Annual Report

2021

Research Saves Lives

Heart Research Australia

Heart Research Australia

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Contents

Message From Our Chairman

The COVID-19 global pandemic has continued to create havoc across Australia as we face ongoing uncertainty, the risk of losing loved ones and adjusting to remote working and remote home schooling across large parts of the nation.

The increasing spread of COVID-19 and consequential pressure on our hospitals has been very worrisome. What is additionally concerning is knowing other health complications such as heart disease have not lessened.

Our team have been continuing to raise awareness of the signs and symptoms of a heart attack and how important it is to receive prompt medical care despite the threat of COVID-19. We are grateful to the media for helping us amplify this message. You can read more about this on pages 10 and 11.

This global pandemic has brought one of the biggest challenges in history for the fundraising sector.

We are so grateful to our donors for your continued support, trust and generosity. Every donation no matter how small or large is truly appreciated.

Thanks to you, our researchers are continuing to research innovative ways to prevent, diagnose and treat heart disease throughout this challenging time.

It fills me with hope to see the outstanding work our researchers are doing with papers such as Professor Gemma Figtree's recent study on the analysis of SWEDEHEART registry data being published this year. Her recent publication partially funded by Heart Research Australia highlighted that women, with no significant modifiable risk factors, have the highest chance of dying from a heart attack. This mortality rate is 3 times that of men with at least one risk factor. The detailed findings from this research put a spotlight on the need to continue to invest into research which aims to understand and identify more risk indicators to highlight individuals at risk for atherosclerosis many years before they present with their first heart attack. You can read more about her research on page 29.

Our board of directors are all volunteers, donating their time and knowledge to help guide our organisation through this unprecedented time and I am very grateful for their guidance and support.

The board and I would also like to acknowledge and thank our Heart Research Australia team. Their enduring commitment through these tough times whilst working from home highlights their never wavering passion for our vision. Whilst small, our team is dedicated to and passionate about raising awareness across all aspects of heart disease, highlighting the continuing need and power of heart research. As always, Heart Research Australia remains passionate about changing the future of heart disease and keep our vision of keeping families together for longer at the forefront of everything we do. Thank you for your philanthropic support enabling us to continue to work towards this vision.

Please stay safe and take care.

Tony Crawford

Tony Crawford
Chairman

Message From Our CEO

A year that has been a challenge for our country, to say the least, has shown us the true Australian spirit of loyalty, kindness, and determination.

As Australians around the nation are signing up for the COVID-19 vaccination, one thing is at the top of our minds. How grateful we are to science and medical research to be able to have a vaccine now available to help reduce the COVID-19 threat that has impacted us and our loved ones so severely. COVID-19 has shown that thanks to science and medical research, a devastating threat such as COVID-19 can have a foreseeable future of relief. As of the 29th of September 2021, 1,278 Australian's have died from COVID-19*. In 2019, Coronary heart disease was the underlying cause of death for 17,731 Australians^. We have seen the impact science and research has had on COVID-19. There is so much we still need to know and understand about heart disease to be able to make life-saving breakthroughs into its prevention, diagnosis and treatment. This can only be done with research.

Coronary heart disease is the disease that causes the most burden for those 45+ and accounts for about $2.2 billion a year in health care costs. This does not include the emotional devastation heart disease causes families and communities.

We are so grateful to all our donors who have been so loyal to us and continued to support us through this year that has been filled with so much uncertainty. Your loyalty has been truly noticed and appreciated and we are excited to share the research updates we have been able to fund this past year thanks to your generosity. See pages 24 to 39 for research we have funded.

We have loved being able to connect with you through our Heart Health Club webinars this year and your feedback regarding the wonderful work our team is doing has been great.

I strongly encourage anyone who hasn't already signed up to be one of our Heart Health Club members, to sign up online. We now have a private Facebook group connecting those suffering from or at risk of heart disease as well as their family members, and we have been running quarterly webinars with medical experts which have covered a range of topics from latest research, how to detect a heart attack and the impact of COVID-19 on your heart.

Your support through this year has meant so much to myself, my team and our researchers. Whilst the world has stopped for COVID-19, the devastation of heart disease continues on, as does our team and researchers. We continue to fight for answers into the prevention, diagnosis and treatment of heart disease.

Thank you for your generous support and allowing us to continue working on this ongoing fight against heart disease. Together, we will keep families together for longer.

Nicci Dent
Chief Executive Officer

**Australian Government Department of Health, States and Territories Report 29/09/21*
^Australian Institute of Health and Welfare 2021. Deaths in Australia. Cat. no. PHE 229. Canberra: AIHW

"Our Dad's passing may just have saved our lives."

What events marked your 20's? Often, it's a time to explore new places, make new friends or jump into your first career.

Brothers Joshua and Daniel Duffy had a very different, defining decade. When both boys reached their early 20s, they discovered they had the same heart condition. A condition they watched kill their 38-year-old father when they were only 10 and 11 years old.

The brothers, then in primary school, woke one morning with their infant sister to find their father had passed away in his sleep. At age 38, his heart silently stopped beating devastating his family and the wider community.

13 years later, Daniel blacked out on his morning commute to work and brother Joshua was having issues during his sleep. Both underwent MRI scans, blood pressure and other heart tests, but there were no signs of major risk. Like many 20-year-olds, they continued to focus on friendships, sport and work goals. Unfortunately, their health began to deteriorate. Inclusive tests left doctors with more questions than answers.

On sharing their family medical history discussing what happened with their dad, cardiologists inserted an implantable loop recorder just under the skin in their chests to show their heartbeat. Daniel's heart showed irregular beats throughout the day, which were causing the fainting episodes, and it was found Joshua's heartbeat paused up to 28 seconds during sleep. Based on these findings, both had pacemakers implanted to prevent future fatalities.

"We are honoured to be ambassadors for Heart Research Australia and to help raise awareness that heart disease impacts young people too. In 2 years, my brother and I had 6 heart episodes and are lucky to be able to tell the story from the other side, but it hasn't been easy."

Joshua's body rejected his first pacemaker and is now managing ok with his second pacemaker after another tough surgery. Every journey is different and some more difficult than others. Daniel was back at work within 4 weeks, but Joshua experienced almost 2 years of recovery.

The boys state "we would love to be a lifeline for any young individuals going through heart surgery. It's tough and we would have loved to have had someone

we could reach out to when we were going through pacemaker surgery. No one really talks about it, and we didn't know anyone we could reach out to. We have joined the Heart Research Australia Heart Health Club private Facebook group in the hope that we can help share our experience with someone who may be needing it."

There are still so many missing answers about heart disease. "We still don't know why my dad's heart stopped silently and suddenly in the middle of the night and we still don't know what is causing the irregularity of our heart beats. We are grateful technology has allowed us to live a healthy life by the use of a pacemaker but what we don't know is why we need it. "

Investing in research is so critical to further understand prevention, diagnosis and treatment of heart disease and to prevent families being torn apart by this insidious disease.

"We are lucky we had our dad's history to guide us but a better understanding of heart disease and how to prevent heart events may have enabled us to still have our dad with us today."

The boys are quick to credit the incredible role their mum played in raising them single handedly, but note the hole left in their lives without their father around.

"We are so grateful we listened to the warning signs our bodies gave us. Our dad wasn't so lucky. We feel the warning signs were a message from him telling us to get checked."

"We're so lucky to have such an amazing and strong woman in my mum who lead our family. She brought us up as a single parent, sent us to private school and always encouraged us to play sport and eat well. She was everything a kid could ask for. However, it would have been nice for her to not have had to do that alone. We would love to have our dad with us now to be able to see how well we are doing and to be able to see him pop down to our café. He would be so proud."

Together, Daniel and Josh are now business owners at Cabana Café & Bar on the Central Coast of NSW. Their passion for healthy living is expressed positively at work, from the warmth towards their customers to the amazing food. Their business truly nurtures the local community.

To read more personal stories about people impacted by heart disease click here.

Our Work

About Us

Heart Research Australia was established in 1986 by concerned cardiologists at Sydney's Royal North Shore Hospital who recognised the pressing need to find new ways to reduce the high death rate and devastating impact heart disease has on families and the community.

Unfortunately, although there have been some great improvements, heart disease is still the number one killer of all Australians.[1]

The Heart Research Australia team and some of their researchers.

Our goal is to reduce the devastating impact heart disease has on families and the community.

Our Vision

Making breakthroughs in heart disease happen.

Our Mission

We support world class and emerging researchers to conduct groundbreaking research into the prevention, diagnosis and treatment of heart disease.

Heart Research Australia supports:

Seed funding

First-stage or 'seed' funding allows researchers to turn their innovative, 'out of the notebook' ideas into reality. First-stage research often does not qualify for government funding; therefore, it is with thanks to wonderful supporters like you who make the investigation of such ideas possible.

Your generosity gives researchers the opportunity to progress their ideas into research that could result in lifesaving medical breakthroughs. Your support also helps them progress their research to a point where they become eligible, for larger, competitive grants from government funding bodies such as the National Health and Medical Research Council.

PhD students

Heart Research Australia provides scholarships for PhD students whose research is supervised by some of Australia's leading cardiac researchers. These scholarships play an integral role in nurturing and developing some of Australia's most promising heart health scientists.

'Bench to Bedside'

Most of our senior researchers are also practicing clinical cardiologists, which puts them in the best position to identify research opportunities and translate their discoveries 'on the bench' into benefits for patients 'at the bedside'.

The breakthroughs they make contribute to and inspire the international body of knowledge on cardiac research.

[1] *Australian Institute of Health and Welfare 2021. Deaths in Australia. Cat. no. PHE 229. Canberra: AIHW*

How are we different from other heart organisations?

Heart Research Australia raises funds for innovative research into the prevention, diagnosis and treatment of heart disease.

Our goal is to reduce the devastation heart disease has on families and the community. Focus on seed-funding for cardiac researchers helps investigate new areas and supports our aim to make their work competitive for larger grants from national bodies, such as the National Health and Medical Research Council.

Most of our researchers are practicing cardiologists based at Royal North Shore Hospital, which places them in the best position to translate knowledge from the 'bench' to patients 'at the bedside'. Direct patient interaction assists research and triggers new areas for investigation.

Bench to beside has led to the discovery that an increasing number of patients experience a heart attack with no traditional modifiable risk factors, such as high blood cholesterol, diabetes, hypertension or a family history of heart disease. This finding is now being investigated by our researchers to identify new methods of diagnosis and early identification and treatment to better protect patients.

