

SUMMER 2024

HUDSON NEWS



Young cancer survivors set their sights on science

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**Support our life saving research
now for better, safer children's
cancer treatments.**



Director's message

Professor Elizabeth Hartland AM



Finding cures and better treatments for children's cancers

Cancer kills three children every week in Australia – more than any other disease. And more than 1,000 children and adolescents are diagnosed with cancer each year – highlighting why our researchers are focused on trying to find much-needed cures and better treatments for children with cancer.

In this edition of Hudson News, you will read a wonderful story about two young cancer survivors, Tianna and Raya, who were diagnosed at 12 and 11 respectively, who met each other while undergoing bone marrow transplants – and who are now both planning a future in science – one as a paediatrician and one as a pharmacist. Both girls spent time recently here at Hudson Institute in Dr Catherine Carmichael's laboratory, being introduced to the scientific side of leukaemia.

Catherine is a molecular cancer biologist working to find cures and better treatments for children with leukaemia, which is the second leading cause of cancer-related deaths in children. Her research program is developing new laboratory models of leukaemia that more faithfully reflect the childhood disease. Her team is working toward identifying, developing and testing new treatment approaches specifically for Acute Myeloid Leukaemia.

Children are affected by a gamut of cancers, so Hudson researchers are working on how this cruel disease manifests itself in a range of different ways.

In this Hudson News we also share the story of Dr Paul Daniel whose work is focused on the highly promising use of combination therapies for brain tumours in children and adults.

Discovering which paediatric cancer treatments can be safely and effectively used together is a slow process. To accelerate this, Hudson's Next Generation Precision Medicine team is testing thousands of treatment combinations on actual tumour samples to identify and prioritise effective therapies. A ground-breaking initiative of this team is the Childhood Cancer Model Atlas (CCMA) – the world's largest collection of high-risk paediatric cancer cell lines, sharing findings with over 50 cancer research institutes, universities and academic medical centres worldwide.

Researchers like Dr Carmichael and Dr Daniel highlight why it is vital for us to explore every possible avenue for research funding and why every dollar you commit to our work makes such an important difference.

High-quality research requires significant funding, and it takes many years to bring an idea from the laboratory into the clinic.

The team at Hudson Institute continues to strive for cures and better treatment for children with cancer. It is a long road, but together we can continue to strive to overcome these challenges.

With gratitude,

Professor Elizabeth Hartland AM
Director and CEO

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SCAN ME





The lure of the lab calls two teenage cancer survivors

Raya, who was diagnosed with cancer at 11, is a cancer survivor with plans to work in the science field in future. Here she is doing work experience in a laboratory at Hudson.

A girl's teenage years can be a challenging time, with lots of changes to deal with as she works out where she fits in the world, but all of that seems almost insignificant when cancer is thrown into the mix.

Imagine dealing with cancer during the depths of COVID-19 lockdowns, then emerging not just healthy, but with a determination to pursue a career in healthcare.

That's the story shared by two remarkable Melbourne teenagers, Tianna and Raya. They fought and beat leukaemia, and are now aiming to help others who find themselves facing the same medical nightmare.

A friendship forged during treatment

They met and forged a friendship in mid-2021 while undergoing bone marrow transplants and have come together again this year, spending a week of work experience in Dr Catherine Carmichael's laboratory at Hudson Institute of Medical Research.

Dr Carmichael is a molecular cancer biologist who leads the Leukaemia Modelling and Therapeutic Discovery Research Group at Hudson Institute, so she's just the person to introduce the girls to the scientific side of leukaemia.

"Leukaemia is the most common cancer diagnosed in children and the second leading cause of cancer-related death in children. Each year nearly 300 Australian children are diagnosed with leukaemia."

Dr Catherine Carmichael

continued next page



L-R: Samiksha Dhananjay with Tianna who was diagnosed with cancer at 12, is a survivor and she did work experience at Hudson Institute recently.

Therapies tailored to children

“Rather than being developed with children in mind, childhood leukaemia treatments have been largely adapted from the adult setting. We know that children are not just small adults, so we need to design and develop therapies specifically tailored to children, to increase efficacy and reduce toxicity and long-term side effects.”

Dr Carmichael’s research program is developing new laboratory models of leukaemia that more faithfully reflect the childhood disease. Her team is working toward identifying, developing and testing new treatment approaches specifically for childhood leukaemia.

“The hope is to develop new ways to treat children with leukaemia that are more effective, less toxic and longer lasting,” she said, as she prepared to welcome the two teens to her laboratory.

