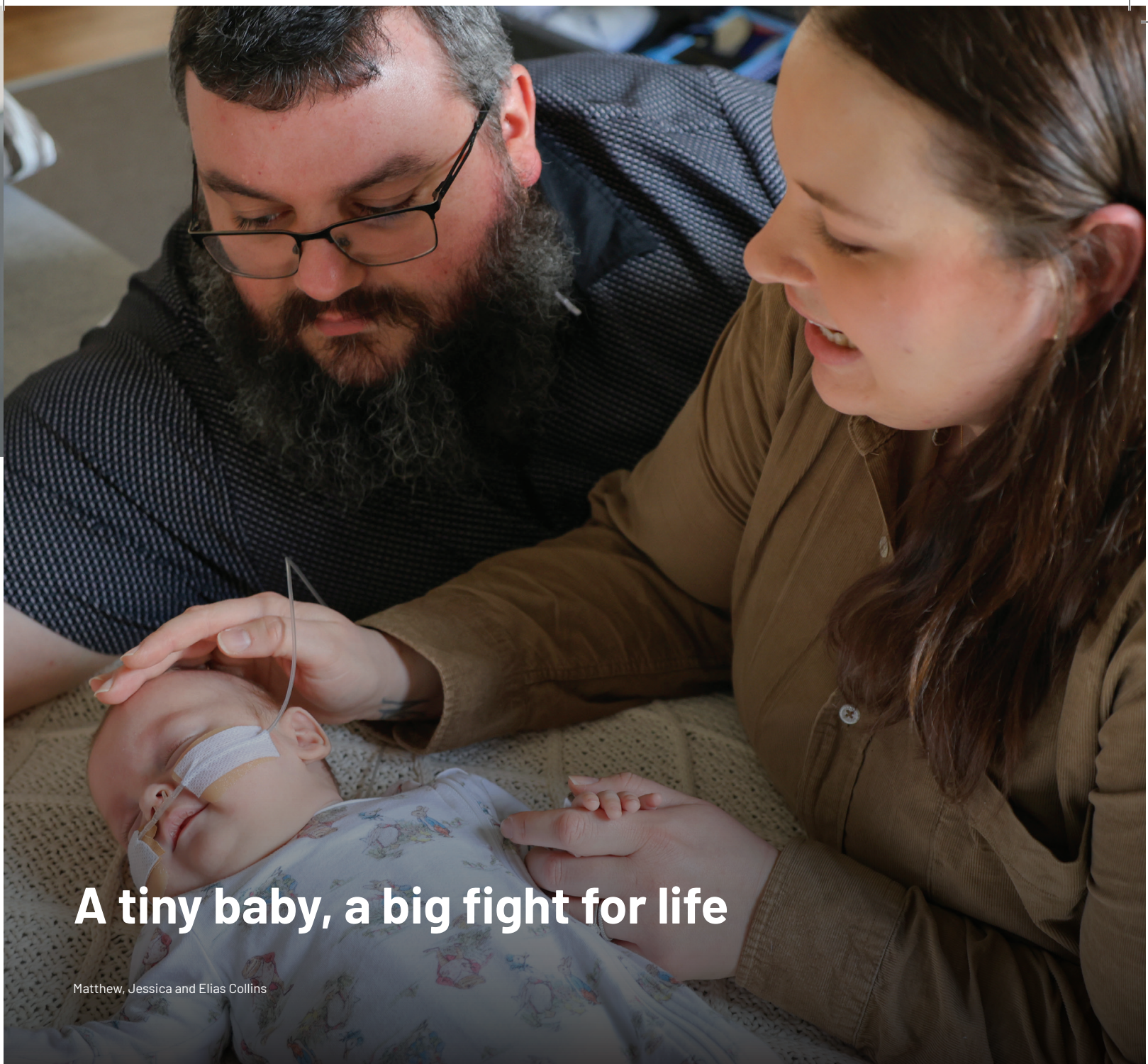
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SCAN ME >



A tiny baby, a big fight for life

Matthew, Jessica and Elias Collins

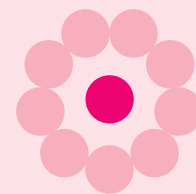
Jessica Collins expected that life would change with the arrival of her first child, but nothing could have prepared her for the changes that were about to come.

Her new life as a mother was still supposed to be four months away when a sudden medical emergency meant that baby Elias was on his way, in a hurry, after just 22 weeks' gestation.

A baby so premature would have had no chance of survival until just a few years ago but as Jessica and her husband Matthew were about to find out, medical science has come a long way in a short time.

No bigger than a soft drink can, little Elias faced the same challenges as all extremely preterm babies, namely getting enough oxygen into his system to ensure healthy growth, without causing the inflammation that could damage his tiny brain or lungs.

"My husband and I knew the professionals would lead us in the right direction," said Jessica. "Elias would not be here without them."



Around **15 million** babies are **born preterm** each year **worldwide** – that's more than **1 in 10** births globally.