You can help us find medical breakthroughs to change the future of heart disease.

Our research needs your support to help make life-saving breakthroughs.

The funds you donate helps our researchers and us continue to work towards our vision of making breakthroughs in heart disease happen to keep families together for longer and protect future generations.

How can you show support?

- *Become a 'Heart Hero' regular donor*
- *Make a gift in memory or celebration*
- *Donate on your birthday by asking for donations instead of gifts*
- *Host a fundraising event*
- *Participate in our annual 'REDFEB' event*
- *Purchase a ticket in 'Play for purpose'*
- *Leave a gift in your Will – even small gifts can make a significant difference.*

Every bit helps. Together, we can change the future of heart disease.

For more information visit our website heartresearch.com.au/support-us or call us on 02 9436 0056.

In the News

A huge thank you to the community and all the media outlets who helped us share our research and education message this year, especially throughout our annual REDFEB campaign.

Heart Health Awareness for REDFEB

REDFEB gives us the opportunity to share vital heart health education with the community. Our 2021 campaign focused on the 2 biggest mistakes people make when it comes to heart attacks. These are:

- dismissing heart attack warning signs;
- thinking the signs and symptoms are the same for everyone.

To help raise awareness around these vital warning signs we spoke with various media outlets such as Channel 7's The Morning Show with Larry Emdur and Kylie Gillies, Studio 10 with Tristan MacManus and Sarah Harris, Channel 10's The House of Wellness, The Australian Women's Weekly, Woman's Day, New Idea, The Sydney Morning Herald, and numerous radio shows, magazines, digital stories and newspapers. A huge thank you to these media outlets for helping us share this life-saving message.

To see some of the media achieved visit https://www.heartresearch.com.au/6842-2/

RED FEB

Heart Research Australia

Channel 10 News First

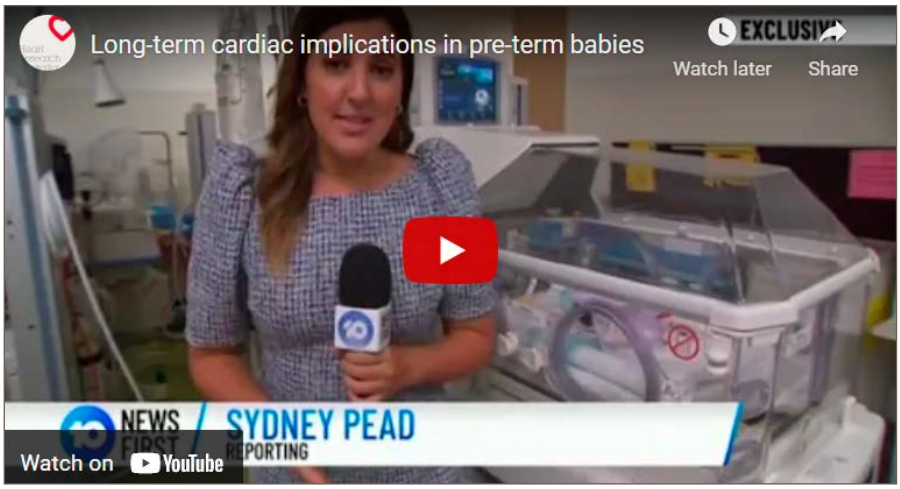
We were very excited to share the life saving work Dr Eveline Staub is doing in researching the long-term cardiac implications for pre-term babies with 10 News First.

Dr Staub's work tracks the development of small blood vessels and blood pressure of premature babies. Over the next three years, approximately 80 pre-term and term babies will be followed from birth at different weeks of gestation until age 1. New techniques of ultrasound imaging will be used to trace the blood vessels in the kidneys and aorta, as well as new measurements of blood pressure and kidney function. This study is looking into understanding why pre-term babies have a higher risk of developing heart disease in later years and earlier than those born at full-term.

To read more about this work visit page 32.

To see the exclusive interview with Dr Eveline Staub on Channel 10 visit our website here:

https://www.heartresearch.com.au/research/long-term-cardiac-implications-in-pre-term-babies/




WOMEN & HEART DISEASE
What you need to know

THE STRATEGIES, CHECKS AND LIFESTYLE CHANGES TO HELP KEEP YOU HEART-HEALTHY

What women need to know – New Idea

Dr Rebecca Kozor, a cardiologist and one of Heart Research Australia's board of directors, shared some life saving information regarding heart health for women with New Idea magazine.

Did you know heart disease kills twice as many Australian women as breast cancer?

High blood pressure is one of the key risk factors for heart disease amongst women and Dr Kozor shared some strategies, checks and lifestyle changes women can make to keep their hearts healthy. You can find information about women and heart health on our website here: https://www.heartresearch.com.au/heart-disease/women-and-heart-disease/

Highlights From The Year

The time and work dedicated by so many of our supporters inspires us daily.

We are so passionate about the work we do so when we get the privilege to meet members of the community as passionate as we are, it truly warms our hearts. We are so grateful to all the individuals who organised, participated in or donated to these events. This support is crucial to provide seed funding for our researchers and next generation young heart scientists to continue life saving heart disease research. As this type of first stage research receives little government funding, we are 100% reliant on community support.

This year, support from individual initiatives and events has raised a grand total of **$76,466** for Heart Research Australia. Without your support this amazing result would not be possible.

Kiama Power Fundraiser Football Game

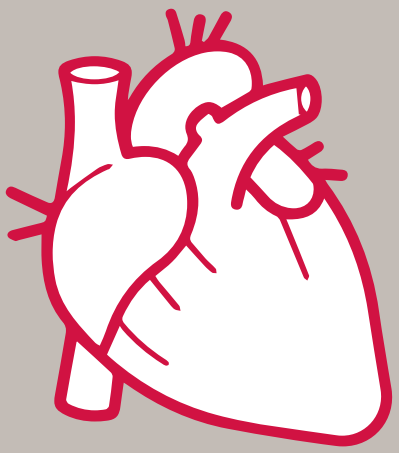
To honor their beloved father and community member, Darren Williams, the Williams family and Kiama Power AFL team have chosen to fundraise for Heart Research Australia on his behalf. In April 2019, Darren Williams suffered a heart attack at the sidelines watching his son's play their football match. This year marked the second annual fundraiser game to help raise awareness of heart disease and funds toward Professor Gemma Figtree's Bioheart project. Despite the challenges faced by the South Coast of NSW in 2020, the Kiama community worked together to raise **$1,158** for the Heart Research Australia Darren Williams Research Fund whilst juggling COVID-19 restrictions. We are so truly grateful for the wonderful support the NSW South Coast community and the Williams family has given us.

A true testament to how respected Darren Williams is by his local community.

Rachel's Runners – Running 136km so Dr Chris Roche can continue his research

In March 2020, Rachel Allworth suffered a sudden heart episode and was subsequently told she will never run again. Unable to participate in her next big event, the 136km 4-day stage race 'Run Larapinta', she organized a team to complete it on her behalf and fundraise the remaining $4000 that was required for Dr Chris Roche to continue the next stage of his lifesaving research.

With a $25 donation to enter, each team covered 136km over 3 days of cold rain from 23-25 October 2020 smashing their **$4,000** target and allowing Dr Roche to complete the next phase of his research. We are so grateful for their support and more so was Dr Chris Roche, who was so happy to have been able to take the incredible results from phase 1 of his research and continue into the next phase. To see the updates from his research see page 40 of this report.



Heart disease is the
SINGLE BIGGEST CAUSE OF DEATH
in Australia[1].

1. Australian Institute of Health and Welfare 2021. Deaths in Australia. Cat. no. PHE 229. Canberra: AIHW. Viewed 25 June 2021.

Highlights From The Year *continued*

REDFEB

Heart Research Australia's annual REDFEB campaign aims to educate the community about heart disease whilst raising much needed funds for research into the prevention, diagnosis and treatment of heart disease. Our 2021 campaign focused on raising awareness of the 2 key mistakes people make with heart attacks:

- assuming all heart attack signs and symptoms are the same for everyone;
- dismissing symptoms and hoping they will go away.

The support from media and the community for this campaign was truly heartwarming seeing social media and our inboxes flooded with images of people, and staff of organisations all wearing RED on behalf of someone they know who has suffered from heart disease. We even saw some buildings lit up in RED! - Thanks QLD and Canberra!

We had hair coloured RED, gym members torturing their trainers by donating money for burpees, morning teas, runs, walks, team meetings and much more! There is no limit to the things you can do in RED!

REDFEB is such an important event that raises much needed awareness of heart disease and how you can identify a heart attack earlier to reduce the risk of permanent long-term damage done to the heart muscle. The event also enables families and friends to honour their loved ones who may have passed away from heart disease and raise much needed funds for research to help develop or improve current strategies to help prevent, diagnose and treat heart disease.

A huge thank you to Abbott Vascular who was our supporting partner for the campaign. Without their support, this event would not be able to share such an important life-saving message to the community and we are truly thankful for their amazing kindness, generosity and support for this campaign.

Thanks to the creativity, passion and generosity of the community we raised over **$46,000** for lifesaving heart research!

REDFEB is an annual event and we'd love to have you involved next year! Who will YOU be wearing RED for?

Highlights From The Year *continued*

Sun Run

To kick off our annual REDFEB campaign, Heart Research Australia formed a team of staff, family, and friends to participate in the Beaches Council Sun Run in February. The team ran (and walked) 10km to raise much needed funds for Heart Research Australia as a part of the REDFEB campaign.

The Power of Legacy

Together with Heart Research Australia, The Williams family have set up the Darren Williams Research fund to honor their devoted father, husband, and local community member. To support REDFEB 2021, sons Michael, Tom and Ben decided to permanently colour their hair red AND perm it. Their mum even got involved as the donations they were raising just kept growing! Their REDFEB fundraiser raised over **$13,000** to support life-saving heart research.

Crossing the heart of Australia

On July 1 2021, Brigid Shute and Rob Porcaro embarked on a 750km trek across the Simpson Desert following the most challenging and remotest tracks, the Madigan line. The trek is estimated to take 25 days and crosses over 700 sand dunes.

The training they have endured has been months in the making enabling them to build their endurance and strength to carry everything they need in their packs. They will have 3 support vehicles with them who will bury caches of food for them to collect every 48 hours and stay 2 days in front to ensure the trip is completed as safely as possible.