Helping future cancer patients

It’s not just the girls who have been inspired by their experiences in the health system – their families are now active in helping others, as part of the Victorian Paediatric Cancer Consortium’s Parental Advisory Committee, a co-led initiative of Hudson Institute.

Though their cancers were different – Raya had B-cell Acute Lymphoblastic Leukaemia (BALL) and Tianna had Acute Myeloid Leukaemia (AML) – they are now both in remission and also aware of the long-term effects of the treatments they endured.

It’s extra motivation to do what they can to improve the science around blood cancers.

Tianna

- 12-year-old Tianna was unwell at Christmas 2020. She got her leukaemia diagnosis a few days later. Her first transfusion was on New Year’s Eve, and she had a lumbar puncture every 6 weeks to administer chemotherapy.
- She spent almost five months in a pod (six weeks inside, then two weeks at home for each cycle) as her immune system was “wiped” before a bone marrow transplant.
- Developed a mystery infection in the Intensive Care Unit, where she was on life support for 72 hours.
- Still dealing with side-effects of the treatment, including potential fertility issues.

Tianna wants to become a paediatric doctor, saying: “I’ve been there, so I truly understand how these kids feel and what they’re going through; I’d love to make this experience better and give people hope.”

Raya

- At 11 Raya developed a tic, then spasms then facial tics, all on the right side of her body, then memory loss. Eventually they were told her body was producing excessive amounts of eosinophils – a rare side-effect of leukaemia – which disrupted brain functions.
- The first round of chemotherapy made a moderate change to her cancer counts, but the second round, which was more intense, made very little change. Each round took a month.
- Wanting to avoid a bone marrow transplant, due to the effects of radiation exposure, her father suggested CAR-T treatment as bridging therapy, which helped, but in the end, a transplant was needed.
- Developed graft-versus-host disease after transplant, meaning an extra month in hospital.
- Still dealing with side-effects of the treatment, including issues with peripheral nerves.

Raya’s ambitions are similar but different – she plans to become a pharmacist: “This whole experience has shaped that; I learned there are lots of nice people in hospitals and I can see myself being part of it.”



Dr Catherine Carmichael is working towards long term remission and cure for children's blood cancer



In a nutshell

Dr Catherine Carmichael is investigating the key mechanisms underpinning the development, relapse and therapy resistance of childhood acute myeloid leukaemia. She aims to develop innovative new models of childhood AML that recapitulate the human disease and can be used to gain an enhanced understanding of how this disease develops and how it can be stopped.

The two types of experimental models that Dr Carmichael is developing will allow her team to devise new treatments for childhood AML with reduced toxicity, enhanced efficacy and increased likelihood of long-term remission and cure.

Dr Catherine Carmichael is working towards long term remission and cure for children's blood cancer

Dr Catherine Carmichael, Group Head, Leukaemia Modelling and Therapeutic Discovery Research at Hudson Institute, aims to identify the key mechanisms that drive development of an aggressive form of blood cancer called acute myeloid leukemia or AML.

Leukaemia is the most common form of cancer diagnosed in children and the second leading cause of cancer related death in children.

About 40 per cent of children diagnosed with AML do not survive past five years, and many of those who do survive, will suffer long-term side effects from the highly toxic treatment that cured their leukaemia.

Side effects can include damage to the heart, brain and reproductive organs, as well as a higher rate of secondary cancers later in life.

With her team of scientists, Dr Carmichael is working to develop non-chemotherapeutic and less toxic treatments, so these young people can make the most of their second chance at life.

This all starts with a better understanding of how the disease develops and identifying key weaknesses that can be targeted with new therapies.

This is where the science gets really interesting, as Dr Carmichael explains: "Up to 80 per cent of childhood and infant AMLs are driven by large chromosomal abnormalities called gene fusions, which lead to the impaired activity of critical blood cell regulators."

"Targeting these gene fusions would be transformative for AML therapy, but currently most gene fusions remain undruggable. So, our research focuses instead on performing large-scale unbiased drug and genetic screens to identify unique druggable gene targets that AML cells depend on to survive," she said.

A major problem to overcome is the fact that AML cells derived from patients can only survive in the laboratory for a short period of time, so Dr Carmichael and her team are developing new approaches to generate renewable sources of AML cells for ongoing analysis in the laboratory.

The first approach they are using involves generating AML gene fusions within human blood stem cells and using these cells to induce AML in immunocompromised mice.

The second approach involves using the Nobel Prize-winning induced pluripotent stem cell (iPSC) technology to re-program AML cells from patients back into an immature stem cell like state. These so-called AML-derived iPSCs can then be expanded indefinitely in the laboratory.