L-R: Dr Robert Galinsky with PhD students Dima Abdu and Kayla Vidinopoulos in the lab at Hudson Institute

Sadly, being born preterm drastically increases a child's chances of developing serious developmental conditions such as cerebral palsy (CP).

Dr Rob Galinsky knows this better than most. As Head of Hudson Institute's Perinatal Inflammation and Neurophysiology research group, he studies the effects of inflammation on the newborn brain and the life-long cognitive, language and movement disorders it causes.

Along with a skilled and dedicated team, Dr Galinsky's work aims to better understand, control and, where possible, eliminate this inflammation and its devastating effects.

The Galinsky lab delivers vital fundamental research that helps improve understanding of seriously life-changing medical conditions. But this is more than theoretical science – it has a direct link to how neonatal specialists manage compromised pregnancies and difficult births.

Among his published work in 2025, Dr Galinsky's team identified a specific strain of bacterial infection that's most likely to cause a preterm birth, like Elias's, and how inflammation, induced by exposure to a bacterial infection, causes damaging inflammation to the unborn brain.

Using this new knowledge Dr Galinsky and his multidisciplinary team are now developing new therapies that can prevent or reverse the mechanisms of brain damage that they have discovered, along with medical technologies that will allow doctors to detect early signs of brain cell stress. This will allow clinicians

to intervene quicker to prevent adverse outcomes for babies at risk of developing a brain injury around the time of birth.

Once the initial danger had passed, and she was preparing to take her son home for the first time, Jessica had a chance to meet Dr Galinsky and thank him personally.

"My research studies the mechanisms that disrupt fetal and newborn brain development," Dr Galinsky said. "My team's vision is to reduce the lifetime impact that cerebral palsy and other neurodevelopmental disabilities have on individuals and their families."

Dr Rob Galinsky

"I've been able to put a face to someone who put in the research that ended up helping my baby and me," she said. "If people weren't dedicating their lives and careers to helping people like Elias & me, then we wouldn't be where we are now."

The old adage "prevention is better than cure" can be applied to many fields of medicine, but nowhere more than in newborn health.

Six months into his young life – and just 2 months past his original due date – little Elias and his grateful family are living proof.

Research with one foot in the clinic and an eye to the future

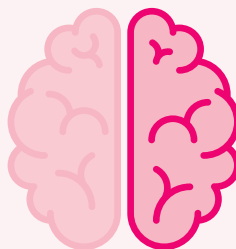
Dr Rob Galinsky works closely with fetal and neonatal physiologist Professor Graeme Polglase, and their insights are translated directly into clinical practice.

2025 also saw publications from the Galinsky lab identifying:

- The specific mediators of inflammation in the womb that are most likely to cause long term damage to the unborn brain
- How inflammation in peripheral organs, such as the babies' lungs, can affect newborn brain development
- The physiological processes that cause brain inflammation before birth and how to detect them
- A new technology, together with collaborators in the Department of Engineering at Monash University, that uses Artificial Intelligence (AI) to monitor brain health and prevent brain injury before birth.

At the same time, the next generation of researchers into perinatal health in Dr Galinsky's lab – scientists like Dr Nhi Tran, Dr Sharmony Kelly, Kayla Vidinopoulos, and Dima Abdu – are building promising research careers on the shoulders of Dr Galinsky and his team.

Up to **half** of **preterm survivors** have some form of **neurodevelopmental impairment.**



Cerebral palsy remains the **most common physical disability** in childhood.



Dr Robert Galinsky in the lab at Hudson Institute



Dr Abdul Razak and Associate Professor Courtney McDonald

Tiny patients, big breakthroughs

Every baby deserves the chance to thrive. But for one in ten born too soon, that chance is often stolen before they take their first breath.

New research from Hudson Institute of Medical Research has uncovered a silent threat to preterm babies: inflammation in the womb that doesn't just strike once—it lingers, causing lasting damage to the developing brain. For the first time, scientists have confirmed that this inflammation persists for months after birth, continuing to harm fragile neural tissue long after the initial exposure.

This breakthrough, led by PhD student Dr Abdul Razak and supervised by Associate Professor Courtney McDonald, reveals a critical window for intervention—and a powerful opportunity for hope.

Preterm birth and brain injury

A/Prof McDonald said previous human studies suggested that ongoing inflammation could be detected in the blood: “But this is the first time we have shown in a preclinical model that closely mimics human brain development that the brain itself also has ongoing inflammation,” she said.

The science behind the discovery

Previous research had clearly identified primary inflammation – the body's initial response to a particular stress – and secondary inflammation, which occurs in the days and weeks after the original injury.

A/Prof McDonald and her team identified “tertiary inflammation”: a third wave of immune activation that continues well beyond the initial insult. This persistent inflammation damages white matter, disrupts myelination (the process where a protective sheath wraps

around nerves, allowing electrical impulses to travel faster and more efficiently), and destroys support cells essential for healthy brain function. These changes mirror those seen in lifelong conditions like cerebral palsy and other neurodevelopmental disorders.

Until now, therapies have focused on the immediate aftermath of preterm birth. But this research opens the door to delayed treatments—ones that could be administered weeks or months later, when the damage is still unfolding.