The support Brigid and Rob have received from the community and corporate sponsors has been wonderful and we are truly thankful to all of them for their wonderful support and to Brigid and Rob for embarking on this extreme challenge.

An incredible **$8,793** has already been raised towards life-saving research. An amazing effort and we are looking forward to hearing the tales from their adventures.

Cook Build – Walking towards healthier hearts

South Australian commercial and residential construction company, Cook Build, value making a visible difference through personal and community support.

In truly living their values, they encouraged staff to get moving in their 'walking towards healthier hearts' initiative. They motivated and encouraged employees, friends and family to build up their fitness and fundraise for Heart Research Australia.

In addition, a golf day with their corporate suppliers was organised to continue their fundraising efforts for Heart Research Australia. The joint efforts from these events saw Cook Build donate a total of **$10,000** towards life saving heart research. We are truly grateful to Cook Build, their suppliers and all involved in this enormous effort.

Community fundraising is a great way to help make a difference to the future of heart disease and help protect the hearts of future generations.

What impact does your support to Heart Research Australia have?

The money raised by our wonderful community of fundraisers and the generous donations made by their family and friends;

- *Helps communities access information and resources*
- *Ensures our researchers have necessary laboratory equipment to assist their findings*
- *Contributes to building research projects dedicated to exploring new ways of protecting Australia's hearts*
- *Goes towards the funding of world class medical equipment*
- *Supports the next generation of heart researchers*

Our Heartfelt Thanks

Thank you for helping us make breakthroughs happen. Your help enables us to keep families together for longer.

Gifts in Wills to help the hearts of future generations

Heart Research Australia is incredibly thankful to the men and women who help make our research possible through a gift in their Will. More than half of our research is funded in this very special way.

Our wish is for a future free of heart disease. There is still a long way to go but as we have seen, research done in the past decades has led to the developments in heart research that have already saved many of our loved ones. Donations from Gifts in Wills, no matter how small or large, are invested in innovative heart research projects so our researchers can transform their ideas into lifesaving treatments that will continue to benefit future generations.

We would like to give special acknowledgement to our 'Breakthrough Partners'. This very special group of people have told us that they have left a gift in their Will to Heart Research Australia. We love to hear if someone has made this decision, so we can thank them and keep them informed of the work our researchers are doing. Of course, we are also incredibly thankful to those who prefer to keep their decisions private.

Regular Giving

In this past year, more than ever before, we are grateful to our generous supporters who choose to donate monthly. COVID has impacted our funding but knowing we have set funds available every month gives us the security of income, so we can guarantee that our research projects continue – and the quicker we find cures for heart disease the more lives are saved.

Many of our wonderful monthly donors or 'Heart Heroes' as we like to call them, have been donating to us for over 30 years – so their impact on advancing understanding and improving outcomes for heart disease patients is immeasurable.

So, a big thank you to all our monthly donors – we couldn't do it without you.

Heart Disease Kills 48 Australians every day[1]

Just over ***1 in 5*** *Australian adults have had* ***a measured high blood pressure reading -*** one of the main risk factors for heart disease[5]

1. Australian Institute of Health and Welfare 2021. Deaths in Australia. Cat. no. PHE 229. Canberra: AIHW. Viewed 25 June 2021.

5. ABS National Health Survey: First results, 2017-18 financial year.

Wendy McCormack – a gift to last a lifetime.

We are so thankful to anyone leaving a gift in their Will to Heart Research Australia.
One kind and thoughtful person who has done just that was the Late Wendy McCormick. After being a patient of one of our researchers, Wendy learnt about the incredible work our researchers do and believed that advancing new and early heart research projects can help make a difference for future generations of Australians.

Wendy McCormick (nee Lawson) was born in Willoughby in 1938 and was educated at St Thomas Catholic Primary School, Willoughby and Monte Sant' Angelo Mercy College, North Sydney. She was a regular attendee at the Old Girls' Reunions

"We want to thank Wendy and acknowledge how truly grateful we are for thinking of us in this way. Your legacy will live on for generations to come in the hearts of so many."

After leaving school, Wendy worked at radio station 2GB in the Production Department. Wendy loved to travel and made many trips overseas with her Late husband Peter and her Late sister Julie. She was an avid skier, loved ballroom dancing and playing golf at Cromer Golf Club where she and Peter were long time members.

Wendy sadly passed away last year and chose to leave part of her estate to Heart Research Australia. We can not tell you what these contributions mean to us, and how touched we are when someone chooses to acknowledge us in their Will no matter how small or large.

Giving the Gift of Life at Work

Thank you to everyone who supports our life giving research through workplace donation programs. Every year more Australians embrace this tax-effective mode of regular giving with donations to Heart Research Australia through their payroll from their pre-tax pay, thereby reducing their taxable income. Some employers also match donations made by employees, doubling the impact of their support.

Workplace or payroll giving is an easy and effective way to support pioneering heart research. It provides a reliable income stream to more effectively fund lifesaving heart research to prevent, diagnose and treat heart disease – Australia's biggest killer. To learn more or get involved visit: www.heartresearch.com.au/workplace-giving/

Volunteers – Carsten, Amanda and Maddie

Heart Research Australia would not be able to do the work we do without the help of all our wonderful volunteers. We are so grateful for all their incredible help particularly in this challenging time. Remote working has added some complexity as some of the tasks our volunteers do cannot be completed virtually. Despite this, these wonderful volunteers continue to check in and assist us where at all possible. Thank you so much to all these selfless individuals, for donating their time, sharing their skills, and helping us keep families together for longer - their care, generosity, dedication and flexibility never cease to amaze us.

Carsten

Heart Research Australia has been so fortunate to have Carsten selflessly devote his time for a few years now.
With an abundance of knowledge from his background in IT, Carsten has been an invaluable asset to the team, particularly throughout our continuous transition to working from home. We can all agree that we would absolutely struggle without Carsten's support (and patience) with the inevitable and seemingly never-ending IT issues that arise through remote working. We have just recently welcomed Carsten to our team as the IT and Database Specialist which is exciting news! We are so incredibly grateful for everything that he contributes.

"With a family history of heart disease, I chose to volunteer for Heart Research Australia while having a break from work due to sickness. This role has given me immense satisfaction being able to use my skill set as well as contributing to a great cause."

Amanda

Amanda began volunteering just a few weeks before the pandemic hit in March 2020 which meant we had to put her role on hold whilst working remotely.

When we were back in the office some days, Amanda was very enthusiastic to start volunteering again which was a huge relief for our small team. With her incredible attention to detail, efficiency with data entry, and beautiful handwriting, she really is an amazing asset and we're very lucky to have her help. We wanted to thank Amanda for not giving up on us despite how uncertain things have been with COVID. Being the only volunteer we had at one stage, her time is so valuable to us and we all really enjoy having her around.

"Volunteering at Heart Research Australia has allowed me to gain an understanding of the inner workings of a non-profit organisation and I feel lucky to be part of such a lovely and devoted team."

Maddie

Heart Research Australia has had the privilege of having Maddie volunteer her time throughout her university summer holidays providing support to our Communications Manager. We are so incredibly fortunate to have Maddie continue working with us throughout the year, via an internship as a component of her Communications and Design degree. Maddie has brought such a fresh and positive approach to the team and has added enormous value. With a thirst for learning all she can, she has been helping us out in all areas of the organisation and is a true asset to the team. She has been working on events, social media and communications and her contribution has been phenomenal. As a small team having someone of Maddie's skill set, strengths, personality and willingness to help has added significant value to our organisation, donors and the future of heart health.

"Working with the team at Heart Research Australia has been a fantastic opportunity to gain valuable and practical industry skills, as well as a new found appreciation for the amazing work our researchers contribute to help save loved family and friends."

Corporate Supporters

Heart Research Australia is so thankful to the following corporate supporters and their teams. Their significant support helps fund our researcher's life-saving work and upcoming breakthroughs. Thank you for helping us keep families together for longer.

Abbott Vascular

Abbott

Heart Research Australia is so grateful for the incredible support from Abbott Vascular this year.

As the supporting partner for our REDFEB campaign Abbott Vascular helped us share vital life-saving information about heart attacks to the community, helping encourage people to seek medical assistance early if they suspect they are having a heart attack. This knowledge will help save long term damage done to the heart muscle and help keep families together for longer. Without their support REDFEB would not have been the success it was, and we are beyond grateful to them for this.

In addition to being the supporting partner for REDFEB, Abbott Vascular is also supporting the BioHEART program through a grant for the Clinician Research PhD Program. In this way Abbott is contributing towards the BioHEART program and it's development of biomarkers for early risk identification as well as the potential identification of new pathophysiological pathways and novel therapeutic targets for coronary artery disease.

Ormeggio, Chiosco & Via Alta

ORMEGGIO
AT THE SPIT

Alessandro Pavoni has been an ambassador for Heart Research Australia for a number of years now, a partnership we are truly so appreciative of and grateful for. Together with his wife Anna Pavoni, they own Ormeggio at the Spit, Chiosco and a'Mare. They consistently support Heart Research Australia by donating generous prizes of their gorgeous venues to our Charity Challenge Golf Day and other events. We are so appreciative of both him and Anna for sharing their personal stories, promoting the importance of heart health and for their dedication and continuous support for us each year.

ZOLL

ZOLL generously donated 2 of their lifesaving AED defibrillators to our REDFEB 2021 campaign. The defibrillators were gifted to the organisation and individual who raised the most amount of funds for lifesaving heart research as a part of our REDFEB event.

The winners were 5ive Element Fitness Southport and Michael Williams.

5ive Element Fitness members donated $1 per burpee by the trainer of their choice. All up there were **2,111** burpees to be done by the gym instructors! A huge thank you to all involved.

Michael Williams and his brothers chose to permanently colour their hair red AND perm it if they reached their goal of raising **$4K** for Heart Research Australia. They reached it, threefold, raising **$13,462** with even their mum getting in on the action and colouring her hair as well. The Williams family went RED on behalf of their father and husband who tragically passed away from a heart attack in 2019. The passing of Darren Williams devastated the entire community which was evident in the outpouring of support for the Williams family and their REDFEB challenge.

The Williams family were wanting to win one of the Defibrillators generously donated by ZOLL to replace the one recently stolen from their local football club, Kiama Power. We were overjoyed to be able to present them with one.