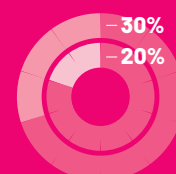
Both approaches will provide Dr Carmichael and her team with a ready source of AML cells for large scale experimental study and identification of new drug targets.

Ultimately, Dr Carmichael's team aims to develop new treatment options for childhood AML, which will be more effective and have reduced toxicity and long-term side effects.

Dr Carmichael's overall aim is to explore new potential treatments for this poor outcome disease, saving countless children from not just leukaemia, but the unwanted acute and chronic effects of current cancer treatments.

Blood Cancer 101

- Blood cancers arise when blood cells start to grow abnormally and uncontrollably. These abnormal blood cells usually arise in the bone marrow and continue to grow and expand until they fill up the bone marrow and impair its ability to generate normal blood cells.
- There are several different types of blood cancer that are distinguished by the form of blood cell affected and the way that an abnormal blood cell behaves. Some of the more commonly diagnosed blood cancers include leukaemia, lymphoma, myeloproliferative neoplasm, myelodysplastic syndrome and myeloma.
- With the development of new and improved therapies, some blood cancers such as Acute Lymphoblastic Leukaemia (ALL) in children now have very high cure rates above 80 per cent.
- Other blood cancers such as aggressive forms of Acute Myeloid Leukaemia (AML), however, can still have as low as a 25 per cent chance of cure with current treatment strategies.



Leukaemia accounts for approximately **30% of all childhood cancers** and **20% of childhood cancer deaths.**



—R. Shazia Adjumain and Dr Paul Daniel at Hudson Institute of Medical Research.

New Australian Lions' children's cancer fellowship



Every week in Australia three children die of cancer.

Many children who survive cancer never really leave it behind. It stays with them, either in the form of ongoing risk of relapse or in the many health effects that can come from the current treatments used to fight childhood cancers.

Hudson Institute is at the forefront of research to change these statistics and improve the outlook for children with cancer. It is an endeavour that takes large amounts of expertise, imagination, persistence...and money.

The Australian Lions Childhood Cancer Research Foundation (ALCCRF) has recognised this challenge with the establishment of a prestigious national fellowship awarded to Dr Paul Daniel from our Centre for Cancer Research.

Lions have been involved with childhood cancer since 1976. They have raised more than \$13 million for childhood cancer research in the past 15 years through their foundation and have become one of Australia's most important philanthropic donors in this vital field.

Chair of the ALCCRF, Ron Skeen OAM, was thrilled to announce the establishment of this prestigious national fellowship at Hudson.

"This new fellowship provides \$424,213 over two years to support Dr Daniel's salary and much of his equipment plus a budget for engagement with cancer patient advocates and their families."

At a time when funding for research is becoming harder and harder to win, this fellowship will have a massive impact.

Dr Daniel said: "The project which the ALCCRF funding helps support is my role in the Next Generation Precision Medicine Program, which is investigating the highly promising use of combination therapies, employing multiple drugs concurrently to enhance therapeutic effectiveness for cancer patients."

"This approach has proven transformative for patients and presents several advantages compared to single-drug treatments, chief among them, improved survival for certain patients."

The Next Generation Precision Medicine Program is led by Hudson Institute's Professor Ron Firestein, a clinician-scientist and the Head of the Centre for Cancer Research at Hudson.

Discovering which treatments can be safely and effectively used together is a slow process, so the Next Generation Precision Medicine team is using actual tumour samples to evaluate thousands of treatment combinations for the identification and prioritisation of effective therapies.

Hudson Institute is also home to the Childhood Cancer Model Atlas - the world's largest collection of high-risk paediatric cancer cell lines, sharing research findings with 50 cancer research institutes, universities and academic medical centres worldwide.

This is the international network that Dr Daniel is part of, working with clinical trial groups where our findings will have the opportunity to be rapidly translated into clinical settings, to improve outcomes for children with cancer.

"The support from the Lions foundation has immediate and long reaching impacts on my

career as a paediatric cancer researcher," Dr Daniel said. "Firstly, the fellowship secures my position as a researcher for the next few years, where I hope to make an immediate impact on how childhood cancers are treated."

"But it will also provide a springboard for me to establish myself as a leading researcher for high-risk childhood cancers, from which I hope to set up my own laboratory in the future

to continue to address the most important questions facing the field - improving outcomes for children with cancer."

Through this type of philanthropy, Lions have not just improved the chances of children with cancer living longer and better lives. Lions have also improved the likelihood that the next major breakthrough in paediatric cancer will come from Hudson Institute in Australia.