“These findings will enable the testing of delayed therapies for brain injury that show up months after preterm birth and will help researchers explore long-term behavioural deficits after preterm inflammation.”

“This research provides a clinically relevant model to test therapies that could prevent or reduce this injury, with the goal of improving long-term outcomes for these babies,” Dr Razak said.

There are currently no therapies that target inflammation-induced brain injury in the womb. However, with continued research, we can move beyond understanding the damage to developing real treatments—giving preterm babies not just survival, but the chance to thrive.



Preterm birth is the leading cause of death and disability in children under 5 years of age.



Associate Professor Samuel Forster

Uncovering a whole new world inside the gut

Microbiome medicine has been described as having the potential to revolutionise healthcare.

Thanks to a team from Hudson Institute and Monash University, that revolution just came a whole lot closer, promising a new range of possibilities.

Hudson Institute's own Associate Professor Sam Forster working with Professor Jeremy J. Barr from Monash University's School of Biological Sciences and PhD student Dr Sofia Dahlman, who, published a ground-breaking study in the journal *Nature*, identifying hundreds of previously unknown gut viruses.

These viruses, known as bacteriophages, infect the bacteria in the gut. They offer the potential to reshape the gut microbiome, influencing gut health and the progression of various disease states.

Waking dormant viruses

They found that compounds produced in human gut cells can wake up dormant viruses inside gut bacteria. This could have major implications for gut diseases like inflammatory bowel disease (IBD), where inflammation and cell death are common.

"We've known that the gut is full of viruses, but until now, we didn't have the tools and experimental approaches to study them in the lab," explained Dr Dahlman, "...but our findings suggest that the human host isn't just a passive environment, it's actively influencing viral behaviour."

The research represents over eight years of collaborative work, and A/Prof Forster believes it will have significant implications for health translation.

"Being able to grow these viruses allows us to understand their function and provides the opportunity to develop microbiome therapeutics for diseases from inflammatory bowel disease to cancers," he said.

Decoding mysteries of the human gut

But this work – described as "a major step forward in decoding the viral dark matter of the human gut" – is far from the only breakthrough to come from the Forster lab in the past year.

As part of a joint project between A/Prof Sam Forster, PhD Student Dr Caitlin Welsh and Prof Chris Greening from Monash

University's Biomedicine Discovery Institute, they have revealed for the first time how hydrogen is made and used in the human gut – including the positive role it plays in supporting gut health.

Their work, published in *Nature Microbiology*, analysed how microbes control hydrogen levels in the gut.

Hudson Institute post-doctoral researcher, Dr Caitlin Welsh said the results revealed hydrogen had an even bigger role in gut function than previously thought.

"Most people release about a litre of gas per day and half of that is hydrogen. But hydrogen is more than just the gas behind flatulence – it's a hidden driver of gut health," Dr Welsh said. "Our study shows hydrogen shapes the gut microbiome in surprising and varied ways. It helps some beneficial bacteria thrive in the gut and keeps digestion going."

This research highlights the need to expand fundamental knowledge of how our gut works so it can be used to design new treatments for gastrointestinal issues.

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L-R: Elias and Jessica Collins

Every 15 hours, a baby's future is at risk of brain injury.

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Walking for Cade – a community united in hope

On Friday, 26 September, the Grand Final public holiday, family, friends and supporters came together along Melbourne’s bayside for *The Long Walk Home* – a moving tribute to Cade Watts, who passed away in February 2023 at just 15 years of age from Ewing Sarcoma.

The walk was organised by Cade’s father, former Western Bulldogs player **Jason Watts**, together with a group of friends and relatives known as *Team Cade*. Their aim was to honour Cade’s memory while raising vital funds for Hudson Institute of Medical Research’s sarcoma program.

“This is the most common type of cancer in children and even for those who survive, the effects can be devastating, so we want to make a positive difference”, says Jason Watts.

A community response

Participants chose from four starting points – St Kilda Pier (40km), Mentone (20km), Chelsea (10km) and Seaford (5km) – all converging at Frankston Pier. Every step symbolically carrying Cade’s spirit through the places he loved most.

The event drew walkers of all ages: Cade’s schoolmates, teammates, local families and long-time supporters. Together, they turned grief into action, raising significant funds to accelerate research into sarcoma, one of the most aggressive and underfunded childhood cancers.

Cade’s legacy lives on

For Jason, the walk was about more than distance. “We wanted to do something that reflected Cade’s strength and resilience, and to bring people together in his name,” he said.

Although Cade’s life was heartbreakingly short, his legacy is already inspiring change. *The Long Walk Home* is set to become an annual tradition, ensuring Cade’s story continues to drive progress in sarcoma research for years to come.



Jason and Cade Watts



Team Cade at Frankston Pier after completing the inaugural 40km Long Walk Home on September 26, 2025.



Write the next breakthrough into your will – leave a legacy that saves lives.

Your legacy can power our brilliant researchers to find new and innovative treatments and cures for current and future generations.

Our team is here to help with any queries.

Please contact Connie Honaker at:

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L-R: Elias and Jessica Collins