The dedes Group

Year after year the dedes group continue to support Heart Research Australia and we are overwhelmingly grateful to their generous contributions to prizes throughout the year. Thank you for your continuous support every year in helping Heart Research Australia fund life-saving heart research.

dedes WATERFRONT·GROUP

Our Research

Keeping families together for longer through life-saving heart research

Heart Research Australia focuses on funding research which identifies new ways to prevent, treat and diagnose heart disease, Australia's leading cause of death. Ongoing COVID-19 restrictions have placed challenges on researchers, but they have still made considerable progress to help keep families together for longer.

This report features just some of the many inspiring projects our researchers are working on, from **using a patient's own cells to create mini beating hearts, finding a potential new risk factor for a heart attack, and finding a diagnosis tool for Peri-Partum Cardiomyopathy.** To read more about the work our researchers are doing visit https://www.heartresearch.com.au/our-researchers/ and sign up for our newsletter to stay up to date with the latest research and news.

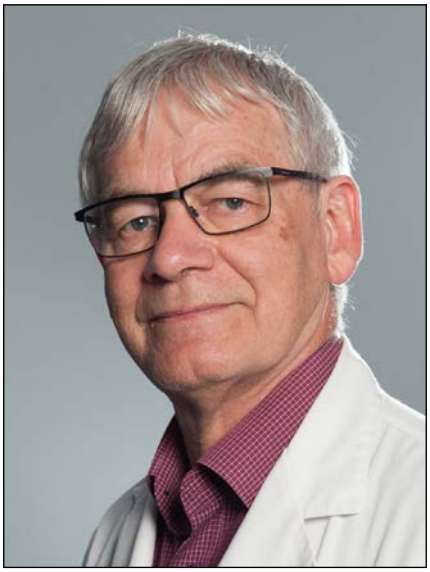
Why research is so important

Heart disease kills one Australian every 30 minutes[1]. Despite major advances in the understanding and treatment of heart disease, there remains a large gap in our knowledge. Without further understanding of the disease, its diagnosis and treatment, families will continue to lose their loved ones to heart disease each year.

Research is imperative to shifting the current status quo of heart disease and reducing the current devastating statistics.

1. *Australian Institute of Health and Welfare 2021. Deaths in Australia. Cat. no. PHE 229. Canberra: AIHW*

Research Projects



Chair of Cardiology - Professor Helge Rasmussen

Professor Helge Rasmussen divides his time between working as a clinical cardiologist and leading a team of researchers in molecular and cellular medicine. A particular focus of his research is learning how heart cells work. This has led to discoveries that could mean better treatment for heart failure and other forms of cardiovascular disease. Professor Rasmussen's work includes studies directed at understanding regulation of the cardiac Na+-K+ pump. His science research has led to paradigm shifts in understanding this regulation and other areas of cardiology.

Preventing cardiac side effects from breast cancer treatment

Lead Researcher:
Prof Helge Rasmussen

One in eight Australian women will be diagnosed with breast cancer before the age of 85. With an average age at diagnosis of 60 years, many will have a long unadjusted life expectancy. Breast cancer-specific deaths have declined due to improved diagnosis and treatments but only with the penalty of long-term side effects, mostly cardiovascular, from radiotherapy and/or chemotherapy.

Some cancers overexpress FXYD3. Overexpression of FXYD3 protects cancer cells from anticancer treatments, particularly radiotherapy. Serious cardiac side effects of any cancer treatment are common and the risk of it must be considered early in the development of any new treatment. Breast cancers are treated with doses of radiotherapy, and as the heart lies directly under the breast, the heart can also receive doses of radiotherapy, increasing risk of heart attack and coronary artery disease.

After radiotherapy, some studies report the collateral cardiac damage of radiation and increase in death from heart disease almost offsets the decrease in breast cancer-specific deaths.

The compound (FXYD3-pep) is derived from FXYD3 and can replace it in cancer cells. However, unlike FXYD3, FXYD3-pep does not protect the cancer cell from the anticancer treatments, that is, exposing cancer cells to FXYD3-pep eliminates the protection the FXYD3 protein itself gives.

In a novel approach to reduce heart muscle damage, Professor Rasmussen and his team have developed a small protein molecule (peptide) that greatly increases the sensitivity of cancer cells to the radiation, while its effects on the heart cells is much less pronounced.

The objective of Professor Rasmussen's project is to test if this new peptide can reduce or eliminate the risk of heart failure induced by radiation for cancer treatment, without decreasing the effectiveness of the radiation in treating the cancer. The team's test tube studies have found that the effectiveness of radiation was increased when

Research Projects

the peptide they have developed was applied to the cancer cells. Professor Rasmussen and his team have previously treated two types of breast cancer cells in cell culture with FXYD3-pep, one type overexpresses FXYD3, the other expresses little FXYD3. When they gave FXYD3-pep to the cells that have little FXYD3, they saw no enhancement of the effect of anticancer drugs. However, when they put their FXYD3-pep drug onto breast cancer cells that had high levels of native FXYD3, they were able to kill most of them with 9 times less anticancer drug.

The next stage of the project is determining the optimal dose of FXYD3-pep, the timing of administration; determining the optimal radiation dose for tumor reduction and finally performing the combination therapy.

Whilst the project has been delayed due to COVID lockdowns in NSW, the experiment has seen exciting early results.

Experimentation will be commencing as soon as NSW COVID lockdown is lifted.

Professor Rasmussen would like to thank the donors for their crucial support of basic fundamental research.

Chair of Epidemiology – Professor Geoffrey Tofler

Professor Geoffrey Tofler is the Chair of Epidemiology at Royal North Shore Hospital. With over 20 years' experience as a clinical consultant cardiologist, including 13 years at Harvard Medical School Hospital in Boston, Professor Tofler's expertise is in the prevention of heart disease and management of heart failure. Current research includes triggers for heart attack and the links between bereavement and heart health.

Despite the pressures of COVID, Professor Tofler continues to look at new approaches to prevent heart disease, as well as ways to maximise the outcome of patients with known disease. His research group's work ranges from population and clinical research to basic genetic level, with local, national and international collaborations.

In the past year, Professor Tofler was an author of four peer-reviewed publications.

One study supported by Heart Research Australia and published in American Heart Journal received national and international publicity. The study conducted a randomised placebo-controlled trial of metoprolol and aspirin in early bereavement. It identified favorable effects of the active medication on haemodynamic, thrombotic and psychological measures. There was interest from Kaiser Permanente in the USA to roll out the study but this was put on hold due to COVID.

Three further publications explored different aspects of Heart Failure management. They identified heart rate hospital discharge as a predictor of mortality, evaluated precipitants and seasonal variation of heart failure, and provided a NSW Snapshot review of predictors of

12 months survival after Heart Failure hospitalisation.
Prof Tofler was a panellist in an end-of-year Heart Research Australia webinar chaired by Heart Research Australia Ambassador Chris Russell.
He continued educational activities at Royal North Shore Hospital, including tutoring medical students and coordinating department journal club and lunchtime rounds.
Prof Tofler is also a supervisor of 2 PhD students, Dr Elizabeth Shaw and Monica Ruckholdt.

Triggers of Heart Attack and their prevention

Professor Tofler and his research group have been leaders in the field of acute triggers of heart attack – providing additional clues to prevention that complement chronic risk factors such as hypertension and high cholesterol. The group developed and have used the TAMAMI database of patients who had heart attacks that were treated at Royal North Shore Hospital, to look more closely at specific triggers. A/Prof Tom Buckley, published a manuscript on Physical Exertion as a Trigger of Heart Attack. Another paper by the Group, examining Heavy/Fatty Meals as a trigger, is currently under review for publication (Dr Lorcan Ruane, first author).
These findings are being used to provide justification for a proposed larger study of Triggered Acute Risk Prevention.

SCUPI (Smoking Cessation through Personal Identification)

SCUPI is a novel approach to smoking cessation that uses video to create a simulated teachable moment. It was supported by a grant from Heart Research Australia, a SPARK innovation award, and an Australian patent. It builds on the observation that many smokers can stop smoking once they have experienced a heart attack. In a recent internet-based study, over 60% of the smokers successfully stopped smoking and were still abstinent at 6 months. These findings were published by the Journal of Smoking Cessation with psychologist, Robin May, as first author. Professor Tofler and his research group are currently looking to expand the work, and recently attended a Bio Asia Conference in Taiwan, where the work was well received.

MACARF (Management of Cardiac Failure):

Professor Tofler is medical director of the Northern Sydney MACARF program to optimise management of heart failure. Analysis of the database of over 5000 patients has resulted in a recent publication (Dr Nelson Wang, first author) examining temporal changes in heart failure characteristics and outcome.
In addition, a short paper on the prognostic role of heart rate in heart failure has been accepted for publication in a peer-reviewed journal.
A quality improvement project on polypharmacy in heart failure is currently being conducted in collaboration with pharmacy collaborators.

Research Projects

Framingham Heart Study Collaboration

This ongoing international collaboration with Framingham, Massachusetts, investigates the role of Haemostatic Risk Factors, and Genetic Determinants, in Cardiovascular Risk Prediction. This collaboration saw an important publication into novel associations regulating coagulation Factor VIII and von Willebrand Factor plasma levels, which was published in the prestigious US journal, Circulation.

PADDLE (Patient Directed Discharge Letter):

Professor Tofler and his team received a $200,000 grant from HCF to further develop his published findings that a one-page discharge letter written specifically for the patient using lay language, improved patient understanding of their hospitalisation and discharge plans. This project includes North Shore Private Hospital, Ryde Hospital and Royal North Shore Hospital. Professor Tofler is currently on a NSW Health Committee to improve hospital discharge summaries. There is the exciting possibility that PADDLE will be rolled out state-wide.

MAFACARI (Masters Football and Cardiovascular Risk)

In 153 masters age footballers, Professor Tofler and his research group conducted a survey to assess the footballers knowledge of their cardiac risk, warning symptom recognition, and support of measures such as defibrillators. The findings showed that there was a significant amount of cardiac risk factors among the group, that many of the potential cardiac risk factors were not appropriately acted upon, and that there were gaps in knowledge of heart disease risk. There was strong support among the group for defibrillator availability. The findings were presented by Matthew Francis, medical student, at the 2019 Annual Australia and New Zealand Cardiology Conference. As medical director of the North Shore Cardiac rehabilitation service, Professor Tofler encourages and supports clinical research from the rehabilitation service based on the patient characteristics and excellent outcomes.