It's a donation made with love, and something that everyone involved in can be very proud of.

There is an urgent need for new and more precisely targeted medicines to treat childhood cancers.

"Dr Daniel is a cancer biologist with over a decade of experience. He studies adult and paediatric brain tumours and is currently driving cutting-edge translational research to identify better treatments for low-survival childhood brain cancers."

Ron Skeen OAM

lions australia 
75 years and counting

Lions Australia

- Supporting childhood cancer research since 1976
- Australian Lions Childhood Cancer Research Foundation set up after 2009 lifting its commitment to achieving 100 per cent survival of children with cancer
- Funded a two year fellowship covering Dr Daniel's salary, equipment and vital cancer patient engagement.

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Tianna and Raya childhood cancer survivors, in Dr Carmichael's Laboratory at Hudson Institute.

“Our overall aim is to identify new treatments for this aggressive disease, saving children from not just leukaemia, but the unwanted effects of current cancer therapy.”

-Dr Catherine Carmichael



SCAN ME

Support our life saving research now with a tax-deductible gift before 31 December 2024.

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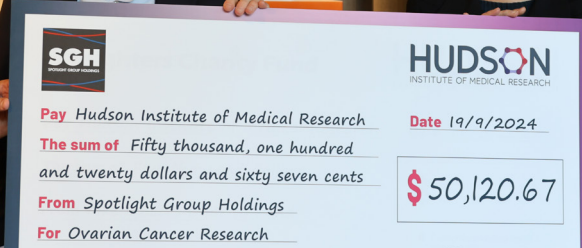
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Spotlight supporting ovarian cancer research



Morry Fraid, Co-Founder and Executive Chairman of Spotlight Group Holdings and Ben Clark, General Manager Investments Spotlight Group Holdings give Dr Maree Bilandzic, Hudson Institute Research Group Head, Metastasis Biology and Therapeutics a donation for ovarian cancer research.



Dr Bilandzic’s research focuses on developing effective strategies to block the harmful actions of leader cells, thereby improving the efficacy of cancer treatments and preventing tumour progression. She is working to understand how leader cells interact with other cancer cells and healthy cells and the mechanisms that enable leader cells to resist chemotherapy.

She returned recently to the Spotlight head office to receive the gift for ovarian cancer research from Spotlight Group co-founder Morry Fraid and Ben Clark and said she was “very grateful and overwhelmed by the interest and support in her and other researchers’ work at Hudson.”

Morry Fraid, Co-Founder and Executive Chairman of Spotlight Group Holdings, said “The Spotlight Foundation embodies the family’s values and is committed to supporting those in need, both locally and overseas.”

There are few parts of the Australian community that remain untouched by ovarian cancer. The team at Spotlight Group Holdings, one of the nation’s largest retail organisations, is supporting Hudson Institute’s work to help find a cure and better early diagnostics for the deadly disease.

Each year about 1,500 Australian women are diagnosed with ovarian cancer and fewer than half will survive beyond five years. The reality is that five Australian women will be diagnosed with ovarian cancer every day. Seventy per cent of the women are

diagnosed in the advanced stages.

So, when ovarian cancer researcher Dr Maree Bilandzic visited the company’s head office earlier in the year to speak about her work on ovarian cancer research at Hudson Institute, there were plenty of people with more than an academic interest in what she had to say.

“My wife, Jessica Clark is an ovarian cancer survivor so this means the world to us. It is incredibly important to come together to fund this research so that a cure can be found.”

Ben Clark

Ben Clark, General Manager Investments Spotlight Group Holdings, said he and his team organised a fundraiser for ovarian cancer. More than 20 gifts - including from the Spotlight Foundation - raised more than \$50,000.

Spotlight Group controls, operates and invests in a diverse set of businesses and assets, including retail brands, Spotlight, Anaconda, Harris Scarfe and Mountain Designs, the Spotlight Property Group (SPG), multi-asset class global investment

portfolio and its in-house charity, the Spotlight Foundation.

It’s the kind of corporate philanthropy that can make an enormous difference to researchers themselves, the work they do and the lives they’re working to save.



Help find cures for children’s cancers through your legacy.

Partner with us to find critical cures for debilitating diseases by leaving a gift in your Will to Hudson Institute of Medical Research. 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 Enrica Longo at
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e: Enrica.longo@hudson.org.au

L-R: Lachy Kinsella and his sister, Isabelle Kinsella. Lachy is a survivor of neuroblastoma cancer.