Discovery of new mechanisms for coronary disease

Project Title:
Discovering new mechanisms and early markers of coronary artery disease - The BioHEART Study.

Lead Researchers:
Prof Gemma Figtree

Cardiovascular disease remains the greatest health burden for Australia and has enormous social and economic impact across the globe. Despite common perceptions, it is not all solved.
Professor Figtree and her team developed the BioHEART project to look for novel blood markers and mechanisms that identify people with atherosclerosis well before they suffer from events such as a heart attack or cardiac arrest. They are also investigating factors that may explain individual susceptibility and resilience to the well-established cardiovascular risk factors, aiming to identify new markers and therapies to reduce the burden of cardiovascular disease.
In collaboration with clinicians, researchers, healthcare and industry leaders, the BioHEART study has made significant progress in their search for novel early coronary artery disease markers to detect and prevent heart attacks in patients who do not present with traditional risk factors of heart disease. The study combines advanced non-invasive imaging of the coronary arteries with biobanked blood samples for comprehensive molecular characterisation.
The team have successfully established the cardiology BioBank for biomarker discovery with the support of the Figtree team, industry partners and international researchers. They have recruited a large cohort over 2500 patients who are at risk or suffering from coronary artery disease. These patients volunteer, and consent to contribute a blood sample and their de-identified data to the study. The team have continued to expand the study thanks to pilot funding from Heart Research Australia.
The BioHEART study's discovery phase has generated preliminary data that brings the team closer to unravelling new mechanisms, and prioritisation of new therapeutic targets for the next phase of research. Ultimately, the work done by Professor Figtree and her team will help improve early identification of coronary artery disease and atherosclerosis beyond traditional risk factor assessment and will help guide personalised preventative therapies.
Prof. Gemma Figtree and her multi-disciplinary team are tremendously grateful for your generosity in supporting their pioneering efforts to improve cardiovascular health. Your support has greatly contributed to the successes of the BioHEART program, supporting ground-breaking scientific research, core staff and critical functions. Without you their continued collaboration would not be possible.

Research Projects

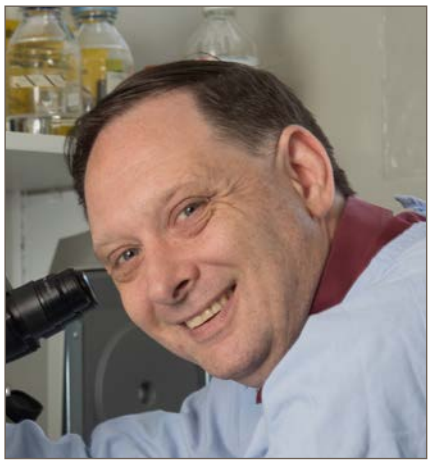
Heart Failure and Cardiovascular MRI

Project Title:
Heart Failure and Cardiovascular Magnetic Resonance Imaging – pathophysiological mechanisms, improved diagnosis and new treatment.

Lead Researcher:
Prof Martin Ugander

Heart failure affects about 40million people worldwide, which is roughly 2% of adults and 6-10% of people over 65 years of age. Once diagnosed, heart failure leads to 50% mortality within 5 years. This survival rate is worse than most cancers and leads to a large patient group with a sizable burden of hospitalisation and premature death.
Professor Martin Ugander's research focuses on developing and using unique and novel methods to address currently unmet clinical needs to better understand, diagnose and evaluate treatment of heart failure. This research focuses on challenges related to identifying and treating inefficient filling of the heart (diastolic dysfunction), thick walls of the heart (left ventricular hypertrophy) and small vessel disease (coronary microvascular dysfunction). These issues are more common with increasing age, amongst women and indigenous populations, and are associated with hospitalisation and death. Professor Ugander and his team have pioneered new methods for diagnosing the causes of heart failure through imaging methods, such as MRI and CT and electrical activity of the heart (ECG). This includes MRI to accurately measure the speed of the heart whilst filling and blood pressure in different chambers of the heart, which helps identify and treat diastolic dysfunction. These findings have been published in leading international journals and are now in clinical use and for continued clinical research. The outcomes of this research are crucial to help improve clinicians' ability to diagnose and follow the effects of heart failure treatment.
The results of Professor Ugander's research can benefit all patients being evaluated for known or suspected heart failure. More accurate diagnostic methods lead to earlier detection and treatment, decreased morbidity and mortality, and decreased costs for the healthcare system. The new methods will also accurately and non-invasively study the effects of new treatments for heart failure, which ultimately will come to clinical use.
Since the start of the project, Professor Ugander has founded a multi-disciplinary research team and co-authored twenty six publications. Your generous donations have been instrumental to establish and expand the research group, including collaborations with nine different research groups across the University of Sydney. Your support not only funds current research but is also essential to foster tomorrow's generation of physician-scientists in the cardiovascular space.

Pre-eclampsia and Peri-Partum Cardiomyopathy



Project Title:
Is pre-eclampsia in pregnancy related to pregnancy induced heart failure?

Lead Researchers:
Dr Anthony Ashton

Unfortunately for some women, some pregnancies end in unforeseen and currently untreatable complications.
The signs that something is wrong in these pregnancies are unfortunately "normal" for most women at the end of pregnancy. Headaches, swelling and difficulty breathing are "par for the course" for the latter stages of pregnancy but may belie an underlying and dangerous pregnancy complication called pre-eclampsia.
Pre-eclampsia affects 1 out of every 20 pregnancies in Australia and is the biggest cause of death in new mothers. The disease is a serious challenge for obstetricians because there are no effective interventions to treat, prevent or diagnose it. It is also a predisposing factor to another life threatening complication of pregnancy, peri-partum cardiomyopathy, where the mother goes into heart failure in the last months of pregnancy or in the 6 months following it. In fact, more than 40% of women with pregnancy induced heart failure have had high blood pressure during their pregnancy. Both conditions are life threatening and without treatments.
Dr Ashton and his team have now identified that "the match that lights the fuse" in pre-eclampsia results from a change in the DNA of the placenta. This change causes the placenta to release factors that negatively affect the mother.
This insight allowed them to create a first-of-its-kind test which can be used to develop new drugs to combat both pre-eclampsia and peri-partum cardiomyopathy. To find these drugs, the team are currently engaging with pharmaceutical companies to choose the "diamond in the rough" that will become the first prototype agent for curing pre-eclampsia.
Dr Ashton is also collaborating with international researchers with the aim of characterising the DNA of women with pre-eclampsia and peri-partum cardiomyopathy to see why some women with pre-eclampsia develop heart failure. These findings will provide opportunities for development of new diagnostics for early detection of both conditions.
Despite the restrictions of COVID-19, the team is embracing new and exciting technologies in the pathology lab to tailor treatments to each individual pregnancy so treatment for these conditions can start earlier and address the specific needs of each mother.

"Our goal is to develop the next generation of cures and diagnostics that will mean no parent has to feel the sense of desperation and loss associated with problematic pregnancies."

Dr Ashton and his team extend their gratitude to the passion and support of donors who help uncover the fundamental research to benefit all women with less than optimal pregnancy outcomes.
This research aims to ensure a complication free pregnancy for every mother and the healthy delivery of all babies in our care.

Research Projects

Prevention of arterial hypertension and cardiovascular disease in premature infants later in life by examining early kidney development.

Lead Researchers:
Prof Martin Kluckow
Dr Eveline Staub

Heart Research Australia and the Mill House Foundation have been supporting newborn cardiac research projects in the department of Neonatology at Royal North Shore Hospital for over 23 years. The generous donations by the Mill House Foundation via Heart Research Australia fund the position of a part time research nurse for the past 17 years in the Department of Neonatology at Royal North Shore Hospital.

The current research nurse, Ms Yan Chen, is invaluable for the gathering of data and general smooth running of the study. For this support, the research team is deeply grateful.

Dr Staub and Professor Kluckow are investigating hypertension and problems associated with blood vessels in babies currently being born pre-term, to try to understand what is causing teens and young adults born prematurely to suffer these cardiac risk factors at such a younger age than those born at term. This study collaborates with several other hospitals around Australia to develop and conduct new clinical studies in their quest to understand the problems with heart function in premature and sick infants.

Each year 26,000 babies are born prematurely in Australia. Even those born just a few weeks before their due date have a higher risk of suffering and dying from cardiovascular disease as adults. Professor Kluckow's world first study applies new ultrasound technology to observe the growth of small blood vessels in the kidneys of pre-term babies from birth to childhood. This will offer insight into the mechanisms that lead pre-term babies to develop high blood pressure and poorer health because the kidneys are vitally important to regulate blood pressure. Eventually, this study will not only help raise awareness that prematurely born individuals need lifelong blood pressure and heart health monitoring, but hopefully help prevent these late adverse outcomes.

The pilot study has successfully established that the new ultrasound technique is safe and feasible for vulnerable newborn babies. The preliminary results confirm the validity of the project aim of investigating the development of small blood vessels in the outer layer of the kidney. The careful setting up of the study encourages parents to consent for the first part of the study and follow-up studies in years to come.

Recent publications report that adults born moderately very early have almost double the risk of death from cardiovascular diseases compared to adults born at term. The area of long-term cardiac health in pre-term infants is a current hot topic with several lines of investigation assessing cardiac risk in young adults born pre-term. This study has the potential to contribute substantially to understanding how pre-term birth leads to poorer heart health: less well grown blood vessels in the outer layer of the kidneys could be the key step to development of high blood pressure and subsequent cardiovascular disease.

3D bioprinted heart 'replacement parts'

Project Title:
Developing 3D bioprinted personalised 'replacement parts' for heart attack patients.

Lead Researchers:
Dr Carmine Gentile

In a world first, Dr Carmine Gentile's team are studying how to 3D bioprint 'mini hearts' from patients-derived stem cells to study heart attacks in test tubes. By mimicking the conditions that the human heart is exposed to during a heart attack, researchers will be better able to see the effects on a patient's own heart tissue to potentially develop better, more personalised and targeted treatments and therapies. This could be life-changing particularly for patients that suffer from sudden heart attacks, one occurring every ten minutes in Australia.

Funding from Heart Research Australia enabled Dr Gentile to purchase a Panlab Organ Bath System to evaluate and test bioprinted cardiac patches. The heart tissue is tested to make sure that it contracts like a healthy heart and one day could be safely transplanted in patients. Heart tissue that contracts irregularly may lead to arrhythmia, a dangerous and deadly complication for the patient. Current data analysis shows that the bioprinted cardiac patches improved heart function in mice with a heart attack. The amount of blood pumped from the heart with each beat seems to have increased from around 40% - 60%. If confirmed, this would be a significant improvement and a very promising result.

"This research could be life-changing for patients who suffer from sudden heart attacks."

The team have also led a project which designed and prototyped a surgical instrument to transplant patches to the heart via a keyhole robot surgical approach. They recruited and supervised four multidisciplinary teams with twenty contributors in total and after two years have recently tested the prototype. This world first achievement is a completely new innovation, which has deviated from the original plan and could lead to a new tool for multiple applications. The full proof-of-concept manuscript detailing the world-first achievement is currently under review.

Dr Gentile's bioprinted heart tissues can also be used in a test tube to identify unpredicted side effects of medications on the heart of a patient. For instance, some chemotherapies can damage a heart in some cancer patients. In particular, doxorubicin, a drug used to treat lymphoma and leukemia in children and breast cancer in women, is responsible for damage to their heart even after 17 years following this treatment.

This would enable a patient to be able to see if a prescribed medication changes the way their personalised mini-heart contracts, enabling them to seek safer therapies if required.

Dr Carmine would like to thank Heart Research Australia's donors because without this support, the research would not have continued. The published papers are a direct result of donor funding, as well as the surprise outcome of inventing a new surgical instrument exemplifies how the importance of research as a first step to innovations that can keep families together for longer.

Research Projects

Unravelling the calcification – inflammation axis to predict the risk of heart disease

Lead Researchers:
Dr Belinda Di Bartolo

In Australia, one person suffers a heart attack every 10 mins. It is the biggest cause of premature cardiovascular death and a major driver in disability of those that survive. The biggest contributor to heart disease is atherosclerosis. This disease starts with cholesterol build up in the blood vessels and is maintained by inflammation. Over time, a patient's genetic background, presence of obesity, diabetes and high cholesterol contributes to the disease's progression and in some cases to a heart attack or stroke.

Dr Belinda Di Bartolo has been awarded a Heart Research Australia grant to research the two different risk factors in atherosclerosis – calcification and inflammation. Dr Di Bartolo is an early career researcher with a BMedSci (Hons) from the University of Sydney and has a PhD in Lipoprotein Biology. She has had 36 research articles published, with over 1500 citations and has won numerous awards.

She is looking to understand how the calcium gets into the blood vessel, how it affects the blood vessel and why, when combined with inflammation, is it so damaging.

By using advancements in new technology, she will investigate the structure of atherosclerotic plaque within the blood vessel, to identify the precise cell profile of the patient, then correlate this with what she can measure in the patient's blood – effectively taking a 'snapshot' of what is happening in patients with heart disease. This information will be used to predict the risk of having a heart attack and to tailor personalised treatment strategies – so that someday we can reduce the number of heart attacks happening in Australia and world wide.

Dr Bartolo's research will generate new knowledge of direct clinical relevance to the largest cause of death in our community. It will facilitate the discovery of a cell profile to be clinically applied to improve risk stratification and targeted preventative management. The findings will be extremely important in closing the significant clinical gap of defining early atherosclerotic disease, risk in the community and assist in improved personalised treatment strategies.

Dr Di Bartolo would like to thank Heart Research Australia donors for their generous support because the information to predict the risk of having a heart attack is so crucial and your support could help reduce the number of heart attacks in Australia.

Does mammary artery inflow improve graft potency in Coronary Artery Bypass (CABG)

Lead Researchers:
Dr Levi Bassin

Coronary artery disease represents an enormous burden of disease in the general population which has resulted in coronary artery bypass surgery evolving into one of the most commonly performed surgical procedures globally. However, because of its success, it remains largely unchanged from when it began 40 years ago.

This surgical procedure usually involves bypassing vessels on the surface of the heart, which have significant narrowing. By grafting new arteries or veins onto these blocked ones, a new blood flow is created to the heart to reduce the risk of heart attack, angina and improve survival rates.

The most commonly used grafts are the Internal Mammary Artery (or IMA), which can be found behind the chest wall, or in veins from the leg. While this procedure is effective and durable for complex coronary artery disease, there can still be a significant proportion of patients, up to 10%, whose grafts fail in the first year following the operation, meaning patients have to undergo further treatment.

Practicing cardiothoracic surgeon, Dr Levi Bassin, has received funding from Heart Research Australia for a project which essentially looks at ways to improve this life saving procedure. Dr Bassin and his team are undertaking a randomised study over the next 2 years, of over 140 patients who are undergoing coronary artery bypass surgery at Royal North Shore Hospital. They will compare how open their grafts are after 1, 5, and 10 years and if this correlates to whether the graft is placed off the aorta vs off an IMA. They will also be assessing the flow characteristics within the arteries at the time of surgery, by using transit time flow measurement (TTFM). This uses ultrasound technology to assess the blood flow and flow characteristics through a coronary artery bypass graft at the time of surgery. Dr Bassin's team are planning to gather this data and to follow these patients over the longer term to establish whether there were any signs at the time of surgery which would indicate future graft failure.

Dr Bassin and his team have developed an excellent foundation to conduct a robust and successful trial, including the production of two computer programs to extract and analyse the desired information. Even at this early stage, this degree of in-depth assessment of ultrasound output has never been done before. The trial hopes to change the way coronary bypass surgery is done in the future by reducing graft failure and therefore the need for subsequent therapy.

This trial will also have the added benefit of involving and attracting new, young academics to cardiothoracic surgery, improving their knowledge and helping them to be better surgeons.

Dr Bassin and his team would like to thank donors who have supported this study. Without you, this study could not be conducted. They are looking forward to having the first scan results back in twelve months.

Research Projects

Growing new arteries – an alternative for stent or bypass surgery

Project Title:
Growing new arteries – an alternative for stent or bypass surgery.

Lead Researchers:
Dr Usaid Allahwala

Coronary artery disease (CAD) affects 4.2 million people in Australia. Unfortunately, for up to 20% of these patients, stenting or bypass are not suitable procedures and there is currently no optimal treatment strategy for these patients. Dr Allahwala, Consultant Cardiologist at Royal North Shore Hospital, is seeking an alternative treatment strategy for this group of patients. Up to 10-15% of patients who have significant CAD are naturally able to grow new arteries, called collaterals, to supply blood and oxygen to the heart. The process in which some patients are able to form a natural "bypass" is unknown.

With assistance from the generous donations and funding from Heart Research Australia, Dr Allahwala and his team have been able to identify patient factors which promote the formation and function of these collaterals. By unlocking the mechanisms by which this occurs, they aim to identify novel and targeted treatments for patients with significant CAD who cannot be treated with conventional treatment options.

Dr Allahwala and his team have published sixteen articles in peer reviewed journals that explore the underlying process of collateral formation. The findings were presented at national and international meetings and resulted in collaborations with local and international experts to continue developing this important data.

Your support to assist in unlocking future treatments for the leading cause of death in Australia is truly amazing. With your support, Dr Allahwala and his team have begun to understand the process by which some people are able to grow new arteries, published their research in peer reviewed journals, presented the results at multiple national and international virtual meetings and begun collaborations with local and international experts to continue to unlock this important data. These important steps could not have been done without your support. Dr Allahwala is also currently working on exciting research looking at a possible link between obstructive sleep apnoea, snoring and developing of collaterals, which involves collaborating with researchers across Sydney.

Non-Nominal Deployment of the SAPIEN 3 Transcatheter Heart Valve: An Ex Vivo Bench Study

Project Title:

Non-Nominal Deployment of the SAPIEN 3 Transcatheter Heart Valve: An Ex Vivo Bench Study.

Lead Researchers:

Dr Kunwar Bhatia

Dr Peter Hansen

Aortic stenosis is the most common valvular heart disease in elderly Australians. Early diagnosis is essential because without treatment the two-year mortality rate approaches 50%. Unfortunately, it is difficult to diagnose aortic stenosis in patients that also experience heart failure and traditional diagnosis methods perform poorly.

Dr Bhatia and his team's study will make the diagnosis of severe aortic stenosis easier in patients with heart failure. Often, it is not possible to distinguish between true aortic stenosis and pseudostenosis in patients with heart failure. Pseudostenosis occurs when there is insufficient blood flow to completely push open the aortic valve. Clinicians must be able to accurately distinguish between true aortic stenosis and pseudostenosis because only patients with true aortic stenosis will benefit from an aortic valve replacement.

This study could improve patient management for those with aortic stenosis and heart failure, allowing more patients to receive the most appropriate treatment.

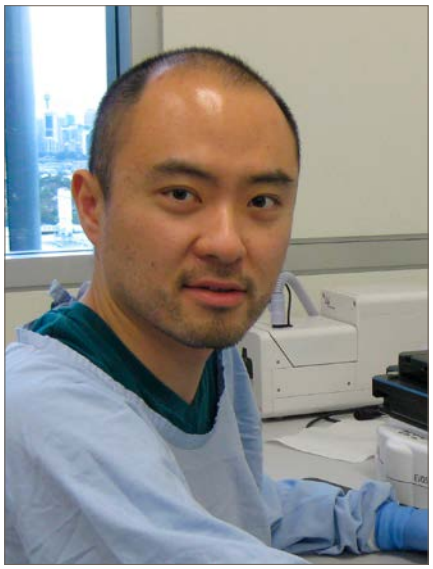
With funding from Heart Research Australia, a model of the aortic valve complex has been created with a state-of-the-art pulse generator, which mimics the contraction of the heart and movement of heart valves. The model measures the flow of blood with pressure sensors and record heart valve movement with high-speed cameras. Data obtained has already been gathered from the model and will help develop a new method to accurately distinguish between true aortic stenosis and pseudostenosis.

The multidisciplinary research team has collaborated throughout the challenges of the past year to complete the 3D modelling and presented their findings at the 2021 Australia & New Zealand Endovascular Therapies Meeting. They are pleased their findings will be published soon in the Heart, Lung and Circulation Journal.

Dr Bhatia and his team would like to extend their gratitude to the generous support of donors who make their ground-breaking research possible. Research is essential to make changes in clinical cardiology practice so that patients have the best care and outcomes possible. Thank you for supporting this research.

Research Projects

Owen Tang - Laboratory Manager for Professor Gemma Figtree



Dr Owen Tang, in his role as Postdoctoral Research Associate and Lab Manager, has significantly contributed to the progression of the diverse projects with Professor Figtree's research team. As well as offering mentorship and technical expertise to the entire research team, including co-supervision of 4 Honours students, Dr Tang has taken a leading role in the advancement of the metabolomics projects. Together with The BioHEART team, Dr Tang has contributed to the significant progress in the screening of the first 1000 patient samples using emerging technologies to identify new blood biomarkers spanning across the entire biology of a patient.

Currently, Dr Tang is working towards additional metabolomic studies to further capture the suite of metabolites characterising early coronary artery disease and expects to have the results available by early next year. Also, in collaboration with leading bioinformaticians Dr Tang has contributed to the design and implementation of novel approaches to downstream bioinformatic analyses of large-scale metabolomics studies, which has been published in Nature Communications (doi:10.21203/rs.3.rs-156243/v1). Dr Tang's research contribution has been critical for the achievement of the diverse project milestones. His work will directly contribute to the broad research goal of identifying new mechanisms and biomarkers of coronary artery disease and risk of heart attack through the integration of state-of-the-art "omics", bioinformatics, and imaging techniques in well-established and well-phenotype cohorts. A greater understanding of outcomes and mechanisms in CAD patients with minimal or no risk factors will be a world first and generate novel insights and improved strategies to promote optimal cardiovascular health and access to care for all Australians.

2. Australian Institute of Health and Welfare 2020. Coronary heart disease. Canberra: AIHW

Dr Elisha Hamilton - Laboratory Manager for Professor Helge Rasmussen

Dr Hamilton is responsible for all experimental work that is conducted within Professor Rasmussen's laboratory as well as providing a supervisory role to students within the lab. The main focus of the experimental work carried out at the moment is addressing how we might reduce damage to the heart caused by radiation treatment for breast cancer. Dr Hamilton's role as Laboratory Manager requires a balance of the scientific needs of the laboratory staff and students with the business needs of the lab. In addition to experimental work, her duties include the maintenance of laboratory equipment, procurement, data management, budgeting, training staff/students and liaising with collaborators. In addition, Dr Hamilton acts as the work health and safety representative for the laboratory group. As well, she prepares and submits funding applications, scientific manuscripts, and ethics applications.

If you or someone around you was suffering from a heart attack, would you know what it was? Would you know what to do? Visit heartresearch.com.au/heart-attack to learn the symptoms of a heart attack as well as a heart attack action plan.

PhD Scholarships funded by Heart Research Australia

Dr Chris Roche - Developing 3D bioprinted personalised 'replacement parts' for heart attack patients

Dr Chris Roche, a cardiac surgical trainee funded by HROz since 2019, brought surgical skills and insights to the team supervised by Dr Carmine Gentile – a bioprinting expert working towards producing heart patches made of special 'bio-ink'. Together, their project aims to regenerate parts of the heart that have died following a severe heart attack and help heart failure patients. The 'bio-ink' uses individualized stem cells taken from blood or skin samples, which are then converted to beating heart cells.

In the past year, the team has completed the data collection phase for the key final experiment of the PhD project – where they test patches on mouse hearts to show that the patches work in real life. They are currently analysing the data from this study and it looks like their patches have improved heart function in mice. The ejection fraction (amount of blood pumped from the heart with each beat, also called the LVEF) have increased from around 40% to 60% – these results once confirmed, would be a significant improvement and a very promising result.

Dr Chris Roche has also been working on a spin-off project to his PhD where he has designed and prototyped a surgical instrument to transplant patches to the heart via a keyhole robotic surgical approach. He recruited and supervised four multidisciplinary teams of over 20 contributors in total and after two years he recently tested the prototype for this. This world first achievement is a completely new innovation which was not actually part of his original PhD plan but is an example of how when you start out on a pathway in research, you never know quite what it will lead to. Dr Roche's new surgical approach and his new surgical operation are currently under review for publication and he plans to release all the data freely without patenting his invention to maximise the chance that it will progress to patient use.

Dr Carmine Gentile and Dr Chris Roche will be presenting at the surgical instrument invention association at the Biofabrication 2021 conference.

Indigenous Australians had ***cardiovascular disease hospitalisation and death rates*** *that were over* ***50% higher*** *than non-indigenous Australians*[4]

4. *Cardiovascular disease – heart, stroke, and vascular diseases Last updated 1/12/2020 v16.0 © Australian Institute of Health and Welfare 2021*

Dr Di Wu (Woody) - Halting free radicals which alter the sodium pump and can lead to heart failure

Dr Di Wu is on a pathway to fulfilling his dream of combining research with clinical practice. His passion and focus is to help discover cures for people with heart failure.

Working with Professor Gemma Figtree and Dr Kirsten Bubb, Dr Wu has begun working on investigating a novel pathway that involves free radicals which cause damage to the heart – and results in the enlargement and scarring of the heart. Dr Wu aims to discover whether this pathway can be targeted with new medicines in order to develop new and better treatments for heart failure.

Free radicals produced as a by-product of oxygen are essential to physiological metabolism but will cause disease when the production of free radicals becomes uncontrollable, which is a common problem in heart failure patients.

Dr Wu uses the aortic banding procedure, a disease model that mimics pressure-loaded left ventricular remodelling which is the pathological feature of enlarged and scarred hearts. Already, he has successfully performed the aortic banding model and has developed a novel genetically modified mouse which is protected from free radicals.

Keeping Hearts Beating

The Heart Health Club

Receiving the overwhelming news you have a heart condition, have had a heart attack, require surgery, or having a loved one go through this can be a very lonely and isolating time. On returning home from hospital or a doctors surgery or even knowing you have a family history with heart disease can leave you with a lot of questions about your condition, any potential lifestyle changes or even how you can best minimise any potential modifiable risk factors.
Heart Research Australia's Heart Health Club helps provide support to those directly or indirectly affected by heart disease and may be searching for information and support or connection.
Heart Health Club Members receive access to exclusive offers and information, including:

- Mental Wellbeing guidance and strategies to implement in your heart health journey
- Exclusive free webinars with our cardiologists and other health experts
- Exercise tips and programmes from Accredited Exercise Physiologists
- Heart Healthy Recipes
- Quarterly E-Newletters with lots of content, tips and advice from Cardiologists, as well as the latest updates from our Researchers
- Access to our private Facebook community to connect with others going through a similar experience.

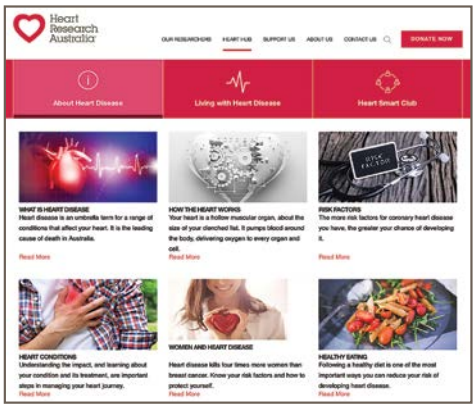
You can join our FREE Heart Health Club here www.heartresearch.com.au/heart-health-club/

Connecting with others in a similar situation can be helpful to manage any strong emotions you may be feeling or questions you may have. Heart Health Club members can access our private Facebook community where heart patients and their carers can share support and advice.
www.facebook.com/groups/hearthealthclub

The Heart Hub

The Heart Hub, featured on our website, provides easy to understand information about heart disease, risk factors and the different types of treatments, conditions and procedures available for those affected by heart disease. There are also personal stories to read about patient experiences with heart disease. Make sure you are signed up to our Heart Health Club for all the latest information in heart health.

Visit ***heartresearch.com.au/heart-hub*** for more info.



Heart Smart pocket guide

This year 6,426 Heart Smart Pocket Guides were distributed to our community.

The handy guide, designed to be pocket size, provides information on the common symptoms and risk factors of a heart attack, as well as a heart attack action plan.

Sadly, heart attacks inflict grief on many loved ones simply because they were unaware of the signs and symptoms. Beyond the traditional chest pain, other warning signs include heartburn, pain in the back jaw and arm, difficulty breathing and extreme fatigue or weakness. The guide can help people be aware of heart attack symptoms and encourage them to seek help as soon as possible in order to prevent long term permanent damage done to the heart muscle.

No family should experience the tragedy of losing a loved one unexpectedly and we hope the pocket guide could play a small role in preventing such grief.

To order your free guide visit heartresearch.com.au/free-pocket-guide

LIKE us!

Want to see all the latest updates from our researchers, events and heart health tips? Make sure you like and follow our Facebook page to keep your heart health top of mind. We are also on Instagram, LinkedIn and Twitter.

Matters of the heart cardiac series

The Heart Research Australia team have produced a series of videos to provide cardiac patients, their families and the wider community with information that may help them or prepare them for their experience with heart disease. Topics include: About Angiography, What is a Heart Attack? and The Important of Cardiac Rehabilitation.

Understanding the impact, and learning about your condition and its treatment, can be helpful in coming to terms with a heart disease diagnosis and any procedures that may be recommended.

The videos are available on our website and offered for use in doctor rooms and hospital TV channels.

To view our Matters of the Heart Cardiac series, ***heartresearch.com.au/video***

Financials

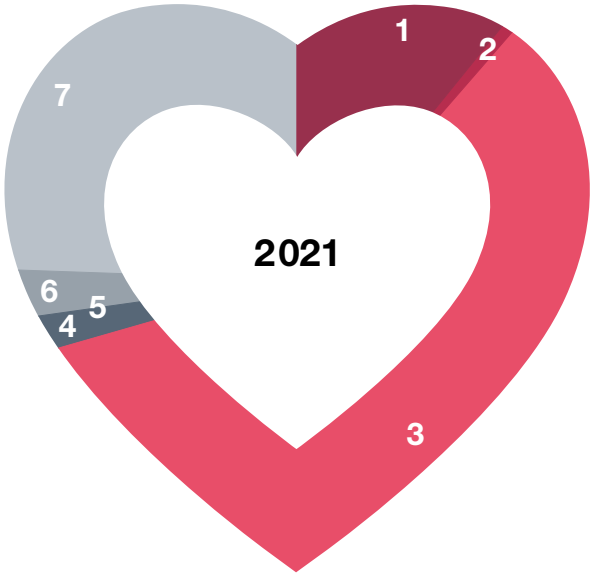
Heart Research Australia supports a centre of excellence that attracts world-class and emerging researchers to conduct ground breaking research into the prevention, diagnosis and treatment of heart disease.

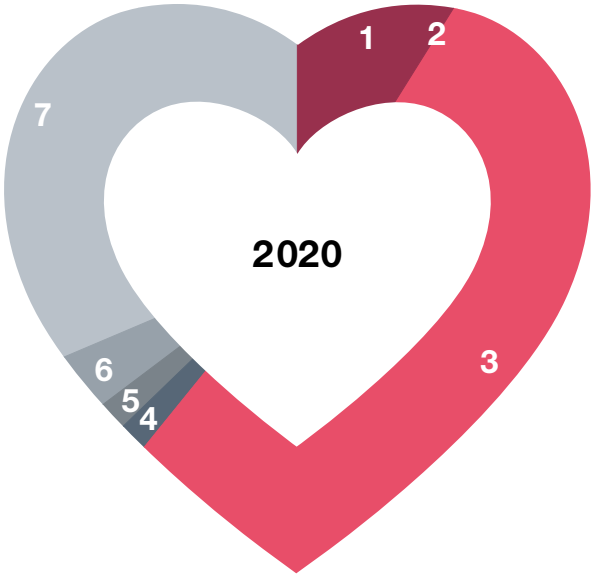
We are extremely proud of the contribution to research of over $32.6M we have made over the past 32 years towards combating Australia's leading killer and creating more heart survivors.

In an increasingly competitive environment to obtain research funding there is a greater need for Heart Research Australia to increase the amount of funds available for research. To enable this, we continue to invest some of the income received to acquire new donors and increase funds available for research. In FY18 the board approved a 5-year plan to invest 15% of current income to the acquisition of regular donors. At the end of year 2 the plan provided additional income of $301k. It is essential to invest in acquisition to ensure the long-term viability of the organization.

None of our achievements would be possible without the continuing generosity of our supporters, backed by the hard work of our community fundraisers, corporate supporters and Trust and Foundations.

How you have helped us over the part two years - Income





2021			*2020*
10.99%	1	Appeals	9.06%
0.66%	2	Raffles	0.25%
59.00%	3	Bequests	51.66%
2.14%	4	Corporate	1.98%
0.00%	5	Corporate in kind	2.06%
3.01%	6	Community	3.80%
24.19%	7	Other donations (Includes Merchandise)	31.20%

Income	2021	2020
Fundraising activities	2,446,701	2,816,139
Appeals	268,885	255,243
Raffles	16,183	7,040
Bequests	1,443,631	1,454,720
Corporate	52,432	55,758
Corporate In Kind	--	57,875
Community	73,616	106,978
Other Donations	591,954	878,525
Non-operative activities	352,300	203,418
Total income	**2,799,001**	**3,019,557**

Expenses	2021	2020
Employee costs	716,547	687,524
Fundraising	401,472	458,444
Administration	128,344	317,784
Provision for Doubtful Debt	0	(425,000)
Corporate In Kind	--	57,875
Research support	770,036	960,479
Total expenses	**2,016,399**	**2,057,106**
Net surplus/(deficit)	**782,602**	**962,451**

Assets and Liabilities	2021	2020
Cash and cash equivalents	3,394,677	1,878,099
Trade and other receivables	70,663	668,387
Financial investments	729,619	630,889
Plant and equipment	14,466	13,191
Intangibles	10,003	11,285
Inventory for distribution	27,953	29,425
Total assets	**4,247,381**	**3,231,276**
Trade and other payables	815,799	593,298
Provisions	60,602	49,599
Total liabilities	**876,401**	**642,897**
Net Assets	**3,370,980**	**2,588,379**

Our Governance

Heart Research Australia is a company limited by guarantee. We are registered with the Australian Charities and Not-for-profits Commission (ACNC) and are authorised to fundraise in most Australian States and Territories. Heart Research Australia is approved by the Australian Tax Office as a health promotion charity and a deductible gift recipient.

Heart Research Australia is an organisational member of the Fundraising Institute Australia (FIA) and abides by the FIA's Principles and Standards of Fundraising Practice.

BOARD OF DIRECTORS

Heart Research Australia is governed by a Board of Directors. Members include cardiologists, academics, researchers and business leaders.

CHAIR

Anthony Crawford

BA, LLB, FAICD

Retired Solicitor

Company Director

VICE CHAIR:

Chair, Scientific Advisory Committee

Professor Ravinay Bhindi

MBBS (USyd), MSc (Oxon), PhD (USyd), FRACP, FCSANZ, FESC

Professor, University of Sydney

Head, Department of Cardiology, Royal North Shore Hospital

Consultant and Interventional Cardiologist

VICE CHAIR:

Chair of the Finance, Audit & Risk Committee

Michael Lawrence

BEc, SF Fin, MAICD,

Harvard Executive Program

CEO, Customer Owned Banking Association

HONORARY MEDICAL DIRECTOR

Dr Rebecca Kozor

BSc (Med) MBBS PhD FRACP FCSANZ

Cardiologist,
Royal North Shore Hospital & North Shore Private Hospital

Senior Lecturer,
Faculty of Medicine & Health, University of Sydney

Co-director, University of Sydney Cardiovascular Magnetic Resonance Group

DIRECTORS*

Charlie Frew OAM

MPH/MIPH(UNSW

Managing Director, CodeClean Australia/New Zealand

** to November 2020*

Professor Levon Khachigian

BSc (Hons1), PhD, DSc (UNSW), MIP (Law) (UTS)

NHMRC Senior Principal Research Fellow

Professor in Medicine, UNSW

Head, Vascular Biology and Translational Research, School of Medical Sciences, UNSW Medicine

Dominic May

MMgmt, JP, MAICD

Corporate Services Manager & Executive Member, North Shore Private Hospital (retired Mar 21)

Governance review

The Board Charter, adopted in September 2016, commits the Board to **"excellence in governance"**. To this end, a program of periodic review has been established to ensure all aspects of the Foundation's activities are consistent with best practice for the sector.

Associate Professor Gregory Nelson
MBBS, FRACP, FCSANZ
Consultant Cardiologist
** to November 2020*

Brigid K. Shute
Grad Dip. ProfMktg
Director, PolarMermaid Pty Ltd

Anthony Thirlwell OAM
FAICD, BSC(Hons), MBA
Previously CEO National Heart Foundation of Australia (NSW)

Dr Michael Ward
MBBS (Hons), FRACP, PhD, DDU, FCSANZ
Consultant & Interventional Cardiologist
** to November 2020*

COMMITTEES OF THE BOARD

The primary responsibility of the **finance, audit and risk committee (FAC)** is to oversee the Foundation's financial management, corporate governance and compliance with statutory requirements to ensure the Foundation's long-term viability. Its duties include monitoring the performance of the Foundation's investment portfolio and oversight of the annual audit process.

The FAC also monitors the risk profile of the organisation and advises the Board on matters relating to the key risk areas of Revenue, Expenses, Research and Administration.

CHAIR

Michael Lawrence

MEMBERS

Tony Crawford

Prof Ravi Bhindi (from Nov.'20)

Dominic May

A/Prof Greg Nelson (to Nov.'20)

Brigid Shute

The research advisory committee (RAC) reviews applications made to the Foundation for financial support, monitors the research activities funded by the Foundation and makes recommendations and delivers reports to the Board of Directors on matters relating to the research objectives of the Foundation. Members of the RAC are all highly qualified researchers and practitioners.

CHAIR

Dr Michael Ward

MEMBERS

Prof Ravi Bhindi,
Prof Levon Khachigian
Dr Rebecca Kozor

EXTERNAL MEMBER

Professor Carolyn Sue
AM, MBBS, PhD, FRACP, FAHMS
Executive Director, Kolling Institute, Royal North Shore Hospital, Northern Sydney Local Health District

The primary role of the **Scientific Advisory Committee (SAC)** is to advise the Board on future directions in research and the resources required to support future research initiatives.

CHAIR

Prof Ravi Bhindi

MEMBERS

Prof Gemma Figtree
Prof Levon Khachigian
Brigid Shute
Tony Thirlwell
Dr Michael Ward

Honours Board

Heart Research Australia supports world-class and emerging researchers to conduct groundbreaking research into the prevention, diagnosis and treatment of heart disease.

By supporting 'seed' funding, we allow our researchers to turn their innovative, 'out of the notebook' ideas into reality. This type of first stage research does not qualify for government funding, so we rely on the community to help make the investigation of such ideas possible.

We would like to recognise the incredible generosity of the following individuals and organisations who have contributed significantly to help these major breakthroughs happen and save lives. We are so truly grateful for your wonderful support. Thank you.

Significant benefactors $50,000 and over

Chris & Julia Vonwiller

Significant benefactors $10,000 and over

Anonymous (1)
Ian & Helen Bersten
National Club
Richard Small

Significant benefactors $5,000 and over

Jeffrey Anderson
Lyn Shaddock
Mary Glendinning
Moreton Rolfe
Sam Miller
Tony & Jane McCormick

Significant benefactors $1,000 - $5,000

Anonymous (9)
Alfred Myers
Allice Oppen OAM
Allan & Lori Farrar
Anthea Duncan
Barry Duncan
Bernard & Shirley Maybloom
Beverley Large
Brian Martin
Bruce Walker
Sandy & Charlie Shuetrim AM
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John Campbell
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Lorraine Todman
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Stephen North
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Thomas & Robyn Pinzone
Wendy Trevor-Jones
William Oxby

Trusts and Foundations

Lady Proud Foundation
Lin Huddleston Charitable Foundation
Skipper Jacobs Charitable Trust
Stening Charitable Trust
Wiggs Foundation
Wood Family Foundation

Estate of the late

Betty Madge Humphery
George and Mary Thompson
Janette Elizabeth Hamilton
Margaret Watson
Wendy Noela McCormick

Community Organisations and Ambassadors

AFL South Coast
Australian Rugby Union (ARU)
Anna & Alessandro Pavoni from Ormeggio
Chris Russell AM
Community Heart Health Care
Red & White Committee:
Lori Farrar
Lynne Ravenhall
Fiona Taylor
Jenny Carr
Lynn Varvel
Jenny Goldring
Con Dedes from the Dedes Group
Northern Suburbs Rugby Club
Matt Shields
Cathy Licuanan
Brooke Williams

Corporate supporters

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